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Data On Particles And Resonant States*

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Data on the properties of leptons, mesons, and baryons are listed, referenced, averaged, and summarized in tables and wallet cards. This is an updating of the Reviews of Modern Physics article of January 1967.

This data summary is an updating of that of January 1967.[1] An intermediate version was distributed at the Heidelberg International Conference on High Energy Physics held in September 1967.

Only small changes have been made in our procedures and in the tables printed here. We hope that we have saved the reader some time by discussing here only the changes, and referring him to the 1967 text[1] if he should want more details.

We want to reiterate our standing requests:

(1) Please continue to inform us of mistakes and omissions.

(2) We reemphasize that it is inappropriate to make reference to this compilation instead of to the original work; we provide the references, please use them.

TABLES, WALLET SHEETS, BOOKLETS

The three summary tables—one each for Stable Particles, Mesons, and Baryons—are printed once in this text, and are repeated at the back of the article, where they are printed on perforated durable rag paper that seems to survive being carried around, folded, in a wallet for six months. We also provide a very compact summary wallet card for those who feel that the paper sheets are too cumbersome.

In addition, in response to a September 1967 poll, we will soon provide the wallet sheet tables in the form of an insert in an appointment book. For information on how to request any of these tables, see the end of this text, right after the Acknowledgments.

* Work done under the auspices of the U.S. Atomic Energy Commission.

[1] A. H. Rosenfeld, A. Barbaro-Galtieri, W. J. Podolsky, L. R. Price, Paul Söding, C. G. Wohl, M. Roos, and W. J. Willis, Rev. Mod. Phys. 39, 1 (1967).

NOTES ON THE TABLES

The notation used in the tables is unchanged since the January 1967 edition.

NOTES ON TABLE S

We are expanding this table to include additional parameters of interest.

Rates. For K decays we are now tabulating partial decay rates in addition to branching ratios. In order to compare the experimental data with theoretical predictions, it is necessary to know the rates and errors coming from an overall fit which takes into account the correlations between the various measured quantities. Our programs provide such fitted quantities.

CP violation in K^0 decays. Parameters of current interest are

$$\eta_{+-}=\frac{A(K_L\rightarrow\pi^+\pi^-)}{A(K_S\rightarrow\pi^+\pi^-)}=|\eta_\pm|\exp(i\phi_{+-}),$$

$$\eta_{00}=\frac{A(K_L\rightarrow\pi^0\pi^0)}{A(K_S\rightarrow\pi^0\pi^0)}=|\eta_{00}|\exp(i\phi_{00}).$$

The phases ϕ_{+-} and ϕ_{00} have been measured directly, whereas the magnitudes $|\eta_{+-}|$ and $|\eta_{00}|$ are derived parameters. We have used, as far as we could, the directly measured quantities as input, and have calculated $|\eta_{+-}|$ and $|\eta_{00}|$ from the values given by our constrained fits. Therefore, if one looks at the data card listings, the $|\eta|$ do not appear as such, but in the form of branching ratios, with appropriate comments.

$\Delta S=\Delta Q$ rule in K^0 decays. The validity of this rule is measured by the parameter x defined as

$$x=[A(\bar{K}^0\rightarrow\pi^-l^+\nu)/A(K^0\rightarrow\pi^-l^+\nu)].$$

We list Re x and Im x.

Form factors in K leptonic decays. Assuming that only the vector current contributes to these decays, we write the matrix element as

$$\langle \pi \mid J_\lambda \mid K \rangle \propto [f_+(q^2)(P_K+P_\pi)_\lambda + f_-(q^2)(P_K-P_\pi)_\lambda],$$

where P_K and P_π are the four-momenta of K and π mesons; f_+ and f_- are dimensionless form factors which can depend only on $q^2=(P_K-P_\pi)^2$, the square of the momentum transfer to the leptons. The parameters we are listing are

λ_+: the energy dependence of the $f_+(q^2)$ form factor,

$$f_+(q^2)=f_+(0)[1+\lambda_+(q/m_\pi)^2];$$

ξ: the ratio of the two form factors,

$$\xi = f_-/f_+.$$

The quantity ξ can be determined in two ways

(A) by measuring the $K_{\mu 3}/K_{e3}$ branching ratio and lepton (or π^0) momentum spectra, and

(B) by measuring the muon polarization in $K_{\mu 3}$ decays.

The values of ξ obtained with these two methods do not seem to be in agreement at present, for reasons not yet understood. We therefore call them ξ_A and ξ_B and list them separately.

A/V ratio for baryon leptonic decays. The baryon part of the matrix element for these decays may be written as

$$\langle B_f \mid \gamma_\lambda(g_V - g_A\gamma_5) \mid B_i \rangle,$$

where B_i and B_f represent initial and final baryons, and g_A and g_V the axial and vector coupling constants. We compile the ratio g_A/g_V for those decays for which it has been measured.

Appendices. Appendix I compares the predictions of postulated selection rules with the present experimental situation in the field of weak interactions.

NOTES ON THE MESON TABLE

Since the January 1967 edition, three major changes have been made in the Meson Table. (i) The situation of nonstrange mesons with mass >1600 MeV has become badly entangled. We have collected all available reports on these in the data listings and in a sketch attached to the meson table. However, the meson table itself includes only those resonances whose existence and quantum numbers seem better established. (ii) From the $I=\frac{1}{2}$ $K\pi\pi$ states between 1100 and 1300 MeV, two new possible resonances begin to emerge. The general status is still confused; we illustrate it with another sketch. (iii) A 2.5 standard-deviation indication of $H(990)$ production in $K^-n\rightarrow\Sigma^-3\pi$, compatible only with $I=0$, suggests that H is indeed different from the thusfar unobserved neutral $A1$; we include it in the table as a possible resonant state.

NOTES ON THE BARYON TABLE

The greatest change in the state of baryon resonances has come from phase-shift analyses of πN scattering data. To the ten old and (with one or two exceptions) well-established N^*'s having $M<2300$ MeV, there have now been added nine new candidates. Almost all the old resonances have $\Gamma_{el}/\Gamma_{tot}>30\%$; almost all the new ones have $\Gamma_{el}/\Gamma_{tot}<30\%$. None of the new candidates is completely established, and most have been excluded from the summary table. The reader should see the listings for further information on them.

The many pages of listings of data cards may give the impression that the process of obtaining numerical values for the summary tables is systematic and relatively unique. This is definitely not the case for the baryon resonances. Most determinations of resonance parameters are model-dependent, and the values which have been published are usually not accompanied by meaningful statistical uncertainties.

The phase-shift analyses mentioned above provide an excellent example. Almost all nonobsolete information on the N^*'s between the $\Delta(1236)$ and the $N(2190)$ comes from analyses by groups at Saclay, CERN, and LRL (Berkeley). In the first place, while the analyses are in reasonably good qualitative agreement, there are some quantitative differences. In the second place, there is no generally agreed upon way to read the resonance parameters from the sinuous Argand diagrams. Saclay uses two methods for obtaining the resonant energy. They define the resonant energy to be (i) where the partial-wave total cross section is maximal, or (ii) where the amplitude has greatest velocity across the plot. CERN uses a third method: where the absorption is greatest. As the background in the resonant amplitudes is often large, the three methods in general give three different results. In addition, it is difficult to assign meaningful statistical uncertainties to the results, so that even when the three methods are nearly equivalent, it is not apparent how to combine results from different groups.

What choice is made in cases such as these is largely arbitrary, and is indicated in the listings. These also contain a few figures and tables to make comparison among different analyses easier.

PROCEDURES FOR TREATING THE DATA

Our procedures are unchanged since the January, 1967 edition, with the following addition.

Fluctuations in Average Values Since Last Edition

It sometimes happens that the average (or fitted) value for a particular measured quantity changes by more than one standard deviation between one edition of these tables and the next. We have tried to bring these fluctuating parameters to the attention of the reader by printing them in italics in the Tables. A note is also included in the listings for each, explaining what has caused the value to shift by a large amount since the last edition. The most common reason for this kind of fluctuation is that physicists often report a value and error for a parameter in a conference report or preprint, and then *enlarge* the error by the time the experiment is published in a journal. This has the effect that when we include the preliminary result in our average, the central value shifts sharply towards this new measurement and the error shrinks. Later, when more reasonable errors are published for the experiment in question, the averaged value will again return close to the old number, which is often a shift of more than one shrunken standard deviation. We are attempting to avoid this in the future by not averaging in data from conference reports or preprints *unless* the authors specifically write us that the errors they have quoted are not likely to be enlarged before the paper is published in its final form.

NOTES ON THE DATA CARDS: NOTE A

Apart from one addition to the listings, mentioned below as Note A, the procedures are unchanged.

Note A. For each quantity that has been measured by more than one experiment, we have added a card to the data listings, giving the average value and scaled error for that quantity. In addition, if a constrained fit has been made, we have added a card giving the constrained result.

We illustrate with an example: Assume a particular particle has only three decay modes, P_1, P_2, and P_3 $(\Sigma P_i = 1)$. Now suppose that three independent branching ratios $R_1 = P_1/P_2$, $R_2 = P_1/(P_1+P_2)$, $R_3 = \cdots$, have been measured (the problem is then overconstrained). From these data our fitting program, AHR, calculates two types of results:

1. P_i^{fitted} with errors (which have always appeared on the tables),
2. R_i^{fitted} with errors (which now appear in the listings, since there is no place for them in the tables).

We also give the straight, unfitted average for each R_i.

EXPLANATIONS OF SYMBOLS USED ON DATA CARDS

The following abbreviations have been used.

1. *Measurement Technique* (TECH)

CC	Cloud chamber
CNTR	Counters, electronics
EMUL	Emulsions
HBC	Hydrogen bubble chambers
HEBC	Helium bubble chambers
DBC	Deuterium bubble chambers
PBC	Propane bubble chambers
XBC	Heavy liquid bubble chambers
SPRK	Spark chambers
MMS	Missing mass spectrometer
RVUE	Review of previous experimental data

2. *Journals*

ADVP	Advances in Physics
ANP	Annals of Physics
ARNS	Annual Reviews of Nuclear Science
BAPS	Bulletin of the American Physical Society
JETP	English Translation of Soviet Physics JETP
NC	Nuovo Cimento
NP	Nuclear Physics
PL	Physics Letters

PPSL	Proceedings of the Physical Society of London
PR	Physical Review
PRL	Physical Review Letters
PRSL	Proceedings of the Royal Society of London
RMP	Reviews of Modern Physics
ZPHY	Zeitschrift für Physik

The following abbreviations refer to proceedings of Conferences.

AIX	International Conference on Elementary Particles, Aix-en-Provence, 1961
ARGONNE	International Conference on Weak Interactions, Argonne National Laboratory, 1965
ATHENS	Athens Topical Conference on Recently Discovered Resonant Particles, Ohio University, 1963
BALATON	Symposium on Weak Interactions, Balatonvilagos, Hungary, 1966
BERKELEY	International Conference on High Energy Physics, 1966
BNL	International Conference on Fundamental Aspects of Weak Interactions, Brookhaven National Laboratory, 1963
BOULDER	Symposium on Strong Interactions 1965
CERN	International Conference on High Energy Physics, 1958 and 1962
CORAL GABLES	Conference on Symmetry Principles at High Energy, 1964 and 1965
DESY	Internation Symposium on Electron and Photon Interactions at High Energies, Hamburg, 1965
DUBNA	International Conference on High Energy Physics, 1964
KIEV	Ninth Annual International Conference on High Energy Physics, 1959
OXFORD	International Conference on Elementary Particles, 1965
ROCH	Fifth (Sixth, Seventh) Annual Rochester Conference on High Energy Nuclear Physics 1955 (1956, 1957). Annual International Conference on High Energy Physics, Rochester, 1960.
SIENA	International Conference on Nucleon Structure, 1963.

Finally,

BNL	Brookhaven National Laboratory
CU	Columbia University, includes Nevis Reports
NYO	New York Operations Office, AEC
UCRL	Lawrence Radiation Laboratory (University of California)
etc.	refer to unpublished reports of the Author's Institution.

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We thank Professor George Trilling for helpful discussions on the selection and treatment of the data on K meson decays. W. J. Podolsky has volunteered valuable help both with the meson data and the data processing; Alan Rittenberg has provided some improved output routines; finally, many physicists have given us helpful suggestions and comments on their data.

EXTRA COPIES OF THE TABLES AND BOOKLET

Copies of the wallet sheets and cards are available from the libraries of the major national laboratories, or may be requested from Scientific Information Service, CERN, or from Technical Information Division, LRL, Berkeley. In order to save on postage, please address European requests to CERN.

The inserts for appointment books will be little 32-page booklets, 3×5 in., (7.5×12.5 cm), available from CERN or LRL. We can also supply inexpensive appointment-address books of the same size. Please state whether you want only the insert, or both.

Table S: STABLE PARTICLES. January, 1968.

A. H. Rosenfeld, N. Barash-Schmidt, A. Barbaro-Galtieri, L. R. Price, Matts Roos, Paul Söding, W. J. Willis, C. G. Wohl

Quantities in italics have changed by more than one standard deviation since January, 1967.

Particle	$I^G(J^P)C$	Mass (MeV)	Mass difference (MeV)	Mean life (sec) cτ(cm)	Mass² (GeV)²	Decays: Partial mode	Decays: Fraction	Q(MeV)	p or p_{max} ‡ (MeV/c)	Partial Rates (sec^{-1})
γ	$0,1(1^-)^-$	0		stable	0	stable				
ν (ν_e, ν_μ)	J = ½	0(<0.2 keV) 0(<2.1 MeV)		stable	0	stable				
e	J = ½	0.511006 ±.000002		stable ($>2\times10^{21}$y)	0.000	stable	μ_e = 1.001159596 ±.000000023 $e\hbar/2m_ec$			
μ	J = ½	105.659 ±.002	−33.920 ±.014 (μ − π±)	2.1983×10^{-6}	0.011	$e\nu\bar{\nu}$	100	105	53	
				±.0008		eγγ	(<1.6)10^{-5}	105	53	
				cτ = 6.592×10^{4}		3e	(<1.3)10^{-7}	104	53	
	μ_μ = 1.0011666 ±.0000005 $e\hbar/2m_\mu c$					eγ	(<6)10^{-9}	105	53	
π±	$1(0^-)$	139.579 ±.014	4.6041 ±.0037 (π± − π⁰)	2.604×10^{-8}	0.019	μν	100 %	34	30	
				±.007, S=2.3*		eν	(1.24±0.03)10^{-4}	139	70	
				cτ = 781		μνγ	(1.24±0.25)10^{-4}	34	30	
				$(\tau^+-\tau^-)/\bar{\tau}$=(.4±.2)%		$\pi^0e\nu$	(1.03±0.07)10^{-8}	4	5	
				(test of CPT)		eνγ	(3.0 ±0.5)10^{-8}	139	70	
π⁰	$1^-(0^-)^+$	134.975 ±.014		d 0.89×10^{-16}	0.018	γγ	(98.83±0.04)%	135	67	
				±.18, S=1.6*		γe^+e^-	(1.17±0.04)%	134	67	
				cτ = 2.67×10^{-6}		γγγ	(< 5)10^{-6}	135	67	
						$e^+e^-e^+e^-$	b(3.47)10^{-5}	133	67	
K±	$\frac{1}{2}(0^-)$	493.83 ±0.11	−3.93 ±0.17 (K± − K⁰)	1.235×10^{-8}	0.244	μν	c(63.58±0.29)%	388	236	c(51.49 ±0.27)10^6 S=1.1*
				±.005 S=2.1*		$\pi\pi^0$	(20.94±0.28)% S=1.1*	219	205	(6.96 ±0.23)10^6
				cτ = 370		$\pi\pi^-\pi^+$	(5.57±0.04)%	75	126	(4.51 ±0.03)10^6
				$(\tau^+-\tau^-)/\bar{\tau}$=(.09±.12)%		$\pi\pi^0\pi^0$	(1.70±0.05)%	84	133	(1.38 ±0.04)10^6
				(test of CPT)		$\mu\pi^0\nu$	(3.38±0.17)% S=1.6*	253	215	(2.74 ±0.14)10^6 S=1.6*
				S=1.3*		$e\pi^0\nu$	(4.83±0.12)% S=1.4*	358	229	(3.91 ±0.10)10^6 S=1.4*
						$\pi\pi^{\mp}e^{\pm}\nu$	(3.8 ±0.8)10^{-5}	214	204	
						$\pi\pi^{\pm}e^{\mp}\nu$	(<2)10^{-6}	214	204	
						$\pi\pi^{\mp}\mu^{\pm}\nu$	(≤1.4)10^{-5}	109	151	
						$\pi\pi^{\pm}\mu^{\mp}\nu$	(<3)10^{-6}	109	151	
						eν	(1.24±0.40)10^{-5}	493	247	
						$\pi\pi^0\gamma$	(2.2 ±0.7)10^{-4}	219	205	
						$\pi\pi^+\pi^-\gamma$	(10 ±4)10^{-5}	75	126	
						πeνγ	(6 ±4)10^{-4}	354	227	
						πe^+e^-	(<1.1)10^{-6}	353	227	
						$\pi\mu^+\mu^-$	(<2.4)10^{-6}	143	172	
						πγγ	(<1.1)10^{-4}	354	227	
K⁰	$\frac{1}{2}(0^-)$	497.75 ±0.18		50% K_{short}, 50% K_{long}						
K^0_S	$\frac{1}{2}(0^-)$		−0.48×$1/\tau_S$ ±0.02 (K_L − K_S)	0.874×10^{-10}	0.248	$\pi^+\pi^-$	(68.4 ±1.0)%	219	206	(0.783±0.015)10^{10}
				±.011 S=1.3*		$\pi^0\pi^0$	(31.6 ±1.0)%	228	209	(0.362±0.012)10^{10}
				cτ = 2.61						
K^0_L	$\frac{1}{2}(0^-)$			5.30×10^{-8}	0.248	$\pi^0\pi^0\pi^0$	c(25.5 ±1.9)%	93	139	c(4.81 ±0.41)10^6
				±.13		$\pi^+\pi^-\pi^0$	(*12.1 ± 0.4*)%	84	133	(2.29 ±0.09)10^6
				cτ = 1593		πμν	(27.3 ±1.3)%	253	216	(5.15 ±0.26)10^6
						πeν	(*35.1 ±1.4*)%	358	229	(6.62 ±0.29)10^6
						$\pi^+\pi^-$	(0.149±0.006)%	219	206	(0.028±0.001)10^6
						d) $\pi^0\pi^0$	still uncertain	228	209	
						$\pi^+\pi^-\gamma$	(< 0.3)%	219	206	
						d) γγ	still uncertain	498	249	
						eμ	(< 0.8)10^{-5}	392	238	
						$\mu^+\mu^-$	(< 1.5)10^{-6}	287	225	
						e^+e^-	(< 1.7)10^{-5}	497	249	
η	$0^+(0^-)^+$	548.8 ±0.6		Γ=(2.3±0.5)keV	Neutral decays 71.0%	γγ	(*42 → 34*)% (d)	549	274	
						$\pi^0\gamma\gamma$	(*1 → 19*)% (d)	414	258	
						$3\pi^0$	(*28 → 18*)% (d)	144	179	
					Charged decays 29.0%	$\pi^+\pi^-\pi^0$	(*23.4 ± 1.1*)%	135	174	
						$\pi^+\pi^-\gamma$	(5.5 ±0.5)%	269	236	
						$\pi^0e^+e^-$	(< 0.04)%	413	258	
						$\pi^+\pi^-e^+e^-$	(0.1 ±0.1)%	268	236	
p	$\frac{1}{2}(\frac{1}{2}^+)$	938.256 ±0.005	−1.2933 ±.0001 (p − n)	stable ($>6\times10^{27}$y)	0.880					
n	$\frac{1}{2}(\frac{1}{2}^+)$	939.550 ±0.005		$(1.01\pm0.03)10^3$	0.882	$pe^-\nu$	100 %	1	1	
				cτ = 3.03×10^{13}						
Λ	$0(\frac{1}{2}^+)$	1115.50 ±0.08		2.52×10^{-10}	1.245	$p\pi^-$	(65.3 ±1.2)%	38	100	
				±.04 S=1.4*		$n\pi^0$	(34.7 ±1.2)%	41	104	
				cτ = 7.61		peν	(0.88±0.15)10^{-3}	177	163	
						pμν	(1.35±0.60)10^{-4}	72	131	
Σ⁺	$1(\frac{1}{2}^+)$	1189.47 ±0.08	−7.95 ±.11 (Σ⁺ − Σ⁻)	0.810×10^{-10}	1.412	$p\pi^0$	(52.8 ±1.5)%	116	189	
				±.013		$n\pi^+$	(47.2 ±1.5)%	110	185	
				cτ = 2.43		pγ	(1.9 ±0.4)10^{-3}	251	225	
						$n\pi^+\gamma$	(≈1.)10^{-3}	110	185	
						$\Lambda e^+\nu$	(2.2 ±0.7)10^{-5}	73	72	
				$\frac{\Gamma(\Sigma^+\to\ell^+n\nu)}{\Gamma(\Sigma^-\to\ell^-n\nu)}=.04^{+.04}_{-.02}$ ←		$n\mu^+\nu$	(< 0.7)10^{-4}	144	202	
						$ne^+\nu$	(< 0.3)10^{-4}	249	224	
Σ⁰	$1(\frac{1}{2}^+)$	1192.54 ±0.10	−4.88 ±.06 (Σ⁰ − Σ⁻)	$<1.0\times10^{-14}$	1.422	Λγ	100 %	77	75	
				cτ<3×10^{-4}		Λe^+e^-	b(5.45)10^{-3}			
Σ⁻	$1(\frac{1}{2}^+)$	1197.41 ±0.09		1.66×10^{-10}	1.434	$n\pi^-$	100 %	118	193	
				±.03 S=1.3*		$ne^-\nu$	(1.25±0.17)10^{-3}	257	230	
				cτ = 4.95		$n\mu^-\nu$	(0.62±0.12)10^{-3}	152	210	
						$\Lambda e^-\nu$	(0.66±0.11)10^{-4}	81	79	
						$n\pi^-\gamma$	(≈1)10^{-3}	118	193	
Ξ⁰	$\frac{1}{2}(\frac{1}{2}^+)$	1314.9 ±0.8	−6.3 ±.7 (Ξ⁰ − Ξ⁻)	2.9×10^{-10}	1.728	$\Lambda\pi^0$	100 %	64	135	
				±.4 S=1.2*		$p\pi^-$	(< 0.5)%	237	299	
				cτ=8.85		$pe^-\nu$	(< 0.6)%	376	323	
						$\Sigma^+e^-\nu$	(< 0.7)%	125	119	
						$\Sigma^-e^+\nu$	(< 0.6)%	117	112	
						$\Sigma^+\mu^-\nu$	(< 0.7)%	20	64	
						$\Sigma^-\mu^+\nu$	(< 0.6)%	12	49	
						$p\mu^-\nu$	(< 0.6)%	271	309	
Ξ⁻	$\frac{1}{2}(\frac{1}{2}^+)$	1321.3 ±0.2		1.73×10^{-10}	1.746	$\Lambda\pi^-$	100 %	66	139	
				±.05		$\Lambda e^-\nu$	($0.90^{+0.71}_{-0.43}$)10^{-3}	205	190	
				cτ=5.20		nπ	(< 5)10^{-3}	242	303	
						$\Lambda\mu^-\nu$	(< 1.2)%	100	163	
						$\Sigma^0e^-\nu$	(< 0.3)%	128	122	
						$\Sigma^0\mu^-\nu$	(< 0.5)%	23	70	
						$ne^-\nu$	(< 1.0)%	381	327	
Ω⁻	$0(\frac{3}{2}^+)$? ?	1672±1		$1.1^{+0.6}_{-0.5}\times10^{-10}$	2.795	$\Xi^0\pi^-$		217	293	
						$\Xi^-\pi^0$		216	289	
				cτ=3.3		ΛK^-		63	210	

General Atomic and Nuclear Constants [a]

- N = 6.02252×10^{23} mole^{-1} (based on $A_C 12=12$)
- c = 2.997925×10^{10} cm sec^{-1}
- e = 4.80298×10^{-10} esu = 1.60210×10^{-19} coulomb
- 1 MeV = 1.60210×10^{-6} erg
- ħ = 6.5819×10^{-22} MeV sec = 1.05449×10^{-27} erg sec
- ħc = 1.9732×10^{-11} MeV cm = 197.32 MeV fermi
- k = 8.6171×10^{-11} MeV deg^{-1} (Boltzmann const.)
- α = $e^2/\hbar c$ = 1/137.0388
- m_e = 0.511006 MeV/c^2 = 1/1836.10 m_p
- m_p = 938.256 MeV/c^2 = 1836.10 m_e = 6.721 $m_{\pi\pm}$ = 1.00727663 m_1 (where m_1 = 1 amu = $\frac{1}{12} m_C 12$ = 931.478 MeV/c^2)
- r_e = e^2/m_ec^2 = 2.81777 fermi (1 fermi = 10^{-13} cm)
- $\lambda\!\!\!^{-}_e$ = $\hbar/m_ec = r_e\alpha^{-1}$ = 3.86144×10^{-11} cm
- a_∞ Bohr = $\hbar^2/m_ee^2 = r_e\alpha^{-2}$ = 0.529167 A (1 A = 10^{-8} cm)
- $\sigma_{Thomson}$ = $\frac{8}{3}\pi r_e^2$ = 0.66516×10^{-24} cm^2 = 0.66516 barn
- μ_{Bohr} = $e\hbar/2m_ec$ = 0.578817×10^{-14} Mev gauss^{-1}
- μ_{nucl} = $e\hbar/2m_pc$ = 3.1524×10^{-18} Mev gauss^{-1}

$\frac{1}{2}\omega_{cyclotron}$ (rad sec^{-1} gauss^{-1}) = $e/2m_ec$ = 8.79404×10^{6} = $e/2m_pc$ = 4.7895×10^{3}

(continued on the other side)

[a] Based mainly on E. R. Cohen and J. W. M. DuMond, Rev. Mod. Phys. 37, 537 (1965).

Note that there are some disagreements with the results of recent experiments.

CP violation parameters

$$\eta_{+-\,(00)} = \frac{A(K_L\to\pi^{+(0)}\pi^{-(0)})}{A(K_S\to\pi^{+(0)}\pi^{-(0)})} = |\eta_{+-\,(00)}|e^{i\Phi_{+-\,(00)}}$$

$|\eta_{+-}|$ = $(1.89\pm0.09)\times10^{-3}$

Φ_{+-} = (65±11)° S=1.1*

$|\eta_{00}|$ still uncertain, see data listings

Decay Parameters †

Particle	Magnetic Moment ($e\hbar/2m_pc$)	Measured α	Measured Φ(degree)	Derived γ	Derived Δ(degree)
p	2.792763 ±.000030				
n	−1.913148 ±.000066	g_A/g_V = −1.198 ± .022(e),†			
Λ	−0.73 ±.16 S=1.2*	0.647±0.016	(−6±7)°	0.75	(7±8)°
		0.71 ±0.18	S=1.2*		
		0.06 ±0.19	For Λ → peν, g_A/g_V = $-1.14^{+0.23}_{-0.33}$ †		
Σ⁺	2.5 ±.7	−.955±0.070 ← S=1.1*			
		+.017±0.037	(180±30)°	−0.99	(0±85)°
Σ⁰					
Σ⁻		−.06 ±0.05 S=1.6*	(22±30)°	0.90	
		For Σ⁻ → Λeν, g_A/g_V = 0.3 ± 0.3 †			
Ξ⁰		−.33 ±0.10			
Ξ⁻		−.402±.051 S=1.4*	(6±8)° S=1.3*		

† The definition of these quantities is as follows:

$$\alpha = \frac{2\,\mathrm{Re}(S^*P)}{|S|^2+|P|^2};\quad \beta = \frac{2\,\mathrm{Im}(S^*P)}{|S|^2+|P|^2};\quad \gamma = \frac{|S|^2-|P|^2}{|S|^2+|P|^2}$$

$\tan\Phi = \beta/\gamma$ $\tan\Delta = -\beta/\alpha$

g_A/g_V defined by $M \propto \langle B_f|\gamma_\lambda(g_V-g_A\gamma_5)|B_i\rangle$

* S = Scale factor = $\sqrt{\chi^2/(N-1)}$ where N ≈ number of experiments. S should be ≈ 1. If S > 1, we have enlarged the error of the mean, δx, i.e., δx→S δx. This new convention is still inadequate, since if S > 1, the real uncertainty is probably even greater than Sδx. See text of January 1967 edition.

‡ In decays with more than two bodies, P_{max} is the maximum momentum that <u>any</u> particle can have.

b. Theoretical value, see also data card listings.

c. For comparison with predictions of the $\Delta I=\frac{1}{2}$ rule, see Appendix I.

d. See note in data card listings.

e. This value, not listed in the data cards, was obtained by G. Conforto (Acta Phys. Acad. Hungar. 22, 15 (1967).)

Quantities in italics have changed by more than one standard deviation since January, 1967.

	Symbol (J^P)	$I^G(J^P)C_n$ ⊢⊣ estab. ? ~ guess	Mass M (MeV)	Width Γ (MeV)	$M^2 \pm \Gamma M^{(a)}$ (GeV)^2	Partial decay modes: Mode	Fraction %	Q (MeV)	p or $p_{max}^{(b)}$ (MeV/c)
$\pi^\pm(140)$ $\pi^0(135)$	$\pi(0^-)$	$1^-(0^-)+$	139.58 134.98		0.019 0.018	See Table S			
$\eta(549)$	$\eta(0^-)$	$0^+(0^-)+$	548.8 ±0.6	2.3 kev ±.5 keV	0.301 ±.000	all neutral $\pi^+\pi^-\pi^0+\pi^+\pi^-\gamma$	71 29 }	See Table S	
$\rho^\pm(765)$	$\rho(1^-)$	$1^+(1^-)-$	755-775 (h)	110-140 (h)	0.585 ±.095	$\pi\pi$ $\pi^\pm\pi^+\pi^-\pi^0$ $\pi^+\pi^-\pi^+\pi^-$ $\pi^0\gamma$	≈ 100 < 0.2 < 0.15 < 0.4	491 212 212 630	359 247 247 372
$\rho^0(765)$			760-780 (h)	90-150 (h)	0.590 ±.090	$\eta\pi^\pm$ e^+e^- $\mu^+\mu^-$	< 0.8 .0055±.0007 (k) .0058±.0010	82 769 559	146 385 370
$\omega(783)$	$\phi'(1^-)$	$0^-(1^-)-$	783.3 ±0.7 S-1.9*	12.2 ±1.3	0.614 ±.009	$\pi^+\pi^-\pi^0$ $\pi^+\pi^-$ $\pi^0\gamma$ η+ neutral $\pi^+\pi^-\gamma$ $\pi^0\pi^0\gamma$ e^+e^- $\mu^+\mu^-$	≈ 90 seen (c) 9.5±0.9 < 1.5 < 5 < 1 *.0053* $^{+.0015}_{-.0020}$ (j) < 0.10	369 504 648 234 504 513 782 572	328 366 380 199 366 368 392 377
$\eta'(958)$ or X^0 See note (o).	$\eta'(0^-)$	$0^+(0^-)+$	958.3 ±0.8	<4	0.918 <.004	$\eta\pi\pi$ $\pi^+\pi^-\gamma$(incl. $\rho^0\gamma$) neutrals (excl. $\eta\pi\pi$) for upper limits see footnote (f)	67 ± 10 22 ± 3 11 ± 9	131 679	232 458
$\delta(962)$ Seen in only one experiment	?( )	≥1 ( )	962 ±5	<5	0.927 <.005	$\delta^\pm \to$ 1 charged+neutral(s) ≈ 60 $\delta^\pm \to \geq$ 3 charged+neutral(s)≈40			
H(990) existence in doubt (see note (i))	$\phi(A)$?	$0^-(1^+)-$??	≈990	≲80	0.98	3π	only mode seen (see note (n))	575	440
$\pi_V(1016)$ → $K\bar{K}$ Resonance, virtual bound state, or antibound state, still not distinguished.	$\pi(0^+)$	$1^-(0^+)+$	1016 ±10 (if resonance)	25 ±5	1.032 ±.025	$K^\pm K^0$ $\eta\pi$	only mode seen < 70	24 328	110 342
$\phi(1019)$	$\phi(1^-)$	$0^-(1^-)-$	*1019.3* *±0.6* S = 1.5*	3.4 ±0.8	1.039 ±.004	K^+K^- K_LK_S $\pi^+\pi^-\pi^0$ (incl. $\rho\pi$) e^+e^- indic. seen, $\mu^+\mu^-$ seen, for other upper limits see footnote (g)	47.3±3.2 38.9±3.1 13.8±4.3 < 0.2 < 0.5	32 24 605 1018 808	126 109 462 510 499
$\eta_V(1070)$ → K_SK_S (Some data still favor large scattering length)	$\eta(0^+)$	$0^+(0^+)+$	1069 ±10 S=2.3*	~80 see note (l)	1.14 ±.09	$\pi\pi$ $K\bar{K}$	< 70 >30	793 76	516 198
A1(1070) Existence in doubt (see note (d))	$\pi(1^+)$	$1^-(1^+)+$ ($J^P = 2^-$ not yet excluded)	1070 ±20	80 ±35	1.12	3π (see note (n)) $K\bar{K}$	≈ 100 < 0.25, $G=(-1)^{\ell+I}$ forbids this	651	488
B(1220)	$\rho(A)$? ($J^P = 2^-$ not excluded)	$1^+(1^+)-$??	1220 ±11	129 ±14 S=1.3*	1.46 ±.14	$\omega\pi$ for upper limits see footnote (m)	≈ 100	297	339
f(1260)	$\eta'(2^+)$	$0^+(2^+)+$	1263 ± 10	*141* *±13* *S = 2.3**	1.57 ±.15	$\pi\pi$ $2\pi^+2\pi^-$ $K\bar{K}$ indic. seen,	large < 4 < 2.5	984 705 267	616 552 388
D(1285)	$\eta'(A)$ ($J^P = 0^-, 2^-$ not excluded)	$0^+(1^+)+$	1285 ±4	32 ±8	1.65 ±.04	$K\bar{K}\pi$ (mainly $\pi_V(1016)\pi$) $K^*\bar{K}+\bar{K}^*K$ $\pi\pi\rho$	only mode seen not seen	154 -100 256	304 356
A2(1300) Some evidence for > 1 meson (see data listings).	$\pi(2^+)$	$1^-(2^+)+$	1305 ± 10 S=2.2*	90 ± 10 S=1.2*	1.70 ±.12	$\rho\pi$ (see note (n)) $K\bar{K}$ $\eta\pi$ $\eta'\pi$ $\pi^+\pi^-\pi^0$(excl. $\rho\pi$)	*85.1 ± 2.2* 4.0±1.1 S=1.1* *10.9 ± 2.1* < *10* < 17	395 313 617 207 891	410 424 526 275 615
E(1420)	$\eta(A)$ ($J^P = 1^+$ not yet excluded)	$0^+(0^-)+$	1424 ±6	71 ±10 S=1.2*	2.03 ±.10	$K^*\bar{K}+\bar{K}^*K$ $\pi_V(1016)\pi$ $\pi\pi\eta$ $\pi\pi\rho$	50 ± 10 50 ± 10 < 88 not seen	38 268 596 384	157 328 569 455
f'(1514)	$\eta(2^+)$	$0^+(2^+)+$	1514 ±5	73 ±23 S=1.8*	2.29 ±.11	$K\bar{K}$ $K^*\bar{K}+\bar{K}^*K$ $\pi\pi$ $\eta\pi\pi$ $\eta\eta$	72 ± 12 (e) 10 ± 10 (e) < 14 18 ± 10 < 40	518 128 1235 686 417	570 294 744 624 522
$\pi_A(1640)$ → 3π not yet a completely established resonance	$\pi(A)$?	$1^-(A)+$?	1654 ±12 S=1.6*	109 ±30	2.73 ±.18	3π [$\rho\pi$ † [$f\pi$ † $K\bar{K}$	appears dominant < 40] appears dominant] < 40	1245 745 252 654	797 637 320 658
$\rho_V(1650)$ g → 2π	$\rho(V)$ ($J^P = 1^-, 3^-, \ldots$ with 3^- favored)	$1^+(V)-$	1660 ±17 S=1.4*	169 ±30	2.76 ±.28	2π 4π $\rho\pi\pi$ } $K\bar{K}$ indication seen, < 10 $\omega\pi$ indication seen	appears dominant probably observed	1385 1106 615 668 741	820 773 617 667 638

→The remaining data, --e. g., R, S, T, U mesons--in this mass region are too confused to tabulate.
→See sketch at upper right.

	Symbol (J^P)	$I^G(J^P)C_n$	Mass M (MeV)	Width Γ (MeV)	$M^2 \pm \Gamma M$ (GeV)^2	Mode	Fraction %	Q (MeV)	p or p_{max} (MeV/c)
$K^+(494)$ $K^0(498)$	$K(0^-)$	$1/2(0^-)$	493.83 497.75		0.244 0.248	See Table S			
$K^*(890)$	$K(1^-)$ $m_0 - m_\pm = 6.3 \pm 4.1$	$1/2(1^-)$	892.7 ±0.5 S=1.2*	49.2 ±1.0	0.797 ±.044	$K\pi$ $K\pi\pi$	≈ 100 < 0.2	259 120	289 216
$K_A(1230)$ or C	K(A) Not yet completely established. See footnote (p). $J^P = 2^-$ not yet ruled out.	$1/2(1^+)$	1230	60	1.51 ±.07	See footnote (p)			
$K_A(1320)$	K(A) See footnote (p). $J^P = 2^-$ not yet completely ruled out.	$1/2(1^+)$	1320	60	1.74 ±.08	See footnote (p)			
$K_V(1420)$	$K(2^+)$	$1/2(2^+)$	1418.6 ±3.2 S=1.3*	89.1 ±5.1 S=1.1*	2.012 ±.126	$K\pi$ $K^*\pi$ $K\rho$ $K\omega$ $K\eta$	51 ± 3 33 ± 3 12 ± 3 } S = 1.5* 2.4± 1 2.1± 1	787 388 156 143 378	615 413 318 304 482
$K_A(1800)$ or L	K(A) ?	$1/2(A)$?	1781 ±14 S=1.7*	72 ±24 S=1.3*	3.17 ±.13	$K\pi$ $K^*\pi$ $K_V(1420)\pi$ $K\rho$ Remaining $K\pi\pi$ $K\omega$ $K\eta$	< 2.3 24 ± 8 16 ± 8 10 ± 6 45 ± 15 4.8± 2 < 1	1167 772 245 532 1032 519 754	825 670 317 632 807 624 732

→ The following bumps, excluded above, are listed among the data cards: σ(410); ε(730); $A2_{I=2}(1320) \to \rho^-\pi^-$; ρρ(1410); $K_SK_S(1440)$; η(1600) → 4π; ρ(1700) → 4π, $K^*\bar{K}$; R_{1-4}(1630-1830); η(1830) → 4π; ϕ(1830) → ωππ; S(1930); T(2200); $N\bar{N}_{I=0}(2380)$, U(2380); κ(725); $K_V(1080)$; $K_{A(I=3/2)}(1175)$; $K_{A(I=3/2)}(1265)$; $K_{A(I=1/2)}(1280)$; $K_{V(I=1/2)}(1660)$.

* Quoted error includes scale factor $S = \sqrt{\chi^2/(N-1)}$. See footnote to Table S.

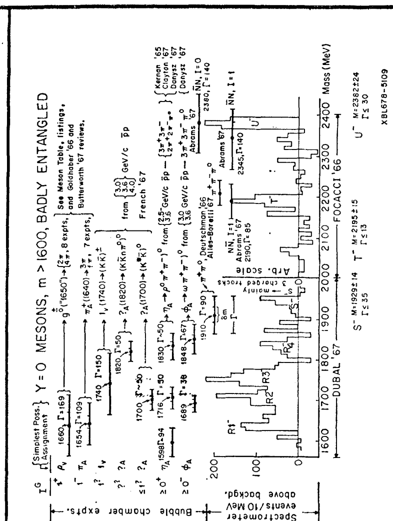
† Square brackets indicate a subreaction of the previous (unbracketed) decay mode.

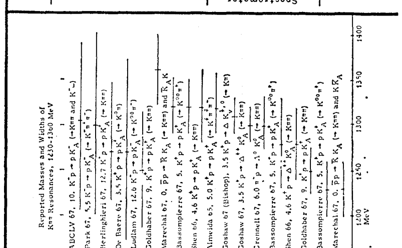
(a) ΓM is the half-width of the resonance when plotted against M^2.

(b) For decay modes into ≥ 3 particles p_{max} is the maximum momentum that any of the particles in the final state can have. The momenta have been calculated using the averaged central mass values, without taking into account the widths of the resonances.

(c) Reported values range between 1% and 15%, and depend on assumptions on ρ-ω interference.

Footnotes continued at right.





(d) Previous evidence from $\pi^\pm p \to (3\pi)^\pm p$ has weakened upon the accumulation of more data, thereby reopening the possibility that the A1 enhancement may be due to "Deck effect." However, there are now indications for some A1 production in $\bar{p}p$ annihilation reactions. As for the A1's parameters, they can be only guessed, since there is no clear way to separate effect from background -- πp experiments are beclouded by Deck effect, $\bar{p}p$ by insufficient signal/noise.

(e) There is only a weak indication for a $K^*\bar{K}+\bar{K}^*K$ mode of the f'(1514). If this mode does not exist, the $K\bar{K}$ branching fraction will have to be reported as (80±13)% (rather than (72±12)% as given in the table).

(f) Empirical limits on fractions for other decay modes of η'(958): $\pi^+\pi^- < 7\%$, $3\pi < 7\%$, $4\pi < 1\%$, $6\pi < 1\%$, $\pi^+\pi^-e^+e^- < 0.6\%$, $\pi^0e^+e^- < 1.3\%$, $\eta e^+e^- < 1.1\%$, $\pi^0\rho^0 < 4\%$, $\pi^0\omega < 8\%$.

(g) Empirical limits on fractions for other decay modes of ϕ(1019): $\pi^+\pi^- < 20\%$, $\eta\gamma < 8\%$, η + neutrals < 13%, $\pi^+\pi^-\gamma < 4\%$, $\omega\gamma < 5\%$, $\rho\gamma < 2\%$.

(h) The values reported for mass and width of the ρ meson (see data listings) fluctuate so widely that we cannot give averaged values with meaningful errors. The ranges given in the table show where we believe the final values are most likely to fall. Contrast in particular the following results: $M^0 = 764 \pm 11$, $\Gamma^0 = 93 \pm 15$ (from e^+e^- colliding beams); $M^0 = 767 \pm 2$, $\Gamma^0 = 151 \pm 4$ (from ππ phase shift analysis); $M^0 = 780 \pm 2$, $M^\pm = 774 \pm 2$, $\Gamma^{\pm 0} = 128 \pm 5$ (from compilation of πN → ρN, ρΔ); $M^- = 755 \pm 5$, $\Gamma^- = 110 \pm 9$ (from Chew-Low extrapolation). (All values in MeV. See listings for the references.)

(i) It seems established that there is a bump in the $(3\pi)^0$ mass spectrum around 1000 MeV although in πN collisions it is seen only between 3 and 4 GeV/c. Recent evidence by Chadwick et al. (LRL/SLAC) for I = 0 suggests that it is indeed different from the $A1^0$ so we list it tentatively as a new resonant state.

(j) SU(3) and ωϕ mixing hypothesis used in the analysis of part of the $\omega \to e^+e^-$ data. Without these data, the rate $\omega \to e^+e^-$ is (0.02±0.012)%.

(k) SU(3) and ωϕ mixing hypothesis used in the analysis of part of the $\rho \to e^+e^-$ data. Without these data, the rate $\rho \to e^+e^-$ is (0.0063±.0009)%.

(l) Width of $\eta_V(1070) \to K_SK_S$: Average value from two bubble chamber experiments Γ = (72±13)MeV, whereas a spark chamber experiment on K_SK_S gives Γ ≳ 100 MeV (author's fit Γ = 168 MeV) and another spark chamber experiment (observing what might be a $\pi^+\pi^-$ mode) yields Γ < 25 MeV. (For references, see data listings.)

(m) Empirical limits on fractions for other decay modes of B(1220): ππ < 30%, $K\bar{K}$ < 2%, 4π < 50%, ϕπ < 1.5%, ηπ < 25%, $(K\bar{K})^\pm\pi^0 < 8\%$, $K_SK_S\pi^\pm < 2\%$, $K_SK_L\pi^\pm < 6\%$.

(n) ρπ fraction of 3π mode difficult to distinguish because ρ bands cover most of the Dalitz plot. (For an I = 0 meson, the spatial part of the 3π decay matrix element must be completely antisymmetric; therefore one expects p-wave states for the 2π subsystems to be dominant.)

(o) This 0^- meson was named η' on discovery, when it looked as if it completed the 0^- nonet. With the recent evidence that the E(1420) is probably also 0^-, it is no longer clear whether η' or E or both are mixed in with the π, η, K octet; so the name η' may be misleading.

(p) See diagram at right and notes in listings. Some investigators see a broad enhancement in mass (Kππ) from 1200 - 1350 MeV, and others see structure. A further bump at 1280 MeV, Γ = 80 MeV, has been suggested. In light of this confusion, the masses, widths, quantum numbers, and branching ratios are at best tentative. For the mass region 1200 - 1350 MeV, the decay rate into $K^*(890)\pi$ is large, and a Kρ decay is seen. The Kη, Kω and Kπ rates are less than a few percent (although for Kπ, there is some disagreement among experimenters).

Mixing angles from Quadratic SU(3) Mass Formula: 0^- nonet (π, K, η, η') θ = 10.4° ± 0.2°; 0^- nonet (π, K, η, E) θ = 6.2° ± 0.1°; 1^- nonet (ρ(m = 765 ± 10 MeV), K*, ϕ, ω) θ = 39.4° ± 0.7°; 2^+ nonet (A2, $K_V(1420)$, f', f) θ = 30.2° ± 1.9°.

BARYONS - January, 1968.

Particle or resonance	$I(J^P)$ —— = estab.	Beam π, K (BeV) (BeV/c)	Mass (MeV)	Γ (MeV)	$M^2 \pm \Gamma M$ (BeV^2)	Partial decay modes: Mode	Fraction (%)	p or $p^{‡}_{max}$ (MeV/c)	$4\pi\lambda^2$ (mb)
p n	1/2(1/2⁺)		938.3 939.6		0.880 0.883	See Table S			
N' (1470)	1/2(1/2⁺) P_{11}	T=0.53πp p=0.66	1470	210	2.16 ±0.31	Nπ Nππ [Nσ][a]	65 35 [domin]	420	27.8
N(1518)	1/2(3/2⁻) D_{13}	T=0.62 p=0.75	1525	115	2.33 ±0.18	Nπ Nππ [Δ(1236)π][a] Nη	55 45 [domin] ~0.5	460 414 229 161	23.2
N(1550)	1/2(1/2⁻) S_{11}	T=0.66 p=0.79	1550	130	2.40 ±0.20	Nπ Nη Nππ	30 70 small	477 210 434	21.5
N(1680)	1/2(5/2⁻) D_{15}	T=0.88 p=1.02	1680	170	2.82 ±0.29	Nπ Nππ [Δ(1236)π][a] ΛK Nη	40 dom. inel. [?] <1.6 <2.5	567 533 365 218 379	15.2
N(1688)	1/2(5/2⁺) F_{15}	T=0.90 p=1.03	1690	130	2.86 ±0.22	Nπ Nππ [Δ(1236)π][a] ΛK Nη	65 dom. inel. [?] < .13 < 1.5	574 540 374 234 390	14.9
N' (1710)	1/2(1/2⁻) S_{11}	T=0.94 p=1.07	1710	300	2.92 ±0.51	Nπ	80	587	14.2
N(2190)	1/2(7/2⁻) G_{17}	T=1.96 p=2.10	2200	250	4.84 ±0.55	Nπ	30	894	6.13
N(2650)	1/2(?⁻)	T=3.12 p=3.26	2650	360	7.02 ±0.95	Nπ	(J+1/2)x=0.45[b]	1154	3.67
N(3030)	1/2(?)	T=4.26 p=4.40	3030	400	9.18 ±1.21	Nπ	(J+1/2)x=0.05[b]	1377	2.62
Δ(1236)	3/2(3/2⁺) P_{33}	T=0.195 p=0.304 $m_0 - m_{++}$ = 0.45±0.85	(++) 1236.0 ±0.6 $m_- - m_{++}$ = 7.9±6.8	120 ±2	1.53 ±0.15	Nπ Nπ⁺π⁻	100 0	231 89	91.9
Δ(1640)	3/2(1/2⁻) S_{31}	T=0.81 p=0.94	1640	180	2.69 ±0.30	Nπ Nππ	30 dom. inel.	540	16.8
Δ(1920)	3/2(7/2⁺) F_{37}	T=1.41 p=1.54	1950	220	3.80 ±0.43	Nπ ΣK	40 seen	741 453	8.91
Δ(2420)	3/2(11/2⁺)	T=2.50 p=2.64	2420	310	5.86 ±0.75	Nπ	11	1024	4.67
Δ(2850)	3/2(?⁺)	T=3.71 p=3.85	2850	400	8.12 ±1.14	Nπ	(J+1/2)x=0.25[b]	1266	3.05
Δ(3230)	3/2(?)	T=4.94 p=5.08	3230	440	10.4 ±1.4	Nπ	(J+1/2)x=0.05[b]	1475	2.24
Z_0(1865)	0(?)	p=1.15 K⁺p Resonance interpretation not established.	1865	180	3.47 ±0.34	NK	(J+1/2)x=0.35[b]	579	14.6
Λ	0(1/2⁺)		1115.5		1.24	See Table S			
Λ(1405)	0(1/2⁻) S_{01}	p<0 K⁻p	1405	50	1.97 ±0.07	Σπ	100	140	
Λ(1520)	0(3/2⁻) D_{03}	p=0.392	1518.8 ±1.5	16 ±2	2.31 ±0.02	NK̄ Σπ Λππ	45±4 45±4 }S=1.8* 10±1	235 258 251	83.6
Λ' (1670)	0(1/2⁻) S_{01}	p=0.74	1670	18	2.79 ±0.03	NK̄ Λη	K⁻p→Λη seen	410 66	28.5
Λ' (1690)	0(3/2⁻) D_{03}	p=0.78	1690	45	2.86 ±0.08	NK̄ Σπ	20 58	429 403	26.1
Λ(1815)	0(5/2⁺) F_{05}	p=1.05	1816 ±2 S=1.3*	74 ±5	3.30 ±0.14	NK̄ Σπ Σ(1385)π Λη	63 11 11 ~ 1	538 500 359 346	16.7
Λ(1830)	0(5/2⁻) D_{05}	p=1.08	1827	76	3.34 ±0.14	NK̄ Σπ	8 42	547 508	16.0
Λ(2100)	0(7/2⁻) G_{07}	p=1.68	2100	140	4.41 ±0.29	NK̄ Σπ Λη ΞK Λω	33 4 < 3 ~ 1 <10	748 699 617 483 443	8.68
Λ(2350)	0(?)	p=2.29 Seen in total c. s.	2350	210	5.52 ±0.49	NK̄	(J+1/2)x=0.7[b]	913	5.85
Σ	1(1/2⁺)		(+)1189.5 (0)1192.5 (-)1197.4		1.41 1.42 1.43	See Table S			
Σ(1385)	1(3/2⁺) P_{13}	p<0 K⁻p S=4.8* ! ←→(-)	(+)1382.2±0.8 S=1.6* 1388.0±3.0	(+)37±3 S=2.1* (-)38±8, S=3.7* !	1.92 ±0.05	Λπ Σπ	91±3 9±3 S=1.4*	208 117	
Σ(1660)	1(3/2⁻) D_{13}	p=0.72 Decay modes of these two states not separated yet.	1660	50	2.76 ±0.08	Λ(1405)π NK̄	large small for both	197 400	29.9
Σ(1690)	1 (? ?)	p=0.80	1690	120	2.89 ±0.19	Λπ Σπ	large not disentangled	455 395	25.1
Σ(1770)	1(5/2⁻) D_{15}	p=0.95	1767 ±4 S=1.5*	95 ±12 S=2.3*	3.13 ±0.16	NK̄ Λπ Λ(1520)π Σ(1385)π Ση Σπ	46 15 15 14 0.5 ~1	497 519 190 317 140 463	19.4
Σ(1910)	1(5/2⁺) F_{15}	p=1.25 A small effect. Not established beyond all question.	1910	60	3.65 ±0.11	NK̄ Λπ Σπ	8 10 3	612 619 568	12.9
Σ(2030)	1(7/2⁺) F_{17}	p=1.52	2030	120	4.12 ±0.24	NK̄ Λπ Σπ ΞK	11 36 9 < 2	700 700 652 412	9.92
Σ(2250)	1(?)	p=2.04 Seen in total c. s.	2250	200	5.06 ±0.45	NK̄	(J+1/2)x=0.3[b]	849	6.76
Σ(2455)	1(?)	p=2.57 Seen in total c.s.	2455	~140	6.03 ±0.34	NK̄	(J+1/2)x=0.26[b]	979	5.08
Σ(2595)	1(?)	p=2.95 Seen in total c. s.	2595	~ 140	6.73 ±0.36	NK̄	(J+1/2)x=0.26[b]	1064	4.30

Particle or resonance	$I(J^P)$	Mass (MeV)	Γ (MeV)	$M^2 \pm \Gamma M$	Mode	Fraction (%)	p (MeV/c)
Ξ	1/2(1/2⁺)	(0)1314.7 (-)1321.2		1.73 1.75	See Table S		
Ξ(1530)	1/2(3/2⁺) p-wave	(0)1528.9±1.1 (-)1533.8±1.9	7.3 ±1.7	2.34 ±0.01	Ξπ	100	145
Ξ(1815)	1/2(?) Branching ratios poorly known.	1815 ±3	16 ±8 S=2.2*	3.29 ±0.03	ΛK̄ Ξπ Ξππ [Ξ(1530)π][a] ΣK̄	~65 ~ 10 ~25 [~20] <2	391 409 351 220 299
Ξ(1930)	1/2(?) Needs confirmation.	1930	140	3.72 ±0.27	Ξπ ΛK̄	seen	501 504
Ω⁻	0(3/2⁺)	1672		2.80	See Table S		

→ at left of Table indicates a candidate that has been omitted because the evidence for the existence of the effect and/or for its interpretation as a resonance is open to considerable question. See listings for information on the following: $N_?$(3245), N(3690), Z_1^*(1900), Λ(1860) F_{07}, Σ(1780), Σ(3000), and Ξ(1705).

* Quoted error includes an S(scale) factor. See footnote to Table S.

‡ For decay modes into ≥ 3 particles p_{max} is the maximum momentum that any of the particles in the final state can have. The momenta have been calculated using the averaged central mass values, without taking into account the widths of the resonances.

a. Square brackets indicate a sub-reaction of the previous unbracketed decay mode.

b. J is not known; x is Γ_{el}/Γ.

c. Several new resonances have been reported by the CERN group (Donnachie et al.) as a result of their phase-shift analysis up to M = 2100 MeV. The other two groups working on phase-shift analysis (Berkeley, Saclay) have not claimed these states at this time; therefore we have to take them with some caution. For the time being, we classify the nine new CERN resonances as follows (the numbers in parentheses are M, Γ, Γ_{el}/Γ, slightly rounded): i) Strong candidates, D_{33}(1690, 270, 0.14), F_{35}(1910, 350, 0.16); ii) less certain, P_{31}(1930, 340, 0.30), P_{33}(1690, 280, 0.10), P_{11}(1750, 330, 0.32), F_{17}(1980, 220, 0.13); iii) require some imagination, D_{35}(1950, 310, 0.15), P_{13}(1860, 300, 0.21), D_{13}(2060, 290, 0.26).

DATA FOR TABLES ON STABLE PARTICLES

STABLE MEANING IMMUNE TO STRONG DECAY

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┌──────ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.──────┐

CODE EVENTS QUANTITY  ERROR+  ERROR-  REFERENCE YR TECN SIGN COMMENTS        CATE
   ABOVE                                                                  PUNCHED
 BACKGROUND
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γ

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                    C GAMMA (0,J=1)

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ν_e

```
                    1  E-NEUTRINO  (0,J=1/2)

                    1  E-NEUTRINO  MASS (KEV)

M    *  LESS THAN              0.25     LANGER     52 CNTR
M    *  LESS THAN              0.15     HAMILTON   53 CNTR
M    *  LESS THAN       C.55 +OR- 0.28  FRIEDMAN   58 CNTR

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                         REFERENCES

                         1  E-NEUTRINO  (C,J=1/2)

LANGER   52 PR  88  669      L M LANGER,R J D MOFFAT ////////  INDIANA
HAMILTON 53 PR  92  1521     D HAMILTON,W P ALFORD,L GRCSS // PRINCETON
FRIEDMAN 58 PR 109  2214     LEWIS FRIEDMAN,LINCOLN G SMITH  /////  BNL

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ν_μ

```
                    2  MU-NEUTRINO  (0,J=1/2)

                    2  MU-NEUTRINO  MASS (MEV)

M    *         3.5   CR LESS         BARKAS    56 EMUL
M    *         4.0   CR LESS         DUDZIAK   59 CNTR
M    *         3.6   CR LESS         FEINBERG  63 RVUE
M    *         3.0   CR LESS         ALLCOCK   65 RVUE
M    *         2.5   CR LESS         BARDON    65 SPRK
M    *         2.1   CR LESS         SHAFER    65 CNTR  CONF LEV = 68PCT
M              1.2   CR LESS         BOOTH     67 CNTR    CONF.LEV.=0.68    11/67
M              2.2     OR LESS,CL=0.90 HYMAN   67 HEBC    O. K- HE          11/67

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                         REFERENCES
                         2  MU-NEUTRINO  (C,J=1/2)

BARKAS   56 PR 101  778       W H BARKAS,W BIRNBAUM,F M SMITH  ////  LRL
DUDZIAK  59 PR 114  336       W F DUDZIAK,R SAGANE,J VEDDER  //////  LRL
FEINBERG 63 ARNS 13 431       G FEINBERG, L M LEDERMAN //////// COLUMBIA
ALLCOCK  65 PPSL  85  875     G R ALLCOCK ///////////////////// LIVERPOOL
BARDON   65 PRL  14 449       BARDON,NORTON,PEOPLES +//COLUM+STONY BROOK
SHAFER   65 PRL  14 923       R E SHAFER,CROWE,JENKINS  ///////////  LRL
BOOTH    67  PREPRINT ULDP 29 +JOHNSON,WILLIAMS,WORMALD     //  LIVERPOOL
HYMAN    67 PL 25 B 376       +LOKEN,PEWITT,MCKENZIE,KEYES+/ARG+CARN+NWU

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e

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                    3  ELECTRON  (0.5,J=1/2)

                    3  ELECTRON  MASS (MEV)

M          0.511006 0.000002        COHEN      65 RVUE

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               3  ELECTRON LIFETIME (UNITS 10**21 YR)

T    *      OVER                    2.0   MOE        65 CNTR

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                    3  ELECTRON MAGNETIC MOMENT(E/2ME)

MM   *     1.0011609 .0000024        SCHUPP    61 CNTR  -
MM   R     1.001159622  +-(27)*10**-9 WILKINSON 63 CNTR -
MM   *     1.001168 0.000011         RICH      66 CNTR +  POSITRON
MM         1.001159596  +-(23)*10**-9 RICH     67                           11/67
MM     RICH 67 IS REEVALUATION OF WILKINSON 63

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                         REFERENCES
                         3  ELECTRON  (0.5,J=1/2)

SCHUPP   61 PR  121   1       A A SCHUPP,R W PIDD,H R CRANE //  MICHIGAN
WILKINSO 63 PR 130 852        D T WILKINSON,H R CRANE ///////// MICHIGAN
COHEN    65 RMP 37 537        E R COHEN, J W M DUMOND //// NAASC+CALTECH
MOE      65 PR 140 B 992      M K MOE,F REINES //// CASE INST TECHNOLOGY
RICH     66 PRL  17  271      A RICH, H R CRANE                // MICHIGAN
RICH     67 CONF ON AT.MASSES A RICH /////////////////////////// MICHIGAN

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μ

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                    4  MUON  (106,J=1/2)

                    4  MUON  MASS (MEV)

M          105.659    0.002              FEINBERG  63 RVUE

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                    4  MUON LIFETIME (UNITS 10**-6)

T             2.198    0.001    0.001 FARLEY    62 CNTR
T             2.203    0.004          LUNDY     62 CNTR    CONLEV=.98      11/67
T             2.202    0.003    0.003 ECKHAUSE  63 CNTR
T             2.197    0.002    0.002 MEYER     63 CNTR +
T             2.198   -0.002    0.002 MEYER     63 CNTR -
T           . . . . . . . . . .
T    AVG      2.1983    .0008   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                    4  RATIO OF LIFETIME OF MU+ TO MU-

DT            1.000     0.001           MEYER     63 CNTR  LIFETIME MU+/MU-

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                    4  MUON PARTIAL DECAY MODES

P1     MUON INTO E (E-NEU) (MU-NEU)                          S 3S 1S 2
P2     MUON INTO E 2GAMMA                                    S 3S 0S 0
P3     MUON INTO 3ELECTRONS                                  S 3S 3S 3
P4     MUON INTO E GAMMA                                     S 3S 0

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                    4  MUON  BRANCHING RATIOS

R1   *  MUON INTO  E+2GAMMA  (IN UNITS OF 10**-5)           (P2)/(P1)
R1   *  LESS THAN               1.6       FRANKEL 1 63 SPRK

R2   *  MUON INTO 3E (IN UNITS OF 10**-7)                   (P3)/(P1)
R2   *  LESS THAN               5.0       PARKER 1  62 CNTR
R2   *  LESS THAN               1.3       ALIKHANOV 62 SPRK
R2   *  LESS THAN               1.5       FRANKEL 2 63 CNTR
R2   *  LESS THAN               1.45      BABAEV    63 SPRK

R3   *  MUON INTO  E+GAMMA  (IN UNITS OF 10**-8)            (P4)/(P1)
R3   *  LESS THAN               1.2       FRANKEL 1 63 SPRK
R3   *  LESS THAN               0.6       PARKER 2  64 SPRK

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                    4  MUON ANOMALOUS MAGN. MOMENT (10**-6*E/(2*MUON MASS))

MM          1162.0      5.0              CHARPAK   62 CNTR +
MM          1165.0      3.0              FARLEY    66 CNTR -  STORAGE RINGS
MM   P      1166.6      0.5              BAILEY    67 CNTR -  STORAGE RING      11/67
MM   P    PRELIMINARY RESULT
MM          . . . . . . . . . .
MM   AVG    1164.2059   2.5725   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
****** ********* ********* ********* ********* ********* ********* *********

                         REFERENCES
                         4  MUON  (106,J=1/2)

CHARPAK  61 PRL   6 126      CHARPAK,FARLEY,GARWIN,MULLER,SENS + //CERN
HUTCHINS 61 PRL   7 129      D P HUTCHINSON,J MENES +  //////  COLUMBIA
ALIKHANO 62 CERN CONF 423    A I ALIKHANOV,A BABAEV +  ///  ITEP MOSCOW
CHARPAK  62 PL    1  16      G CHARPAK,F J M FARLEY,R L GARWIN + //CERN
FARLEY   62 CERN CONF 415    FARLEY,MASSAM,MULLER,ZICHICHI  /////  CERN
LUNDY    62 PR 125 1686      RICHARD A LUNDY //////////////////// EFINS
PARKER   62 NC  23  485      S PARKER,S PENMAN ////////////////// EFINS
SHAPIRO  62 PR 125 1022      G SHAPIRO,L M LEDERMAN ////////// COLUMBIA

BABAEV   63 JETP 16 1397     BABAEV,BALATS,KAFTANOV,LANDSBERG + // ITEP
ECKHAUSE 63 PR 132  422      M ECKHAUSE,T A FILIPPAS + /////// CARNEGIE
FEINBERG 63 ARNS 13 431      GERALD FEINBERG, L M LEDERMAN /// COLUMBIA
FRANKEL  63 NC  27  894      S FRANKEL,W FRATI,J HALPERN + ////// PENNA
FRANKEL  63 PR 130  351      S FRANKEL,W FRATI,J HALPERN + ////// PENNA
MEYER    63 PR  132  2693    S L MEYER,ANDERSON,BLESER,LEDERMAN+//COLUM
PARKER   64 PR 133B 768      S PARKER,H L ANDERSON,C REY //////// EFINS
FARLEY   66  NC  45A  281    FARLEY,BAILEY,BROWN,GIESCH +        // CERN
BAILEY   67 HEIDELBERG CONF. +BARTL,BROWN,PICASSO,FARLEY + // CERN+RMCS


  OLD REFERENCES NOT REFERRED TO IN DATA CARDS

FISHER   59 PRL  3  349      FISHER,LEONTIC,LUNDBY,MEUNIER,STROOT//CERN
ASTBURY  60 ROCH CONF 60 542 ASTBURY,HATTERSLEY,HUSSAIN + //  LIVERPOOL
DEVONS   60 PRL  5  330      DEVONS,GIDAL,LEDERMAN,SHAPIRO  // COLUMBIA
LATHROP  60 NC    17 109     J LATHROP,R A LUNDY,V L TELEGDI + // EFINS
LATHROP  60 NC    17 114     J LATHROP,R A LUNDY,S PENMAN + ////  EFINS
REITER   60 PRL   5  22      REITER,ROMANOWSKI,SUTTON +  ///// CARNEGIE
TELEGDI  60 ROCH CONF 60 713 V L TELEGDI  ////////////////////////  CERN

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$\pi^\pm$

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                    8  CHARGED PION  (140,JPG=C--)  I=1

                    8  CHARGED PI  MASS (MEV)

M           139.37     0.20              CROWE     54 CNTR  -
M           139.68     0.15              BARKAS    56 EMUL +
M           139.577    0.014             SHAFER    65 CNTR
M          . . . . . . . . . .
M    AVG    139.5769    .0139   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                    8  PI+ MU+ MASS DIFFERENCE (MEV)

D            34.00     0.076             BARKAS    56 EMUL
D            33.89     0.076             BARKAS    56 EMUL
D          . . . . . . . . . .
D    AVG     33.9450    .0550   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                    8  CHAR.PI LIFETIME (UNITS 10**-9)

T            25.6      0.5       0.5    CROWE     57 RVUE
T            25.6      0.8       0.8    ANDERSON  60 CNTR
T      8000  25.46     0.32      0.32   ASHKIN    60 CNTR +
T    *                                  MERRISON  62 RVUE
T            26.02     0.04             ECKHAUSE  65 CNTR +
T            25.6      0.3              BARDON    66 CNTR
T            25.9      0.4              DUNAITSEV 66 CNTR
T    N       26.40     0.08             KINSEY    66 CNTR +
T    N   SYSTEMATIC ERRORS IN CALIBR.IN THIS EXP. DISCUSSED BY NORDBERG 67     8/67
T            26.67     0.24             LOBKOWICZ 66 CNTR
T            26.6      0.2              AYRES     67 CNTR
T            26.04     0.05             NORDBERG  67 CNTR +                    8/67
T          . . . . . . . . . .
T    AVG     26.0410    .0689   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3)
                    (SEE IDEOGRAM)

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WEIGHTED AVERAGE = 0.038401 ± 0.000101
SCALE = 2.28    CHISQ = 15.6    CONLEV = 0.001
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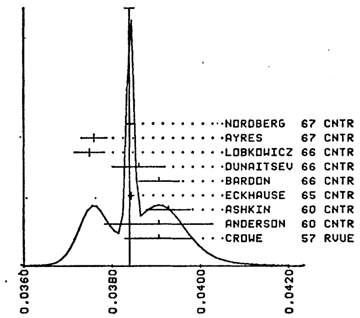

CHARG PI DECAY RATE (UNITS 10**9 SEC-1)

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                 8 MEANLIFE CIFFERENCE,(+)-(-)/AVGE. (PERCENT)

DT  N    THIS QUANTITY IS A MEASURE OF CPT INVARIANCE IN W.I.

DT          0.23     0.40           LCBKOWICZ 66 CNTR      SEE NOTE L
DT  L    ABCVE IS THE MOST CONSERVATIVE VALUE QUOTED BY ALTHORS
DT          0.4      0.7            BARCON    66 CNTR
DT          0.56     0.28           AYRES     67 CNTR
DT        • • • • • • • • • •
DT  AVG       .4465     .2180   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
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                 8  CHARGED PION PARTIAL DECAY MODES

P1      CHAR.PION INTO MU (MU-NEL)                        S 4S 2
P2      CHAR.PION INTC E (E-NEU)                          S 3S 1
P3      CHAR.PION INTC MU (MU-NEU) GAMMA                  S 4S 2S 0
P4      CHAR.PION INTC PIO E (E-NEU)                      S 9S 3S 1
P5        CHAR.PICN INTO E NEU GAMMA                      S 3S 1S 0
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                 8  CHARGEC PION BRANCHING RATICS

R1  *  CHAR.PION INTC MU NEU GAMMA  (UNITS 10**-4)       (P3)/(P1)
R1     26    1.24      0.25           CASTAGNCL 58 EMUL

R2  *  CHAR.PION INTC E NEU         (UNITS 10**-4)       (P2)/(P1)
R2           1.21      0.07           ANDERSON  60 CNTR
R2           1.247     0.028          DI CAPUA  64 CNTR
R2        • • • • • • • • • •
R2  AVG      1.2419     .0260   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

R3  *  CHAR.PION INTC PIO E NEU     (UNITS 10**-8)       (P4)/(P1)
R3     36    0.97      0.20           BARTLETT  64 SPRK
R3     38    1.07      0.21           BACASTOW  65 SPRK +
R3           1.10      0.26           BERTRAM   65 SPRK
R3     43    1.1       0.2            DUNAITSEV 65 CNTR
R3           1.01      0.08      0.10 DEPOMMIER 66 CNTR
R3        • • • • • • • • • •
R3  AVG      1.0287     .0689   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

R4  *   CHAR.PION INTO E NEU GAMMA (UNITS 10**-8)        (P5)/(P1)
R4    143    3.0       0.5            DEPOMMIER 63 CNTR

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                                  REFERENCES
                                  8 CHARGED PION (140,JPG=C--)I=1

CROWE    54 PR  96  470         K M CROWE,R H PHILLIPS /////////////// LRL
BARKAS   56 PR 101  778         W H BARKAS,W BIRNBAUM,F M SMITH ////// LRL
CROWE    57 NC   5  541         K M CROWE ////////////////// STANFORD HEPL
CASTAGNO 58 PR 112 1779         C CASTAGNOLI,M MUCHNIK ////////// ROME I F

ANDERSON 60 PR 119 2050         H L ANDERSON,T FUJII,R H MILLER + // EFINS
ASHKIN   60 NC  16  490         ASHKIN,FAZZINI,FIDECARO,LIPMAN + //// CERN
MERRISON 62 ADVP 11 1           A W MERRISON /////////////////// LIVERPOOL
SHAPIRO  62 PR 125 1022         G SHAPIRO,L M LEDERMAN ////////// COLUMBIA

CZIRR    63 PR 130  341         JOHN B CZIRR ///////////////////////// LRL
DEPOMMIE 63 PL 7 285            P DEPOMMIER,HEINTZE,RUBBIA,SOERGEL // CERN
BARTLETT 64 PR 136B 1432        BARTLETT,DEVONS,MEYER,ROSEN ///// COLUMBIA
DI CAPUA 64 PR 133B 1333        DI CAPUA,GARLAND,PONDROM,STRELZOFF //COLUM

BACASTOW 65 PR 139 B407         +GHESQUIERE,WIEGAND,LARSEN      //LRL+SLAC
BERTRAM  65 PR 139 B 617        BERTRAM,MEYER,CARRIGAN+ //// MICH+CARNEGIE
CLINE    65 PL   15  293        A CLINE,W F FRY //////////////// WISCONSIN
DUNAITSE 65 JETP 20 58          DUNAITSEV,PETRUKHIN,PROKOSHKIN + /// DUBNA
ECKHAUSE 65 PL 19 346           ECKHAUSE,HARRIS,SHULER+// WILLIAM AND MARY
SHAFER   65 UCRL 16365 THESIS   ROBERT E SHAFER /////////////////////// LRL
REPLACES 65 PRL 14 923          R E SHAFER,K M CROWE,D A JENKINS ///// LRL

BARDON   66 PRL 16 775          BARDON,DORE,DORFAN,KRIEGER + //// COLUMBIA
DEPOMMIE 66   PRIV COMM         DEPOMMIER,SOERGEL /////////////////// CERN
DUNAITSE 66 PL 23 263           +KUTYIN,PROKOSHKIN,RASUVAEV,SIMONOV//DUBNA
KINSEY   66 PR 144   1132       KINSEY,LOBKOWICZ,NORDBERG //ROCHESTER UNIV
LOBKOWIC 66 PRL  17  548        LOBKOWICZ,MELISSINOS,NAGASHIMA+ //ROCH+BNL

AYRES    67 PL 24B  483         D S AYRES,CALDWELL,GREENBERG,KURZ+ /// LRL
 ALSO    67 PR  157  1288       AYRES,CALDWELL,GREENBERG,KENNEY,KURZ+//LRL
NORDBERG 67 PL 24B  594         NORDBERG,LOBKOWICZ,BURMAN //ROCHESTER UNIV

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π^0

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               9  NEUTRAL PION  (135,JPG=C--)  I=1

               9  PI MASS DIFFERENCE (PI+-)-(PIO)(MEV)

D   *         5.37      1.0           PANOFSKY  51 CNTR  -
D             4.50      0.31          CHINOWSKY 54 CNTR  -
D             4.62      0.05          HADDOCK   59 CNTR  -
D             4.60      0.04          HILLMAN   59 CNTR
D             4.55      0.07          CASSELS   59 CNTR
D             4.6056    0.0055        CZIRR     63 CNTR
D             4.59      0.03          PETRUKHIN 63 CNTR  -
D             4.6034    0.0052        VASILEVSK 66 CNTR  -
D          • • • • • • • • • •
D   AVG       4.6041     .0037   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
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```
WEIGHTED AVERAGE = 1.120 ± 0.202
SCALE = 1.59    CHISQ = 2.5    CONLEV = 0.111
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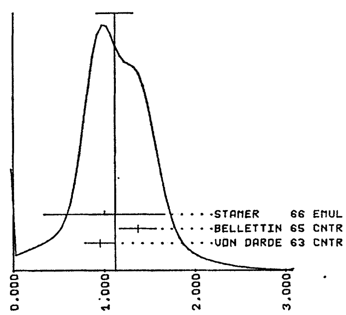

NEUTRAL PI DECAY RATE(UNITS 10**16SEC-1)

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                 9  PIO  LIFETIME (UNITS 10**-16)

T   N   76    1.9      0.5      0.5   GLASSER   61 EMUL
T   N   45    2.3      1.1      1.0   TIETGE    62 EMUL
T   N   88    2.8      0.9      0.9   KOLLER    63 EMUL    SEE STAMER 66
T             1.05     0.18     0.18  VON DARDE 63 CNTR
T   N   75    1.7      0.5            SHWE      64 EMUL
T             0.730    0.105          BELLETTIN 65 CNTR
T   N   67    1.6      0.6      0.5   EVANS     65 EMUL
T   N  OLD EMULSION MEASUREMENTS NOT USED BECAUSE OF POSSIBLE SYSTEMATIC
T   N       SHIFT TO LARGER LIFETIME VALUES
T      232    1.0      0.5            STAMER    66 EMUL    SEE NOTE K BELOW  8/67
T   K   INCLUDES EVENTS OF KOLLER 63                                          8/67
T         • • • • • • • • • •
T   AVG       .8931     .1815   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)
                (SEE IDEOGRAM)
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                 9  NEUTRAL PION PARTIAL DECAY MODES

P1      PIO INTO 2GAMMA                                  S 0S 0
P2      PIO INTO E+ E- GAMMA                             S 3S 3S 0
P3      PIO INTO 4ELECTRONS                              S 3S 3S 3S 3
P4      PIO INTO 3 GAMMA                                 S 0S 0S 0
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                 9  NEUTRAL PION BRANCHING RATIOS

R1  *  PIO INTO (GAMMA E+ E-)/(2GAMMA)                     (P2)/(P1)
R1  *        0.01196 THEORETICAL CALC.JOSEPH    61          QUANTUM ELECT.
R1      27   0.0117   0.0015        BUDAGOV   60 HBC
R1    3071   0.01166  0.00047       SAMIOS    61 HBC        PI-P TO PIO N
R1  S      SAMIOS VALUE USES PANOFSKY RATIO = 1.62
R1        • • • • • • • • • •
R1  AVG       .0117     .0004   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R2  *   PIO INTO (3 GAMMA)/(2 GAMMA) (UNITS 10**-6)       (P4)/(P1)
R2  *    0     5.0 OR LESS          DUCLOS    65 CNTR       CL=90 PERCENT

R3  *   PIO INTO (E+E+E-E-)/(2 GAMMA) (UNITS 10**-5)      (P3)/(P1)
R3  *          3.47   THEORETICAL CAL. KROLL    55          QUANTUM ELECT.

R3     146    3.18     0.30         SAMIOS    62 HBC        SEE NOTE N BELOW
R3  N      ABOVE VALUE USES PANOFSKY RATIO=1.62

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                                  REFERENCES
                                  9 NEUTRAL PION (135,JPG=C--)I=1

PANOFSKY 51 PR   81  565        W K H PANOFSKY,R L AAMODT,J HADLEY /// LRL
CHINOWSK 54 PR   93  566        W CHINOWSKY,J STEINBERGER /////// COLUMBIA
KROLL    55 PR 98 1355          N KROLL ,W WADA               // COLUMBIA+NRLW
CASSELS  59 PPS  74   92        CASSELS,JONES,MURPHY,O.NEILL /// LIVERPOOL
HADDOCK  59 PRL   3  478        HADDOCK,ABASHIAN,CROWE,CZIRR ///////// LRL
HILLMAN  59 NC   14  887        HILLMAN,MIDDELKOOP,YAMAGATA,ZAVATTINI/CERN

BUDAGOV  60 JETP 11  755        BUDAGOV,VIKTOR,DZHELEPOV,ERMOLOV +  //JINR
JOSEPH   60 NC 16 997           D W JOSEPH                          // EFI
GLASSER  61 PR  123 1014        R G GLASSER,N SEEMAN,B STILLER /////// NRL
SAMIOS   61 PR  121  275        N P SAMIOS ////////////////// COLUMBIA+BNL
SAMIOS   62 PR 126 1844         SAMIOS,PLANO,PRODELL + ////// COLUMBIA+BNL
TIETGE   62 PR  127 1324        J TIETGE,W PUESCHEL ////// MAX PLANCK INST

CZIRR    63 PR  130  341        JOHN B CZIRR ///////////////////////// LRL
KOLLER   63 NC   27 1405        E L KOLLER,S TAYLOR,T HUETTER //// STEVENS
KOLLER   63   SEE ALSO STAMER 66
PETRUKHI 63 SIENA CONF 208      V I PETRUKHIN,YU D PROKOSHKIN /////// JINR
VONDARDE 63 PL    4   51        VON DARDEL,DEKKERS,MERMOD,VAN PUTTEN+/CERN

SHWE     64 PR  136B 1839       H SHWE,F M SMITH,W H BARKAS ////////// LRL
BELLETTI 65 NC 40 A 1139        BELLETTINI,BEMPORAD,BRACCINI+/PISA+FIRENZE
DUCLOS   65 PL 19 253           DUCLOS,FREYTAG,HEINTZE + //CERN+HEIDELBERG
EVANS    65 PR 139 B 982        D A EVANS /////////////////////////// OXFORD

STAMER   66 PR 151  1108        STAMER,TAYLOR,KOLLER,HUETTER+ //// STEVENS
VASILEVS 66 PL  23  281         VASILEVSKY,VISHNYAKOV,DUNAITSEV + // DUBNA

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$K^{\pm}$

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               10  CHARGED K  (494,JP=0-)  I=1/2

               10  CHARGED K  MASS (MEV)

M           493.9      0.2            COHEN     57 RVUE +
M           493.7      0.3            BARKAS    63 EMUL  -
M           493.78     0.17           GREINER   65 EMUL +   VIA TAU DECAY
M         • • • • • • • • • •
M   AVG     493.8099    .1189   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    1C  CHAR.K  LIFETIME (UNITS 10**-8)

T   *   CHAR. K LIFETIME
T            0.95    C.36     0.25  ILOFF      56 EMUL
T      52    1.6C    0.3      0.3   EISENBERG  58 EMUL
T            1.21    0.C6     0.06  BURROWES   59 CNTR
T      33    1.38    C.24     0.24  FREDEN     60 EMUL
T            1.25    0.22     0.17  BARKAS     61 EMUL
T      51    1.27    C.36     0.23  BHOWMIK    61 EMUL
T     293    1.31    0.08     0.08  NORDIN     61 HBC   -
T   *        1.24    C.C7           NORDIN     61 RVUE  -
T            1.231   0.011    0.011 BOYARSKI   62 CNTR +
T            1.2443  C.C038         FITCH      65 CNTR +
T            1.2265  0.0036         LOBKOWICZ  66 CNTR +
T            1.221   0.011          FORD       67 CNTR +-          8/67
T   G        1.244   0.005          GIACOMELL  67 CNTR +           8/67
T   G     GIACOMELLI 67 VALUE JUST A CHECK ON APPARATUS
T         . . . . . . . . . .
T   AVG      1.2343   .0052   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)
T   FIT      1.235    .003    VALUE FROM CONSTRAINED FIT
                    (SEE IDEOGRAM)
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                    1C LIFETIME DIFFERENCE,(+)-(-)/AVGE. (PERCENT)

DT  N   THIS QUANTITY IS A MEASURE OF CPT INVARIANCE IN W.I.

DT           0.049   C.097          LOBKOWICZ 66 CNTR     SEE NOTE L
DT  L   ABOVE IS THE MOST CONSERVATIVE VALUE QUOTED BY AUTHORS
DT           0.47    C.30           FORD      67 CNTR                 8/67
DT        . . . . . . . . . .
DT  AVG      .0868   .1232   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
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                    1C  DECAY RATES DIFF.,(+)-(-)/AV.  (PERCENT)

D1  *  DIFFERENCE IN K MU2 RATES ((W1+)-(W1-))/W1
D1          -0.54    C.41           FORD      67 CNTR                 8/67

D2  *  DIFFERENCE IN TAU RATES   ((W2+)-(W2-))/W2
D2          -0.04    0.21           FORD      67 CNTR                 8/67
D2          -0.50    C.90           FLETCHER  67 SPRK                 8/67
D2        . . . . . . . . . .
D2  AVG     -.0638   .2045   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
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                    10  CHARGED K DECAY RATES

W1  *  CHAR. K INTO MU NEU (K MU)      (UN. 10**6 SEC-1) (P1)
W1          51.2     C.8            FORD      67 CNTR +-              8/67
W1        . . . . . . . . . .
W1  FIT     51.487    .270   VALUE FROM CONSTRAINED FIT

W2  *  CHARG. K INTO PI PI+ PI- (TAU) (UN. 10**6 SEC-1) (P3)
W2           4.496   C.030          FORD      67 CNTR +-              8/67
W2        . . . . . . . . . .
W2  FIT      4.511    .028   VALUE FROM CONSTRAINED FIT
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                    10  CHARGED K PARTIAL DECAY MODES

P1      CHAR. K INTO MU (NEU)                K MU          S 4S 2
P2      CHAR. K INTO PI PIO                  K PI          S 8S 9
P3      CHAR. K INTO PI PI+ PI-              TAU           S 8S 8S 8
P4      CHAR. K INTO PI 2PIO                 TAU PRIME     S 8S 9S 9
P5      CHAR. K INTO MU PIO NEU              K MU          S 4S 9S 2
P6      CHAR. K INTO E PIO NEU               K E           S 3S 9S 1
P7      POSIT.K INTO PI+ PI- E+NEU           K E+          S 8S 8S 3S 1
P8      POSIT.K INTO PI+ PI+ E-NEU           K E-          S 8S 8S 3S 1
P9       POSIT.K INTO PI+ PI- MU+ NEU        K+MU+ 4       S 8S 8S 4S 2
P10      POSIT.K INTO PI+ PI+ MU- NEU        K+MU- 4       S 8S 8S 4S 2
P11      CHAR. K INTO E NEU                  K E 2         S 3S 1
P12      CHAR. K INTO MU NEU GAMMA           K MU RAD      S 4S 2S 0
P13      CHAR. K INTO PI PIO GAMMA           K PI RAD      S 8S 9S 0
P14      CHAR. K INTO PI PI+ PI- GAMMA       TAU RAD       S 8S 8S 8S 0
P15      CHAR. K INTO PI E+ E-               PI E E        S 8S 3S 3
P16      CHAR. K INTO PI MU+ MU-             PI MU MU      S 8S 4S 4
P17      CHAR. K INTO PI GAMMA GAMMA         PI GAM GAM    S 8S 0S 0
P18      CHAR. K INTO PI E NEUTRINO GAMMA    PI E NEU GAM  S 8S 3S 1S 0
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                    1C  CHARGED K BRANCHING RATIOS

R   O       OLD DATA EXCLUDED

R1  *  CHAR. K INTO MU NEU (MU2)       (UNITS 1C**-2)      (P1)/TOTAL
R1  O       58.5     3.C            BIRGE      56 EMUL +
R1  O       56.9     2.6            ALEXANDER  57 EMUL +
R1        . . . . . . . . . .
R1  FIT     63.577    .293   VALUE FROM CONSTRAINED FIT
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R2  *  CHAR. K INTO PI PIO (PI2)      (UNITS 1C**-2)      (P2)/TOTAL
R2  O       27.7     2.7            BIRGE      56 EMUL +
R2  C       23.2     2.2            ALEXANDER  57 EMUL +
R2  *       21.0     0.6            CALLAHAN   65 PBC      SEE R17
R2  *       21.6     0.6            TRILLING   65 RVUE
R2        . . . . . . . . . .
R2  FIT     20.942    .279   VALUE FROM CONSTRAINED FIT

R3  *  CHAR. K INTO PI PI+ PI-(TAU)  (UNITS 1C**-2)      (P3)/TOTAL
R3  C        5.6     0.4            BIRGE      56 EMUL +
R3  C        6.8     0.4            ALEXANDER  57 EMUL +
R3  O        5.2     0.3            TAYLOR     59 EMUL +
R3           5.7     C.3            ROE        61 XBC  +
R3    2332   5.54    0.12           CALLAHAN   64 XBC  +
R3     540   5.1     C.2            SHAKLEE    64 XBC  +
R3           5.71    0.15           DE MARCO   65 HBC
R3      44   6.0     0.4            YOUNG      65 EMUL +
R3        . . . . . . . . . .
R3  AVG      5.5477   .1112  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
R3  FIT      5.570    .036   VALUE FROM CONSTRAINED FIT
                    (SEE IDEOGRAM)

R4  *  CHAR. K INTO PI 2PIO (TAU PRIME)(UNITS 1C**-2)   (P4)/TOTAL
R4  O        2.1     0.5            BIRGE      56 EMUL +
R4  O        2.2     C.4            ALEXANDER  57 EMUL +
R4  O        1.5     C.2            TAYLOR     59 EMUL +
R4           1.7     C.2            ROE        61 XBC  +                11/67
R4     108   1.8     0.2            SHAKLEE    64 XBC  +                11/67
R4        . . . . . . . . . .
R4  AVG      1.750C   .1414  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R4  FIT      1.7C1    .048   VALUE FROM CONSTRAINED FIT

R5  *  CHAR. K INTO MU PIO NEU (MU3) (UNITS 1C**-2)      (P5)/TOTAL
R5  O        2.8     1.0            BIRGE      56 EMUL +
R5  O        5.9     1.3            ALEXANDER  57 EMUL +
R5  C        2.8     C.4            TAYLOR     59 EMUL +
R5        . . . . . . . . . .
R5  FIT      3.377    .170   VALUE FROM CONSTRAINED FIT

R6  *  CHAR. K INTO E PIO NEU (E3)   (UNITS 1C**-2)      (P6)/TOTAL
R6  O        3.2     1.3            BIRGE      56 EMUL +
R6  C        5.1     1.3            ALEXANDER  57 EMUL +
R6           5.0     C.5            ROE        61 XBC  +                11/67
R6     429   4.7     C.3            SHAKLEE    64 XBC  +                11/67
R6        . . . . . . . . . .
R6  AVG      4.7794   .2572  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R6  FIT      4.832    .119   VALUE FROM CONSTRAINED FIT

R7  *  POSIT.K INTO PI+ PI- E+ NEU   (UNITS 1C**-5)      (P7)/TOTAL

R8  *  POSIT.K INTO PI+ PI+ E- NEU   (UNITS 1C**-5)      (P8)/TOTAL
R8           0.2    CR LESS         BIRGE      65 FBC  +  95 PER CT CONF

R9  *   POSIT.K INTO PI+ PI- MU+ NEU (UNITS 1C**-5)      (P9)/TOTAL
R9       1   0.77    C.54    0.5C   CLINE      65 FBC  +

R10 *   POSIT.K INTO PI+ PI+ MU- NEU (UNITS 1C**-6)      (P10)/TOTAL
R10      0   3.0 OR LESS            BIRGE      65 FBC  +  95 PER CT CONF

R11 *   CHAR. K INTO E NEU           (UNITS 1C**-5)      (P11)/TOTAL
R11 *      160.0    CR LESS         BORREANI   64 HBC  +  CONLEV=C.95   11/67
R11      4   2.1     1.8     1.3    BOWEN      67 SPRK +                 8/67
R11 *   BOWEN RESULT SHOULD BE CORRECTED TO 1.9(+1.7,-1.2) BECAUSE OF
R11 *   K+ TO E+ NEU GAMMA DECAYS BEFORE COMPARING WITH BOTTERILL 67 R28

R12 *   CHAR. K INTO MU NEU GAMMA    (UNITS 1C**-5)      (P12)/TOTAL

R13 *   CHAR. K INTO PI PIO GAMMA    (UNITS 1C**-4)      (P13)/TOTAL
R13 *   16   2.2     C.7            CLINE      64 FBC  +  PI+ KE 55-90 MEV

R14 *   CHAR. K INTO PI PI+ PI- GAMMA(UNITS 1C**-4)      (P14)/TOTAL
R14          1.0     C.4            STAMER     65 EMUL +

R15 *   CHAR. K INTO PI E+ E-        (UNITS 1C**-6)      (P15)/TOTAL
R15      1   1.1    OR LESS         CAMERINI   64 FBC  +
R15 *        0.4    CR LESS         CLINE      67      +                11/67
R15          4.4    CR LESS         BISI       67 DBC  +  90 PER CT CONF 11/67

R16 *   CHAR. K INTO PI MU+ MU-      (UNITS 1C**-6)      (P16)/TOTAL
R16          3.0    OR LESS         CAMERINI   65 FBC  +  90 PER CT CONF
R16          2.4    CR LESS         BISI       67 DBC  +  90 PER CT CONF 11/67

R17 *   CHAR. K INTO (PI PIO)/TAU                        (P2)/(P3)
R17    134   3.24    0.34           YOUNG      65 EMUL +
R17   1045   3.96    0.15           CALLAHAN   66 FBC  +
R17       . . . . . . . . . .
R17 AVG      3.8427   .2659  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.9)
R17 FIT      3.760    .057   VALUE FROM CONSTRAINED FIT

R18 *   CHAR. K INTO (PI 2PIO)/TAU                       (P4)/(P3)
R18   2027   0.303   0.009          BISI       65 H+HL +
R18     17   0.393   C.099          YOUNG      65 EMUL +
R18       . . . . . . . . . .
R18 AVG       .3037   .0090  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R18 FIT       .305    .008   VALUE FROM CONSTRAINED FIT
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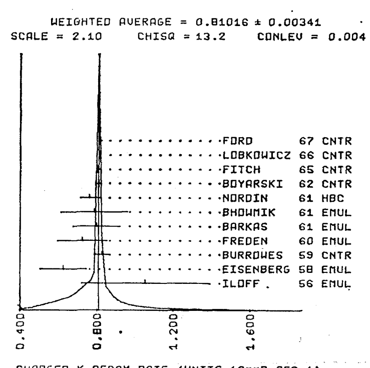

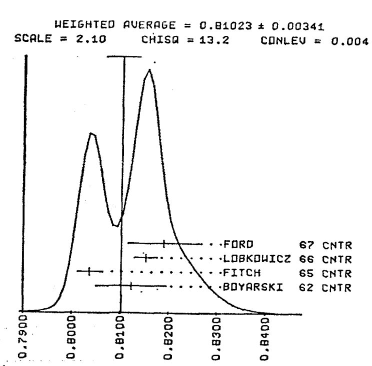

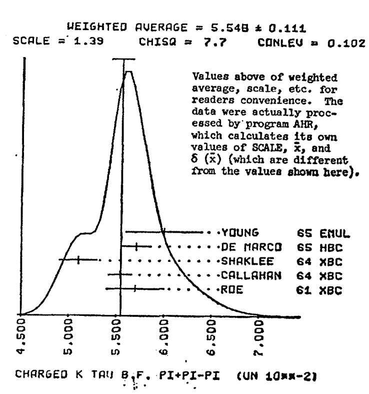

NOTE: Left ideogram contains all the data. Right ideogram contains only those in the central peak.

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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R19 *   CHAR. K INTO (MU PIO NEU)/TAU                 (P5)/(P3)
R19   2175   0.632    0.035          BISI        65 H+HL +
R19     38   0.90     0.16           YOUNG       65 EMUL +
R19    636   0.507    0.035          CALLAHAN    66 HLBC +                8/67
R19
R19 AVG      .5772    .0622   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.5)
R19 FIT      .606     .031    VALUE FROM CONSTRAINED FIT
                     (SEE IDEOGRAM)

R20 *   CHAR. K INTO (E PIO NEU)/TAU                  (P6)/(P3)
R20    230   0.90     0.06           BORREANI    64 HBC  +
R20     37   0.90     0.16           YOUNG       65 EMUL +
R20    873   0.722    0.038          CALLAHAN    66 HLBC +                8/67
R20    854   0.94     0.09           BELLOTTI    67 HLBC                 11/67
R20
R20 AVG      .7955    .0536   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.8)
R20 FIT      .867     .022    VALUE FROM CONSTRAINED FIT
                     (SEE IDEOGRAM)

R21 *   POSIT.K INTO (PI+ PI- E+ NEU)/TAU(UNITS 10**-4)(P7)/(P3)
R21     69   6.7      1.5            BIRGE       65 FBC  +

R22 *   POSIT.K INTO (PI+ PI- MU+ NEU)/TAU(UNITS 10**-4)(P9)/(P3)
R22      1   2.5  APPROX             GREINER     64 EMUL +
R22      7   2.57     1.55           BISI        67 DBC  +               11/67

R23 *   CHAR. K INTO (E PIO NEU)/(MU2+PI2)(UNITS 10**-2)(P6)/(P1+P2)
R23   1679   5.89     0.21           CESTER      66 SPRK +                8/67
R23   5110   6.16     0.22           ESCHSTRUT   67 SPRK +               11/67
R23
R23 AVG      6.0187   .1519   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R23 FIT      5.717    .149    VALUE FROM CONSTRAINED FIT

R24 *   CHAR. K INTO (PI PIO)/(MU NEU)                (P2)/(P1)
R24          0.3253   0.0065         AUERBACH    67 SPRK +                8/67
R24
R24 FIT      .329     .006    VALUE FROM CONSTRAINED FIT

R25 *   CHAR. K INTO (E PIO NEU)/(MU NEU)             (P6)/(P1)
R25    472   0.0797   0.0054         AUERBACH    67 SPRK +                8/67
R25 *   THE VALUE .0785+-.0025 GIVEN IN THE ABOVE REF IS AN AVERAGE OF
R25 *   AUERBACH 67 R25 AND CESTER 66 R23.
R25    561   0.069    0.006          DEVONS      67 SPRK +               11/67
R25
R25 AVG      .0749    .0053   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
R25 FIT      .076     .002    VALUE FROM CONSTRAINED FIT

R26 *   CHAR. K INTO (MU PIO NEU)/(MU NEU)            (P5)/(P1)
R26    310   0.0602   0.0046         AUERBACH    67 SPRK +                8/67
R26    424   0.055    0.004          DEVONS      67 SPRK +               11/67
R26
R26 AVG      .0572    .0030   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R26 FIT      .053     .003    VALUE FROM CONSTRAINED FIT

R27 *   CHAR. K INTO (MU NEU)/(TAU)                   (P1)/(P3)
R27 R  427   10.38    0.82           YOUNG       65 EMUL +
R27 R DELETED FROM OVERALL FIT BECAUSE YOUNG 65 CONSTRAINS HIS RESULTS TO
R27 R TO ADD UP TO 1.  ONLY YOUNG MEASURED MU2 DIRECTLY.
R27
R27 FIT      11.413   .096    VALUE FROM CONSTRAINED FIT

R28 *   CHAR. K INTO (E NEU)/(MU NEU) (UNITS 10**-5)  (P11)/(P1)
R28     10   1.9      0.7     0.5    BOTTERILL   67 SPRK +               11/67

R29 *   CHAR. K INTO (MU PIO NEU)/(E PIO NEU)         (P5)/(P6)
R29 *        0.65     0.05           AACHEN      67       PRELIMINARY    11/67
R29
R29 FIT      .659     .040    VALUE FROM CONSTRAINED FIT

R30 *   CHAR. K INTO PI GAMMA GAMMA/TOTAL(UNITS 10**-4)(P17)/TOTAL
R30          1.1  OR LESS            CHEN        67 SPRK +               11/67

R31 *   CHAR. K INTO PI E NEU GAMMA/PI E NEU          (P18)/(P6)
R31          0.012    0.008          BELLOTTI    67      +               11/67

R32 *   CHAR. K INTO (PI2 + MU3)/(TOTAL)              (P2+P5)/TOTAL      11/67
R32 *   WE COMBINE THESE TWO MODES FOR EXPTS MEASURING THEM IN XENON BC
R32 *   BECAUSE OF DIFFICULTIES OF SEPARATING THEM THERE
R32          23.4     1.1            ROE         61 XBC  +               11/67
R32    886   25.4     0.9            SHAKLEE     64 XBC  +               11/67
R32
R32 AVG      24.5980  .9802   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
R32 FIT      24.319   .284    VALUE FROM CONSTRAINED FIT

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                       10  CHARGED K FORM FACTORS                          8/67

LM+ *   LAMBDA +  (LINEAR ENERGY DEPENDENCE OF F+ IN KE3 DECAY)            8/67
LM+ *   FOR RAD. CORR. TO THE DALITZ PLOT, SEE GINSBERG 67.

LM+ *  217   +0.038   .045           BROWN       62 XEBC + PIO SPEC,NO R.C.
LM+ *  230   -0.04    .05            BORREANI    64 HBC  + E+ SPEC,NO R.C.   8/67
LM+ *  407   -0.010   .029           JENSEN      64 XEBC + PIO SPEC,NO R.C.  8/67
LM+ B  457   +0.025   .018           BELLOTTI    66 FBC  +  SEE NOTE B BELOW 8/67
LM+ *  854    0.045   0.017   0.018  BELLOTTI    67          SEE NOTE B BELOW 11/67
LM+ B        BELLOTTI 67 REPLACES BELLOTTI 66.USES DALITZ PLOT WITH RAD. COR. 11/67
LM+ * 1393   +0.016   .016           IMLAY       67 SPRK + DLTZ PLT,NO R.C.  8/67
LM+ *  515   +0.028   .013    .014   KALMUS      67 FBC  + E,PI SPEC,NO R.C. 8/67

XIA *   XIA = F-/F+ (DETERMINED FROM SPECTRA AND KMU3/KE3)

XIA *   76   +1.8      1.6               BROWN      62 XEBC + MU+,PIO SPECTRA   8/67
XIA *   87   +0.7      0.5               GIACOMELL  64 EMUL + MU+ SPECTRUM      8/67
XIA *        -0.1      0.7               JENSEN     64 XEBC + MU+,PIO SPECTRM   8/67
XIA *        -0.17     0.75      0.95    SHAKLEE    64 XEBC + KMU3/KE3          8/67
XIA *        +0.6      0.5               BISI       65 HBC  + KMU3/KE3,MU SPEC  8/67
XIA *      BTWN +0.2 AND +1.4            CUTTS      65 SPRK + MU+ SPECTRUM      8/67
XIA * 1509   +0.4      0.4       0.22    CALLAHAN   66 FRBC + KMU3/KE3          8/67
XIA * 2648    0.0      1.1       0.9     CALLAHAN   66 FRBC + MU+ SPECTRUM      8/67
XIA *  444   +0.72     0.37              CALLAHAN   66 FRBC + PIO SPECTRUM      8/67
XIA *        -0.5      0.3               AACHEN     67      + KMU3/KE3 PRELIM  11/67
XIA *        +0.75     0.50              AUERBACH   67 SPRK + KMU3/KE3          8/67
XIA *  976   +1.0      0.3               DEVONS     67 SPRK + KMU3/KE3          8/67

XIB *   XIB = F-/F+ (DETERMINED FROM MU POLARIZATION IN KMU3)

XIB * 2100   +1.2      2.4       1.8     BORREANI   65 PBC  + POLARIZATION      8/67
XIB *      BTWN -4.0 AND +1.7            CUTTS      65 SPRK + POLARIZATION      8/67
XIB *        -1.32     0.33              AACHEN     66 FRBC + POLARIZATION      8/67
XIB *  397   -1.4      1.8               CALLAHAN   66 FRBC + TOTAL POLAR.      8/67
XIB * 2950   -0.7      0.9       3.3     CALLAHAN   66 FRBC + LONG. POLAR.      8/67

XIB *   MEAS OF XI USING POLARIZATION IS LESS SENSITIVE TO FORM FACTOR
XIB *   VARIATIONS AND PROBABLY GIVES A BETTER EXPERIMENTAL VALUE
                         (SEE IDEOGRAM)
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REFERENCES

10 CHARGED K (494,JP=0-)I=1/2


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BIRGE     56 NC   4   834        BIRGE,PERKINS,PETERSON,STORK,WHITEHEA//LRL
ILOFF     56 PR 102   927        ILOFF,GOLDHABER,LANNUTTI,GILBERT + /// LRL
ALEXANDE  57 NC   6   478        ALEXANDER,JOHNSTON,OCEALLAIGH//DUBLIN INST
COHEN     57 FUND.CONS.PHYS.     E R COHEN,K M CROWE,J DUMOND // AI+LRL+CIT
EISENBER  58 NC   8   663        EISENBERG,KOCH,LOHRMANN,NIKOLIC + /// BERN
BURROWES  59 PRL  2   117        BURROWES,CALDWELL,FRISCH,HILL + ////// MIT
TAYLOR    59 PR 114   359        S TAYLOR,HARRIS,CREAR,LEE,BALMEL//COLUMBIA

FREDEN    60 PR 118   564        S C FREDEN,F C GILBERT,R S WHITE ///// LRL
BARKAS    61 PR 124 1209         BARKAS,DYER,MASON,NORRIS,NICKOLS,SMIT//LRL
BHOWMIK   61 NC  20   857        B BHOWMIK,P C JAIN,P C MATHUR //DELHI UNIV
NORDIN    61 PR 123 2166         PAUL NORDIN JR ///////////////////////// LRL
ROE       61 PRL  7   346        ROE,SINCLAIR,BROWN,GLASER + ///// MICH+LRL
BOYARSKI  62 PR 128 2398         BOYARSKI,LOH,NIEMELA,RITSON ////////// MIT
BROWN     62 PRL  8   450        BROWN,KADYK,TRILLING,ROE+/////////LRL,MICH

BARKAS    63 PRL 11    26        W H BARKAS,J N DYER,H H HECKMAN ////// LRL
BIRGE     63 PRL  11   35        BIRGE,ELY,GIDAL,CAMERINI + // LRL+WIS+BARI
ADAIR     64 PL 12  67           ADAIR,LEIPUNER                // YALE,BNL
BORREANI  64 PL    12 123        G BORREANI,G RINAUDO,A WERBROUCK /// TURIN
CALLAHAN  64 PR   136 B 1463     A CALLAHAN,R MARCH,R STARK ///// WISCONSIN
CAMERINI  64 PRL   13 316        CAMERINI,CLINE,FRY,POWELL // WISCONSIN+LRL
CLINE     64 PRL   13 101        D CLINE, W F FRY /////////////// WISCONSIN
GIACOMEL  64 NC 34  1134         GIACOMELLI,MONTI,QUARENI+// BOLOGNA,MUNICH
GREINER   64 PRL. 13 284         D GREINER, W OSBORNE, W BARKAS /////// LRL
JENSEN    64 PR   136 B1431      JENSEN,SHAKLEE,ROE,SINCLAIR ///// MICHIGAN
SHAKLEE   64 PR   136 B 1423     SHAKLEE,JENSEN,ROE,SINCLAIR ///// MICHIGAN

BIRGE     65 PR 139 B 1600       BIRGE,ELY,GIDAL,CAMERINI,CLINE + //LRL+WIS
BISI      65 NC    35  768       BISI,BORREANI,CESTER,FERRARO + ///// TURIN
BISI      65 PR 139 B 1068       BISI,MARZARI-CHIESA,RINALDO // TURINO,INFN
BORREANI  65 PR 140 B1686        BORREANI,GIDAL,RINAUDO,CAFORIO+/BARI,TURIN
CALLAHAN  65 PRL   15  129       A CALLAHAN,D CLINE ///////////// WISCONSIN
CAMERINI  65 NC    37 1795       CAMERINI,CLINE,GIDAL,KALMUS,KERNAN/WIS+LRL
CLINE     65 PL    15  293       A CLINE,W F FRY ///////////////// WISCONSIN
CUTTS     65 PR 138 B969         CUTTS,ELIOFF,STIENING //             // LRL
DEBOUARD  65 PL 15  58           DEBOUARD,DEKKERS,JORDAN+/MUNICH,CERN,ORSAY
DE MARCO  65 PR 140 B 1430       DE MARCO,GROSSO,RINAUDO ////// TURINO+CERN
FITCH     65 PR 140 B 1088       FITCH,QUARLES,WILKINS //PRINCETON+MT HOLYK
GREINER   65 ARNS  15  67        QUOTED BY BARKAS                     // LRL
STAMER    65 PR  138 B 440       STAMER,HUETTER,KOLLER,TAYLOR,GRAUMAN//STEV
TRILLING  65 UCRL 16473          GEORGE H TRILLING ///////////////////// LRL
TRILLING  65   IS UPDATED FROM 1965 ARGONNE CONF, PAGE   5
YOUNG     65 UCRL 16362          PCH-SHIEN YOUNG (THESIS,BERKELEY) //// LRL
  ALSO    67 PR 156 1464         P-S YOUNG,W.Z.OSBORNE,W.H.BARKAS ///// LRL

AACHEN    66 BERKELEY CONF 28    AACHEN-BARI-BERGEN-CERN-EP-NIJ-ORSAY-PADUA
BELLOTTI  66 PL   20  690        BELLOTTI,FIORINI,PULLIA+ /////////// MILAN
CALLAHAN  66 PR 150 1153         CALLAHAN,CAMERINI+/WISC,LRL,RIVERSIDE,BARI
     ALSO 66 NC  44A 90          A C CALLAHAN //////////////////////WISCONSIN
CESTER    66 PL 21 343           CESTER,ESCHSTRUTH,ONEILL+ //PRINCETON-PENN
CESTER    66   SEE ALSO FOOTNOTE 1 OF AUERBACH 67
LOBKOWIC  66 PRL  17  548        LOBKOWICZ,MELISSINOS,NAGASHIMA+ //ROCH+BNL

AACHEN    67 HEIDELBERG CONF     AACHEN,BARI,CERN,PADOVA,VALENCIA,MADRID
AACHEN    67 CORRECTED VALUE GIVEN AT NOV 67 PRINCETON CONF
AUERBACH  67 PR 155 1505         AUERBACH,DOBBS,MANN+ ////// PRINCETON-PENN
BELLOTTI  67 NC TO BE PUB        BELLOTTI,FIORINI,PULLIA //////////////MILAN
BISI      67 PL 25B  572         BISI,CESTER,CHIESA,VIGONE ///////// TORINO
BOTTERIL  67 PRL  19  982        BOTTERILL,BROWN,CORBETT,CULLIGAN +//OXFORD
BOWEN     67 PR 154 1314         BOWEN,MANN,MCFARLANE,HUGHES+/PENN-PRINCETO
CHEN      67 UCRL 17887          CHEN,CUTTS,KIJEWSKI,STIENING +//// LRL,MIT
CLINE     67 HEIDELBERG CONF     CLINE,HAGGERTY,SINGLETON,FRY+////WISCONSIN
DEVONS    67 PR  TO BE PUB       +GARLAND,MEYER,PONDROM+/COLUMBIA,RUTG,WISC
ESCHSTRU  67 PR  TO BE PUB       ESCHTRUTH,FRANKLIN,HUGHES+//PRINCETON,PENN
FLETCHER  67 PRL  19  98         FLETCHER,BEIER,EDWARDS,+//////////ILLINOIS
FORD      67 PRL 18 1214         +LEMONICK,NAUENBERG,PIROUE //PRINCETON
GIACOMEL  67 BNL 11056           GIACOMELLI,KYCIA,LI,TEIGER /////////// BNL
GINSBERG  67 PR 162  1570        EDWARD S GINSBERG ///////// U. MASS BOSTON
IMLAY     67 PR 160  1203        IMLAY,ESCHSTRUTH,FRANKLIN+///////PRINCETON
KALMUS    67 PR  159  1187       KALMUS,KERNAN ////////////////////////// LRL
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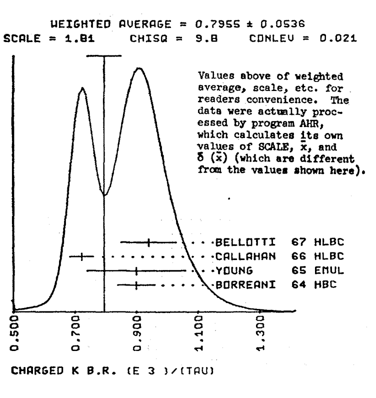

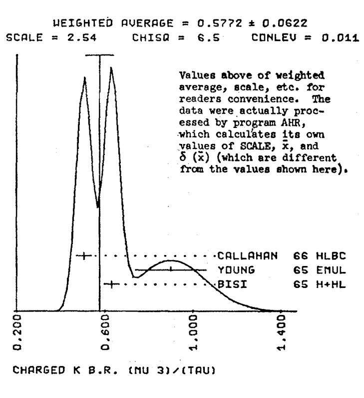

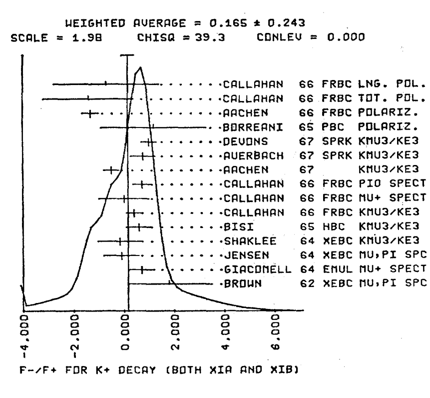

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

K^0

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               11  NEUTRAL K  (JP=C-)  I=1/2

               11  KO MASS  (MEV)

M          498.1       C.4              CHRISTENS 64 SPRK
M    2223  497.44      0.33             KIM       65 HBC    KO FROM PBAR P
M    4500  496.9       C.5              BALTAY    66 HBC    KO FROM PBAR P
M          497.44      0.50             FITCH     67 SPRK                    11/67
M          . . . . . . . . . .
M   AVG    497.8653    .3158   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)
               (SEE IDEOGRAM)

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               11  KO-K CH. MASS DIFFERENCE (MEV)

D            3.9       0.6              RCSENFELC 59 HBC   -
D            5.4       1.1              CRAWFORC  59 HBC   +
D       9    3.90      0.25             BURNSTEIN 65 HBC   -
D      25    3.71      0.35             KIM       65 HBC   -  K- P TC KO N
D          . . . . . . . . . .
D   AVG      3.8888    .1898   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                      REFERENCES
                      11 NEUTRAL K (JP=C-)I=1/2

CRAWFORC 59 PRL   2  112       CRAWFCRC,CRESTI,GOOD,STEVENSCN,TICHO //LRL
ROSENFEL 59 PRL   2  11C       A H RCSENFELC,F SOLMITZ,R C TRIPP //// LRL
CHRISTEN 64 PRL 13 138         CHRISTENSON,CRONIN,FITCH,TURLAY//PRINCETON
BURNSTEI 65 PR   138 B 895     R A BURNSTEIN,H A RUBIN ///////// MARYLAND
KIM      65 PR 140 B 1334      J K KIM,L KIRSCH,C MILLER /////// COLUMBIA
BALTAY   66 PR 142   932       BALTAY,SANDWEISS,STONEHILL +    //YALE+BNL
FITCH    67 PR TO BE PUB       FITCH,ROTH,RUSS,VERNON ///////// PRINCETON

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K_1^0

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               12  SHORT-LIVED NEUTRAL K (498, JP=C-)  I=1/2

               12  KO1 LIFETIME (UNITS 1C**-1C)

T     90   1.07     0.13     0.13  BOLDT     58 CC
T    512   0.94     0.05     0.05  CRAWFORC  59 HBC
T     63   1.09     0.18     C.15  BOWEN     60 CC
T    378   0.94     0.05     0.05  BERTANZA  62 HBC
T    503   0.87     0.05           CHRETIEN  63 PBC
T    545   0.86     0.04           KREISLER  64 SPRK
T          0.866    0.C16          ALFF-STEI 66 SPRK
T    572   0.90     0.06     0.05  AUERBACH  66 SPRK                       8/67
T   4500   0.92     0.04           BALTAY    66 HBC
T          0.904    0.024          BOTT-BODE 66 SPRK
T   5000   0.843    0.013          KIRSCH    66 HBC
T   *      0.862    0.016          HILL      67          PRELIMINARY      11/67
T          . . . . . . . . . .
T   AVG     .8738    .0108   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
               (SEE IDEOGRAM)

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               12  KO1 PARTIAL DECAY MODES

P1     KC1 INTO PI+ PI-                                        S 8S 8
P2     KC1 INTO PIO PIO                                        S 9S 9
P3     KCS INTO MU+ MU-                                        S 4S 4

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               12  KO1  BRANCHING RATIOS

R1  *  KO1 INTO (PI+ PI-)/TOTAL                          (P1)/TOTAL
R1          0.68     0.04             CRAWFORC  59 HBC
R1          0.70     C.08             COLUMBIA  6C HBC
R1  U       0.740    0.024            ANDERSON  62 HBC
R1          . . . . . . . . . .
R1  AVG      .6840    .0358   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R1  FIT      .684     .010    VALUE FROM CONSTRAINED FIT

R2  *  KO1 INTO (PIO PIO)/TOTAL                          (P2)/TOTAL
R2          0.27     0.11             CRAWFORC  59 HBC
R2          0.26     C.06             BAGLIN    60 PBC
R2          0.30     0.035            BROWN     61 XBC
R2   1066   0.335    0.014            BROWN     63 XBC
R2    198   0.288    0.021            CHRETIEN  63 PBC
R2          . . . . . . . . . .
R2  AVG      .3161    .0135   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
R2  FIT      .316     .010    VALUE FROM CONSTRAINED FIT
               (SEE IDEOGRAM)

R3  *  (KO1 INTO PI+ PI- PIO)/(KC2 INTC PI+ PI- PIC)
R3          0.45   OR LESS            BEHR      66 HLBC     90 PER CT CONF

R4  *  KCS INTO (MU+ MU-)/CHARGED  (UNITS 10**-5)        (P3)/(P1)
R4         10.0   OR LESS             BOTT-BODE 67 SPRK     90 PER CT CONF   8/67

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                      REFERENCES
               12  SHORT-LIVED NEUTRAL K (498, JP=C-)  I=1/2

BOLDT    58 PRL   1  150       E BOLDT,D O CALDWELL,Y PAL /////////// MIT
CRAWFORD 59 PRL   2  266       CRAWFCRC,CRESTI,DOUGLASS,GOOD,TICHO +//LRL

BAGLIN   60 NC    18 1043      BAGLIN,BLOCH,BRISSON,HENNESSY + //PARIS EP
BIRGE    60 ROCH CONF 601      R W BIRGE,P P ELY + //////// LRL+WISCONSIN
BOWEN    60 PR  119 2030       BOWEN,HARDY,REYNOLDS,SUN,MOORE+/PRINCE+BNL
COLUMBIA 60 ROCH CONF 727      M SCHWARTZ + ///////////////////// COLUMBIA
MULLER   60 PRL   4  418       MULLER,BIRGE,FOWLER,GOOD,PICCIONI+/LRL+BNL

BROWN    61 NC    19 1155      BROWN,BRYANT,BURNSTEIN,GLASER,KADYK+//MICH
FITCH    61 NC    22 1160      V FITCH,P PIROUE,R PERKINS /// PRINCE+LASL
GOOD     61 PR  124 1223       GOOD,MATSEN,MULLER,PICCIONI + //////// LRL
ANDERSON 62 CERN CONF 636      J A ANDERSON,F S CRAWFORD + ////////// LRL
BERTANZA 62 PREPRINT D105      BERTANZA,CONNOLLY,CULWICK,EISLER + /// BNL
         (BERTANZA UNPUBLISHED,BUT RECERTIFIED BY AUTHORS,AUGUST 66)
CRAWFORD 62 CERN CONF 827      F S CRAWFORD ////////////////////////// LRL

BROWN    63 PR  130  769       BROWN,KADYK,TRILLING,ROE + ///LRL+MICHIGAN
CHRETIEN 63 PR  131 2208       CHRETIEN+ //// BRANDEIS+BROWN+HARVARD+ MIT
KREISLER 64 PR  136 B 1074     M KREISLER,O OVERSETH,J CRONIN / PRINCETON
AUERBACH 65 PRL 14 192         AUERBACH,LANDE,MANN,SCIULLI,UTO + /// PENN
TRILLING 65 UCRL 16473         GEORGE H TRILLING //////////////////// LRL
TRILLING 65   IS UPDATED FROM 1965 ARGONNE CONF , PAGE 115

ALFF-STE 66 PL 21 595          ALFF-STEINBERGER,HEUER,KLEINKNECHT +//CERN
AUERBACH 66 PR 149 1052        AUERBACH,COBBS,LANDE,MANN,SCIULLI+/// PENN
            SEE ALSO AUERBACH 65
BALTAY   66 PR 142   932       BALTAY,SANDWEISS,STONEHILL +  /// YALE+BNL
BEHR     66 PL   22  540       BEHR,BRISSON,PETIAU+//EP,MILAN,PADUA,ORSAY
BOTT-BOC 66    BERKELEY CONF.  BOTT-BODENHAUSEN,DE BOUARD +        // CERN
KIRSCH   66 PR  147  939       L KIRSCH,P SCHMIDT ////////////// COLUMBIA

BOTT-BOC 67 PL 24B 194         BOTT-BODENHAUSEN,DE BOUARD,CASSEL+ ///CERN
HILL     67 HEIDELBERG CONF    HILL,ROBINSON,SAKITT+ ////// BNL,CARNEGIE

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K_2^0

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               13  LONG-LIVED NEUTRAL K (498, JP=C-)  I=1/2

               13  KO2-KO1  MASS DIFFERENCE (UNITS OF INVERSE KO1 LIFE)

D   *        1.9      0.3                FITCH     61 CNTR
D            0.84     C.29       C.21 GOOD      61 PBC
D            0.88     C.20               CAMERINI  62 PBC      SEE NOTE C BELOW 8/67
D   C  VALUE CHANGED FROM 1.5 (SEE TABLE 1 OF CAMERINI 66)                      8/67
D            0.47     0.21               AUBERT    65 PBC
D            0.26     0.36       C.26 BALDO-CEC 65 PBC      ASS.CP CONS.
D            0.55     0.1                CHRISTENS 65 SPRK
D   *        0.60  OR LESS               FITCH     65 SPRK     CF. MEISNER 66
D   G  130   0.82     0.14               VISHNEVSK 65 SPRK     CU AND AL REGEN  8/67
D            0.445    0.034              ALFF-STEI 66 SPRK
D       84   0.36     0.21       0.31 BALDO-CEC 66 HLBC     KO+N INTC HYPER.  8/67
D            0.460    0.024              BOTT-BODE 66 SPRK
D       77   0.50     C.15               CAMERINI  66 HBC, DBC KO+N INTO HYPER  8/67
D   N   72 + 0.54     C.15               CANTER    66 DBC      KO SCATTER IN C2 11/66
D   N     ERROR IGNORES UNCERTAINTY OF PHASE SHIFTS
D       95  -0.54     0.09       0.14 CHANG     66 HBC      KO+P INTC HYPER.  8/67
D            0.72     0.15               FUJII     66 SPRK     IRON REGENERATOR
D   C   89   0.62     C.16               HILL      66 DBC      KO+D INTC HYPER.
D   C  136   0.67     0.15               CANTER    67 DBC      KO+D INTC HYPER. 11/67
D   C     CANTER 67 IS A PRELIMINARY RESULT,INCLUDES HILL 66 EVENTS
D          +0.35      C.15               JOVANOVIC 66 SPRK     C+URANIUM REGEN. 11/66
D          + 0.44     0.06               MEHLHOP   66 SPRK
D       59   0.65     0.30               MEISNER 1 66 HBC      SEE NOTE M
D   M     + SIGN FAVORED                 MEISNER 2 66 HBC
D      600   0.53     0.10       0.11 GALANINA  67 SPRK     CU+AL REGENERAT. 11/67
D   G   GALINIA 67 IS A REANALYSIS OF VISHNEVSKY 65
D            0.57     0.10               MISCHKE   67 SPRK                      11/67
D          . . . . . . . . . .
D   AVG      .4808    .0175   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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               13  KO2 LIFETIME                      (MICROSEC)

T   *   ASSUMED DS=DQ AND DELTA I=1/2 CRAWFORD  59 HBC
T      34   0.081    0.032    0.C24 BARDON    58 CC
T      15   0.051    0.024    0.013 DARMON    62 FBC
T           0.053    0.006          FUJII     64 SPRK                       8/67
T    1700   0.061    0.015    0.012 ASTBURY3  65 CC                         8/67
T           0.0515   0.0014         DEVLIN    67 CNTR                       8/67
T   L       0.050    C.005          LOWYS     67 HLBC     SEE NOTE L BELOW  8/67
T   L  SUM OF PARTIAL DECAY RATES
T          . . . . . . . . . .
T   AVG      .0520    .0014   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
T   FIT      .053     .001    VALUE FROM CONSTRAINED FIT

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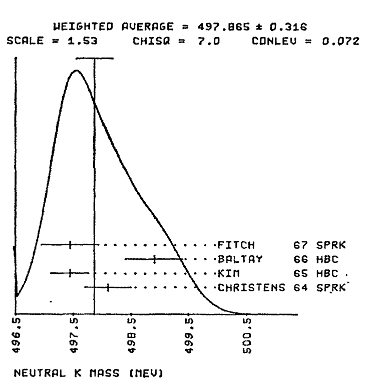

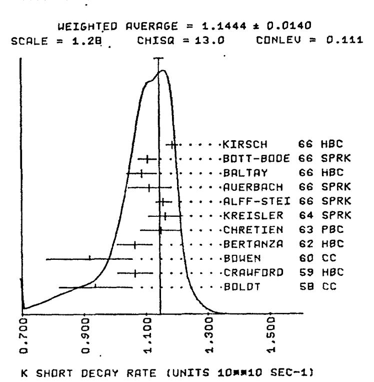

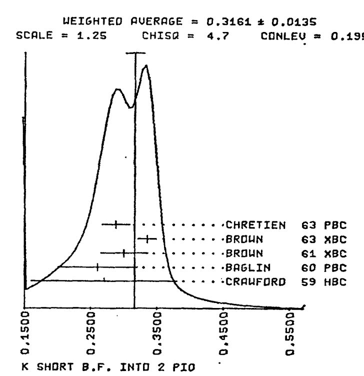

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    13  K02 PARTIAL DECAY MODES

P1      K02 INTO 3PIO                                S 9S 9S 9
P2      KC2 INTO PI+ PI- PIO                         S 8S 8S 9
P3      KC2 INTO PI ML NEUTRINC                      S 8S 4S 2
P4      KC2 INTO PI E NEUTRINO                       S 8S 3S 1
P5      K02 INTO PI+ PI-                             S 8S 8
P6      KC2 INTO ML+ ML-                             S 4S 4
P7      KC2 INTO E+ E-                               S 3S 3
P8      KC2 INTO E MU                                S 3S 4
P9      K02 INTO TWO GAMMAS                          S 0S 0
P10     KC2 INTO PI+ PI- GAMMA                       S 8S 8S 0
P11     KC2 INTO PIO PIO                             S 9S 9
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                    13  K02 CECAY RATES

W1   *  K02 INTO PIO PIO PIO        (UNITS 10**6 SEC-1)  (P1)
W1      54    5.22   1.03       0.84  BEHR      66 HLBC    ASSUMES CP
W1            . . . . . . . . .
W1   FIT      4.814     .405    VALUE FROM CONSTRAINED FIT

W2   *  K02 INTO PI+ PI- P0         (UNITS 10**6 SEC-1)  (P2)
W2      18    3.26      0.77          ANDERSON  65 HBC
W2      14    1.4       0.4           FRANZINI  65 HBC
W2     136    2.62      0.28    0.27  BEHR      66 HLBC    ASSUMES CP
W2            2.54      C.43          HILL      66 DBC
W2            . . . . . . . . .
W2   AVG      2.3573    .3207   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.7)
W2   FIT      2.289     .093    VALUE FROM CONSTRAINEC FIT
                   (SEE IDEOGRAM)

W3   *  K02 INTO PI E NEUTRINO      (UNITS 10**6 SEC-1)  (P4)
W3            7.52      C.85    0.72  AUBERT    65 HLBC    DS=DQ,CP ASSUMEC  8/67
W3            . . . . . . . . .
W3   FIT      6.618     .292    VALLE FROM CONSTRAINED FIT

W4   *  K02 INTO CHARGED (3-BODY)   (UNITS 10**6 SEC-1)  (P2+P3+P4)
W4      98   15.1       1.9           AUERBACH  66 SPRK                      8/67
W4            . . . . . . . . .
W4   FIT     14.057     .465    VALLE FROM CONSTRAINED FIT

W5   *  KC2 INTO LEPTONIC (KMU3+KE3) (UNITS 10**6 SEC-1) (P3+P4)
W5     109    9.4       1.3           FRANZINI  65 HBC
W5      54   11.3       1.9           GOLDEN    66 HBC
W5     335   10.3       C.8           HILL      67 DBC     K+N TO KC P      8/67
W5            . . . . . . . . .
W5   AVG     10.1949    .6413   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
W5   FIT     11.767     .396    VALUE FROM CONSTRAINED FIT

W6   *  KC2 INTO PI ML NEUTRINO     LNITS 1C**6 SEC-1)   (P3)
W6      19    4.54      1.24    1.08  LCWYS     67 HLBC                      8/67
W6            . . . . . . . . .
W6   FIT      5.149     .263    VALLE FROM CONSTRAINED FIT
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              13  DECAY RATES DIFF.,(+)-(-)/(+)+(-)   (PERCENT)

D1 *  K02 INTO MU+PI-NU - MU-PI+NU /MU+PI-NU + MU-PI+NL
D1   10**6    0.403     C.134         DCRFAN    67 SPRK    DERIVED FRCM R16 11/67

D2   *  KC2 INTO E+PI-NU - E-PI+NU /E+PI-NU + E-PI+NU
D2   10**7    0.224     C.036         BENNETT   67 CNTR                     11/67
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                    .13  K02 BRANCHING RATICS

R1   *  K02 INTO (PIC PIC PIC)/CHARGED                   (P1)/(P2+P3+P4)
R1      24    0.24      C.C8          ANIKINA   64 CC
R1            0.31      C.06          KULYUKINA 66 CC
R1   *        0.248     C.035         AUBERT    67                          11/67
R1   *        0.277     0.C35         BEHR      67                          11/67
R1            . . . . . . . . .
R1   AVG      .2848     .0480   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R1   FIT      .342      .034    VALUE FROM CONSTRAINEC FIT

R2   *  KC2 INTO (PI+ PI- PIO)/CHARGED                   (P2)/(P2+P3+P4)
R2      59    0.185     0.038         ASTIER    61 CC
R2      79    0.151     0.020         ACAIR     64 HBC
R2      75    0.157     0.03    0.04  LUERS     64 HBC
R2      66    0.15      0.03    C.C4  ASTBURY 1 65 CC
R2     326    0.159     C.015         ASTBURY 2 65 CC
R2     566    0.178     0.017         GUICCNI   65 HBC
R2   * 1729   0.144     0.004         HCPKINS   65 HBC     SEE HOPKINS 67
R2     126    0.162     0.015         HAWKINS   66 HBC
R2     180    0.17      0.03          KULYUKINA 66 CC
R2   *        0.154     C.020         AUBERT    67                          11/67
R2            0.161     0.005         HCPKINS   67 HBC                       8/67
R2            . . . . . . . . .
R2   AVG      .1618     .0041   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R2   FIT      .163      .004    VALUE FROM CONSTRAINED FIT

R3   *  KC2 INTO (PI MU NEUTRINO)/CHARGEC                (P3)/(P2+P3+P4)
R3   C  251   0.356     C.07          LUERS     64 HBC
R3   C  172   0.39      0.08    0.1C  ASTBURY 1 65 CC
R3   C  330   0.32      C.07          KULYUKINA 66 CC
R3   C THIS MODE NCT MEASURED INCEPENDENTLY FRCM R2 AND R4
R3            . . . . . . . . .
R3   FIT      .366      .014    VALLE FROM CONSTRAINED FIT
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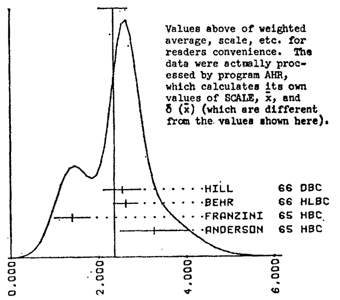
WEIGHTED AVERAGE = 2.357 ± 0.321
SCALE = 1.65   CHISQ = 8.2   CONLEV = 0.042



K LONG RATE INTO PI+PI-PIO (10**6 SEC-1)

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R4   *  KC2 INTO (PI E NEUTRINC)/CHARGED                 (P4)/(P2+P3+P4)
R4     153    0.487     C.05          LUERS     64 HBC
R4     202    0.46      0.08    0.1C  ASTBURY 1 65 CC
R4     500    0.51      C.C6          KULYUKINA 66 CC
R4            . . . . . . . . .
R4   AVG      .4908     .0353   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R4   FIT      .471      .014    VALUE FROM CONSTRAINED FIT

R5   *  KC2 INTO (PI E NEU)/((PI E NEU)+(PI MU NEU))     (P4)/(P3+P4)
R5     320    0.415     0.120         ASTIER    61 CC
R5            . . . . . . . . .
R5   FIT      .562      .016    VALLE FROM CONSTRAINED FIT

R6   *  K02 INTO(PI+ PI- PIO)/TOTAL                      (P2)/TOTAL
R6            . . . . . . . . .
R6   FIT      .867      .022    VALLE FROM CONSTRAINEC FIT
R6   FIT      .867      .022    VALLE FROM CONSTRAINED FIT

R7   *  K02 INTO(LEPTCN PI NEUTRINO)/TOTAL               (P3+P4)/TCTAL
R7            . . . . . . . . .
R7   FIT      5.717     .149    VALLE FROM CONSTRAINEC FIT
R7   FIT      5.717     .149    VALLE FROM CONSTRAINEC FIT

R8   *   KC2 INTO (2 GAMMA)/TCTAL    (UN. 10**-4)        (P9)/TOTAL
R8   *        1.3       0.6           CRIEGEE   66 SPRK
R8   *   33   7.4       1.6           CRONIN    67 SPRK                     11/67
R8   *  NCT AVERAGED BECAUSE OF LARGE DISCREPANCY BETWEEN THE TWO EXPTS

R9   *  K02 INTO (PI+ PI-)/CHARGED   (UNIT 10**-3)       (P5)/(P2+P3+P4)
R9      45    2.0       0.4           CHRISTENS 64 SPRK
R9      54    2.08      C.35          GALBRAITH 65 SPRK
R9            1.93      0.26          BASILE    66 SPRK
R9            1.993     C.080         BCTT-BOCE 66 SPRK
R9   C        2.22      0.27          DEKKERS   66 CNTR
R9            2.12      C.18          DEBOUARC  67 SPRK    SEE NOTE C BELCW 11/67
R9   C     CEBOUARD 67 REPLACES DEKKERS 66                                  11/67
R9            1.97      0.16          FITCH     67 SPRK    ETA+-=1.91+-.06  11/67
R9            . . . . . . . . .
R9   AVG      2.0041    .0626   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

R10 *   K02 INTO (PI MU NEU)/(PI E NEU)                  (P3)/(P4)
R10           0.81      0.19          ACAIR     64 HBC
R10 N         0.78      0.15          DE BOUARC 65 CNTR    SEE NOTE N BELCW
R10 *         0.71      0.07          AUBERT    67                          11/67
R10 *         0.76      0.14    0.08  BASILE    67                          11/67
R10           0.82      0.10          DEBCUARC  67 SPRK    SEE NOTE N BELCW 11/67
R10 N      CEBOUARD 67 REPLACES DEBCUARD 65
R10    273    0.7       0.2           HAWKINS   67 HBC                       8/67
R10           0.81      C.08          HOPKINS   67 HBC                       8/67
R10           . . . . . . . . .
R10 AVG       .8043     .0569   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R10 FIT       .778      .051    VALLE FROM CONSTRAINED FIT

R11 *   K02 INTO (MU+MU-)/CHARGEC   (UNITS 10**-6)       (P6)/(P2+P3+P4)
R11         100.0 OR LESS             ANIKINA   65 CC
R11          50.0   OR LESS           ABASHIAN  66 SPRK    9C PER CT CONF
R11         250.0   CR LESS           ALFF      66 SPRK    0.90 CCNF. LEVEL
R11           2.0   CR LESS           BOTT-BOCE 67 SPRK     90 PER CT CCNF   8/67

R12 *    K02 INTO (PI+ PI- GAMMA)/TCTAL (UNITS 10**-3)  (P1C)/TOTAL
R12          15.0 OR LESS             ANIKINA   65 CC
R12           5.0  CR LESS            BELLOTTI  66 HLBC                      8/67
R12           3.0 OR LESS             NEFKENS   66 SPRK

R13 *    K02 INTC (E+ E-)/CHARGEC    (UNITS 1C**-6)      (P7)/(P2+P3+P4)
R13        1000.0 OR LESS             ANIKINA   65 CC
R13          50.0  OR LESS            ABASHIAN  66 SPRK    9C PRCT CONF
R13         200.0  OR LESS            ALFF      66 SPRK    90 PRCT CCNF
R13          23.0   CR LESS           BOTT-BOCE 67 SPRK    9C PER CT CCNF   8/67

R14 *    KC2 INTO (E MU)/CHARGEC     (UNITS 1C**-4)      (P8)/(P2+P3+P4)
R14          10.0   OR LESS           ANIKINA   65 CC
R14           1.0    CR LESS          CARPENTER 66 SPRK    9C PER CT CONF
R14           0.1C7 CR LESS           BOTT-BOCE 67 SPRK     90 PER CT CCNF   8/67

R15 *   K02 INTO(E+ PI- NEU)/(E- PI+ NEU)
R15 C   97    0.90      0.18          NEAGU     61 CC
R15 C         1.01      0.16          LUERS     64 HBC
R15 C  894    0.95      C.023         KULYUKINA 66 CC
R15 C 1539    1.06      0.05          VERHEY    66 SPRK                        8/67
R15 C   LCW PRECISION EXPTS NOT AVERAGEC.  FOR MORE PRECISE VALUE,
R15 C   SEE S1302 (BENNETT 67)

R16 *   K02 INTO(MU+ PI- NEU)/(MU- PI+ NEU)
R16   3200    1.02      C.C4          ABASHIAN  66 SPRK
R16  1C**6    1.0081    0.0027        DCRFAN    67 SPRK                       11/67

R17 *      K02 INTO (PIC PIO)/TCTAL  (UNITS 1C**-3)      (P11)/TOTAL
R17 C    7    1.2       1.5     1.2   CRIEGEE   66 SPRK
R17 C   CRIEGEE EXPT NOT DESIGNED TC MEASURE 2 PIO DECAY MCDE
R17     87    3.3       1.8     1.1   GAILLARC  67 SPRK    KS REGENER.IN CA  8/67
R17 *   GAILLARD 67 CLOTES ETA CO = 4.3(+1.1,-C.8) UNITS 1C**-3

R18 *    K02 INTO (3PIO)/(PI+PI-PIO)                     (P1)/(P2)
R18    188    2.0       C.6           ALEKSANYA 64 FBC
R18 *         1.73      0.20          BUDAGOV   67                          11/67
R18           . . . . . . . . .
R18 FIT       2.103     .214    VALLE FROM CONSTRAINED FIT

R19 *   KOL INTO (2PIC)/(3PIO)          (UNITS 1C**-2)     (P11)/(P1)
R19 C  1C9    1.89      0.31          CRONIN 1  67 SPRK    ETA00=4.9+-0.5    8/67
R19 C         1.36      C.18          CRONIN 2  67 SPRK    ETA00=3.92+-0.3  11/67
R19 C     CRONIN 2 IS PRELIM RESULT FROM FURTHER ANALYSIS CF CRONIN 1       11/67
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                    13  K02  FORM FACTORS                                    8/67

LM+ *   LAMBDA +  (LINEAR ENERGY CEPENDENCE OF F+ IN KC E3 DECAY)            8/67

LM+ *   FOR RAD. CORR. TO THE CALITZ PLCT OF KE3, SEE GINSBERG 67.

LM+ *  153   +0.07      .06           LUERS     64 DLTZ PLT,NC RAC CORR
LM+ *        +0.15      .08           FISHER    65 SPRKCLTZ PLT,NC RAC CORR  8/67
LM+ *         0.023     0.017         BASILE    67 SPRK                     11/67
LM+ *  762   -0.01      .02           FIRESTONE 67 HBC CLTZ PLT,NO RAD CORR  8/67
LM+ *  531   +0.01      .015          KADYK     67 HBC E,PI SPEC,NC RAD CCR  8/67
LM+ *  240   +0.08      .10     .08   LOWYS     67 FBC PIC SPEC,NC RAC CORR  8/67

XIA *   XIA = F-/F+ (CETERMINED FROM SPECTRA ANC KMU3/KE3)

XIA *  389   +1.1       0.9     1.3   ACAIR     64 HBC     KMU3/KE3          8/67
XIA *        +0.66      0.9     1.3   LUERS     64 HBC     KMU3/KE3          8/67
XIA * 1371   +1.2       0.8           CARPENTER 66 SPRK    MU,PI SPECTRA     8/67
XIA C 1371   -0.82      0.6           CARPENTER 66 SPRK    MU,PI SPECTRA     8/67
XIA C      2ND CARPENTER VALUE ALLOWS ENERGY CEP OF F+,F-
XIA *        -0.2       1.0     1.7   KULYUKINA 66 CC      MU,PI SPECTRA     8/67
XIA *         0.4       0.5           AUBERT    67       + KMU3/KE3         11/67
XIA *         0.8       0.7           BASILE    67 SPRK  + KMU3/KE3         11/67

XIB *   XIB = F-/F+ (CETERMINED FROM MU POLARIZATION IN KMU3)

XIB *        -1.1       0.5           ABRAMS    66 SPRK    POLARIZATICN      8/67
XIB * 2608   -1.2       0.5           AUERBACH  66 SPRK    POLARIZATICN      8/67

XIB *   MEAS OF XI USING POLARIZATION IS LESS SENSITIVE TC FORM FACTCR
XIB *   VARIATIONS ANC PROBABLY GIVES A BETTER EXPERIMENTAL VALUE
                              (SEE IDEOGRAM)
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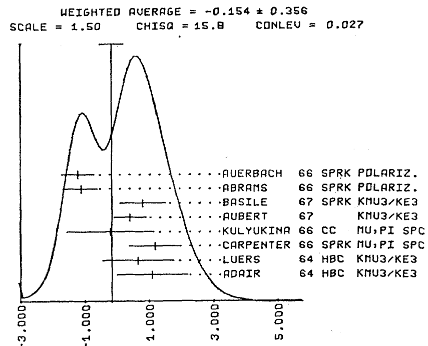
ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.



F-/F+ FOR KO DECAY (BOTH XIA AND XIB)

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                13 X =(CS=-CQ AMPLITUDE /CS=+DQ AMPLITUDE)

REX *    REAL PART CF X

REX     152    0.06      0.18      0.44  BALDO-CE  65 HLBC    K+ CHARGE EXCHNG 11/67
REX *              BALDO-CE 65 GIVES X ANC THETA.CCNVERTED EY LS TO REX AND IMX 11/67
REX     196    0.035     C.11      0.13  AUBERT    65 HLBC    K+ CHARGE EXCHNG 11/67
REX     1C9   -0.08      0.16      0.28  FRANZINI  65 HBC     PBAR P           11/67
REX *              FRANZINI 65 GIVES X ANC THETA.FCR REX ANC IMX SEE SCHMIDT 67 11/67
REX     335    0.17      C.10            HILL      67 DBC     K+D YIELCS KOPP  11/67
REX     116    0.17      0.16      0.35  FELDMAN   67 SPRK    PI-P TO KO LMBCA 11/67
REX            . . . . . . . . . .
REX AVG         .0573     .0681   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

IMX *   IMAGINARY PART CF X (USE CONVENTION THAT M(KS)-M(KL) POSITIVE)

IMX     152    0.44      C.19      0.32  BALDO-CE  65 HLBC    K+ CHARGE EXCHNG 11/67
IMX *              BALDO-CE 65 GIVES X ANC THETA.CCNVERTED EY LS TO REX AND IMX 11/67
IMX     196    0.21      0.15      0.11  AUBERT    65 HLBC    K+ CHARGE EXCHNG 11/67
IMX     109   -0.24      0.30      0.4C  FRANZINI  65 HBC     PBAR P           11/67
IMX *              FRANZINI 65 GIVES X ANC THETA.FCR REX ANC IMX SEE SCHMIDT 67 11/67
IMX     116    0.0       0.25            FELDMAN   67 SPRK    PI-P TO KO LMBCA 11/67
IMX     335    0.20      0.10            HILL      67 DBC     K+D YIELCS KOPP  11/67
IMX            . . . . . . . . . .
IMX AVG         .1874     .0709   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                 13  CP VIOLATICN PARAMETERS
     ETA+- = A(KL TO PI+PI-)/A(KS TC PI+PI-)
     ETACO = A(KL TO PIOPIO)/A(KS TC PICPIC)
     THE MAGNITUDES CF ETA+- ANC OF ETACO ARE DERIVED FRCM BR. RATICS.
     FOR VALUES OF MAGNITUDE(ETA+-) QUOTED BY INDIVIDUAL EXPTS, SEE
     LISTINGS OF S13R9.  FOR MAGNITLDE  OF ETACC,SEE S13R17,S13R19.

F+- *  PHASE OF ETA +-          (DEGREES)

F+- *         45.0      50.C            FITCH     65 SPRK    BE REGEN         11/67
F+- *         39.0      45.C            FIRESTONE 66 HBC                      11/67
F+-           60.0      17.0            BOHM      67 SPRK    VACUUM REGEN     11/67
F+-           70.0      21.C            BOTT-BOCE 67 SPRK    C REGEN          11/67
F+-           84.0      17.0            RUBBIA    67 SPRK    CU REGEN         11/67
F+-           25.0      25.C            MISCHKE   67 SPRK    CU REGEN         11/67
F+-           . . . . . . . . . .
F+- AVG       64.6C89  11.0485   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

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REFERENCES
13 LONG-LIVED NEUTRAL K (498, JP=0-) I=1/2


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BARCON   58 ANP 5 156          M BARCON,K LANDE,L LEDERMAN //COLUMBIA+BNL
CRAWFORC 59 PRL 2 361          CRAWFCRC,CRESTI,COUGLASS,GCCC + ////// LRL
ASTIER   61 AIX CONF 1 227     ASTIER,BLASKOVIC,RIVET,SIALC +/// PARIS+EP
FITCH    61 NC  22 1160        V FITCH,P PIROUE,R PERKINS ///// PRINCETON
GOOC     61 PR 124 1223        GCOC,MAISEN,MULLER,PICCICNI,POWELL +// LRL
NEAGU    61 PRL  6  552        NEAGU,OKONOV,PETROV,ROSANCVA,RUSAKOV//JINR

ALEXANCE 62 PRL 9 69           G ALEXANDER,S ALMEIDA,F CRAWFORC ///// LRL
CAMERINI 62 PR 128 362         CAMERINI,FRY,GAICCS,BIRGE,ELY +///WISC+LRL
DARMCN   62 PL 3 57            J DARMON,A ROUSSET,J SIX /////////PARIS+EP
JOVANOVI 63 BNL CCNF 42        JCVANCVIC,FISCHER,BURRIS + // BNL+MARYLANC

ADAIR    64 PL 12 67           R K ACAIR,L B LEIPUNER ////////// YALE+BNL
ALEKSANY 64 DUBNA 2 102        ALEKSANYAN,ALIKHANYAN,VARTAZARYAN+//EREVAN
  SEE ALSO  JETP 19 1C19       ALEKSANYAN+/// LEBEDEV+MCS ENG PHYS+EREVAN
ANIKINA  64 JETP 19 42         ANIKINA,ZHURAVLEVA+//GEORG ACAD SCI+ CUBNA
CHRISTEN 64 PRL 13 138         CHRISTENSCN,CRONIN,FITCH,TURLAY //PRINCETN
FUJII    64 DUBNA 2 146        FUJII,JOVANOVICH,TURKOT+//BNL,MARYLANC,MIT
LUERS    64 PR 133 B 1276      LUERS,MITTRA,WILLIS,YAMAMCTC ///////// BNL
STERN    64 PRL 12 459         STERN,BINFORC,LINC,ANDERSCN + /// WISC+LRL

ANIKINA  65 JINR P 2488        ANIKINA,VARDENGA,ZHURAVLEVA,KOTLYA+//CUBNA
ANDERSON 65 PRL 14 475         ANDERSON,CRAWFORC,GOLDEN,STERN +//LRL+WISC
ASTBURY1 65 PL 16 80           ASTBURY,FINOCCHIARO,BEUSCH + / CERN+ZURICH
ASTBURY1 65  SEE ALSC M PEPIN  HELV.PHYS. ACTA 39 523
ASTBURY2 65 PL 18 175          ASTBURY,MICHELINI,BEUSCH + /// CERN+ZURICH
ASTBURY3 65 PL 18 178          ASTBURY,MICHELINI,BEUSCH + /// CERN+ZURICH

AUBERT   65 PL 17 59           AUBERT,BEHR,CANAVAN,CHOUNET+///PARIS+CRSAY
AUBERT   65  SEE ALSC LOWYS 67
BALCC-CE 65 NC 38 684          BALCO-CECLIN,CALIMANI,CIAMPCLILLO + /PACVA
BEHR     65 ARGONNE CCNF 59    BEHR,ERISSON,BELLOTTI+ // EP+MILANO+PACCVA
CHRISTEN 65 PR 140 B 74        CHRISTENSON,CRONIN,FITCH,TURLAY//PRINCETON
  (CHRISTENSON 65 HAS BEEN CORRECTEC FOR INTERFERENCE BY FITCH 65, FOOTNOTE)

DE BOUAR 65 PL  15  58         DE BOUARD,DEKKERS,SCHARFF+//CERN+ORSAY+MPI
FISHER   65 ANL 7130 83        FISHER,ABASHIAN,ABRAMS,CARPENTER+/ILLINOIS
FITCH    65 PRL 15 73          FITCH,ROTH,RUSS,VERNON ///////// PRINCETON
FRANZINI 65 PR 140 B 127       FRANZINI,KIRSCH,PLANO + / CCLUMBIA+RUTGERS
GALBRAIT 65 PRL 14 383         GALBRAITH,MANNING,JONES +//AERE+BRIST+RHEL
GUIDONI  65 ARGONNE CCNF 49    +BARNES,FOELSCHE,FERBEL,FIRESTO+//BNL+YALE
HOPKINS  65 ARGONNE CCNF 67    H W K HOPKINS,BACON,EISLER // VANC+RUTGERS
MESTVIRI 65 JINR P 2449        MESTVIRISHVILI,NYAGU,PETRCV,RUSAKOV+//JINR
TRILLING 65 UCRL 16473         GEORGE H TRILLING ///////////////////// LRL
TRILLING 65    IS UPDATED FROM 1965 ARGONNE CONF, PAGE 115
VISHNEVS 65 PL  18   339       VISHNEVSKY,GALANINA,SEMENCV + ///// MCSCOW

ABASHIAN 66 BERKELEY 2B        ABASHIAN,ABRAMS,VERHEY+ // URBANA
ABRAMS   66 BERKELEY CONF 2B   ABRAMS ABASHIAN,CARPENTER+ ////// ILLINOIS
ALFF-STE 66 PL 21 595          ALFF-STEINBERGER,HEUER,RUBBIA +    // CERN
AUERBACH 66 PRL  17  980       AUERBACH,MANN,MCFARLANE,SCIULLI ///// PENN
AUERBACH 66 PR  149 1052       AUERBACH,DOBBS,LANDE,MANN,SCIULLI+/// PENN
AUERBACH 66    SEE ALSC PRL 14 192
BALATZ   66 BERKELEY 2B        BALATZ,BEREZIN,VISNEVSKY,GALANINA+//MCSCOW
BALCC-CE 66 NC  45A  733       BALCO-CEOLIN,CALIMANI,CIAMPCLILLO+///PACUA
BASILE   66  BALATCN CONF      BASILE,CRCNIN,THEVENET +           // SACLAY

BEHR     66 PL   22  540       BEHR,BRISSON,BALCC-CEOLIN,AUBERT+/PACUA,EP
BELLOTTI 66 NC   45A  737      BELLOTTI,PULLIA,BALDO-CECLIN+ /MILAN,PACUA
BOTT-BCC 66 PL   23  277       BCTT-BOCENHAUSEN,CE BOUARC,CASSEL+ // CERN
CAMERINI 66 PR   150 1148      CAMERINI,CLINE,ENGLISH,FISCHBEIN+WISCCNSIN
CANTER   66 PRL 17 942         +CHO,ENGLER,FISK,HILL +    // CARNEGIE+BNL
CARPENTE 66 PR   142  871      CARPENTER,ABASHAN,ABRAMS,FISHER///ILLINCIS
CHANG    66 PL   23  702       CHANG,BASSANO,KIKUCHI,DOCC+// SYRACUSE,BNL

CRIEGEE  66 PRL 17 150         +FOX,FRAUENFELDER,HANSON,MCSCAT+//ILLINOIS
DEKKERS  66 THESIS BRUSSELS    D DEKKERS + ////////////////////////// CERN
FIRESTCN 66 PRL 16 556         FIRESTONE,KIM,LACH,SANDWEISS+/////YALE,BNL
FIRESTON 66 PRL 17 116         FIRESTONE,KIM,LACH,SANDWEISS+/////YALE,BNL
FUJII    66 PRL 13 253         FUJII,JOVANOVICH,TURKOT,ZCRN//BNL+MARYLANC
  (FUJII 66 IS THE CORRECTED VALUE GIVEN BY JCVANOVICH+ 66)
GOLDEN   66  BERKELEY 2B       R.GOLCEN,F.CRAWFCRD,C.STERN          // LRL
HAWKINS  66 PL 21 238          C J B HAWKINS ///////////////////////// YALE
 ALSO    67 PR  156  1444      C J B HAWKINS ///////////////////////// YALE

HILL     66 BNL 1C608          HILL,ROBINSCN,SAKITT,CANTER+//BNL,CARNEGIE
JOVANOVI 66 PRL 17 1C75        JCVANCVICH,FUJII,TURKOT,ZCRN +//BNL+MC+MIT
KULYUKIN 66  BERKELEY 2B       KULYUKINA,MESTVIRISHVILI,NEAGU,PETR+//JINR
MEISNER1 66 PRL 16 278         G W MEISNER,B B CRAWFORC,F CRAWFORD // LRL
MEISNER2 66 PRL  17  492       G MEISNER,B CRAWFORD,F CRAWFCRD ////// LRL
MEHLHOP  66    BERKELEY CCNF.  MEHLHCP,GCOC,PICCIONI +          // LA JOLLA
MISCHKE  66    BERKELEY CONF.  + ABASHIAN,ABRAMS,CARPENTER +  // ILLINOIS
NEFKENS  66 PL 19 7C6          NEFKENS,ABASHIAN,ABRAMS,CARPENTER+ /// ILL
VERHEY   66 PRL 17 669         VERHEY,NEFKENS,ABASHIAN+// URBANA

AUBERT   67 HEIDELBERG CONF    AUBERT,HEUSS,LECCNG,NAGY,PASCAUC /// CRSAY
BASILE   67 HEIDELBERG CONF    BASILE,CRCNIN,THEVENET,TURLAY+ //// SACLAY
BEHR     67 HEIDELBERG CONF    BEHR,BEILLIERE,BOUTANG,VANCERVERLDE/////EP
BENNETT  67 PRL  19  993       BENNETT,NYGREN,SAAL,STEINBERGER +/COLUMBIA
BOHM     67 HEIDELBERG CONF    BOHM,CARRIULAT,GROSSC,KAFTANCV ////// CERN
BOTT-BOC 67 PL  24B  194       BCTT-BODENHAUSEN,DEBOUARC,CASSEL + ///CERN
BOTT-BOC 67 PL  24B  438       BCTT-BODENHAUSEN,DEBOUARC,CEKKERS+////CERN
    ALSC 66 PL   20  212       BCTT-BOCENHAUSEN,CEBOUARC,CASSEL+/////CERN
    ALSC 66 PL   23  277       BCTT-BOCENHAUSEN,CEBOUARC,CASSEL+/////CERN
BUDAGOV  67 HEIDELBERG CONF.   BUDAGCV,BURMEISTER,CUNDY,KRENZ,MYATT+/CERN
CANTER   67 HEIDELBERG CONF    CANTER,CHC,DRALLE,ENGLER+ /// CARNEGIE,BNL
CRONIN 1 67 PRL 18 25          +KUNZ,RISK,WHEELER//////////PRINCETCN
CRONIN 2 67 PRINC CCNF(11/67)  +KUNZ,RISK,WHEELER ///////////// PRINCETCN
DEBCUARC 67 NC TO BE PUB       DEBOUARC,CEKKERS,SCHARFF+///CERN+ORSAY+MPI
DEVLIN   67 PRL 18 54 .        DEVLIN,SOLOMON,SHEPARD,BEALL+//PRINC+MARY.
DORFAN   67 PRL  19  987       DCRFAN,ENSTROM,RAYMOND,SCHWARTZ +/SLAC+LRL
FELDMAN  67 PR  155  1611      FELCMAN,FRANKEL,HIGHLANC,SLCAN //U CF PENN
FIRESTCN 67 PRL 18  176        FIRESTONE,KIM,LACH,SANDWEISS,+////YALE,BNL
FITCH    67 PR TO BE PUB       FITCH,RCTH,RUSS,VERNCN ///////// PRINCETON
GAILLARC 67 PRL 18 2C          +KRIENEN,GALBRAITH,HUSSRI+//CERN+RUTH+AACH
GINSBERG 67 PR 162  1570       ECWARC S GINSBERG ///////// U. MASS BCSTON
HAWKINS  67 PR  156  1444      C J B HAWKINS ///////////////////////// YALE
HILL     67 PRL  19  668       HILL,LUERS,ROBINSCN,CANTER+///BNL,CARNEGIE
HOPKINS  67 PRL 19  185        HCPKINS,BACCN,EISLER ////////////////// BNL
KADYK    67 PRL 19  597        KADYK,CHAN,CRIJARC,OREN,SHELCCN ///////LRL
LOWYS    67 PL  24B  75        LCWYS,AUBERT,CHCUNET,PASCALC+/////EP,CRSAY
MISCHKE  67 PRL 18  138        MISCHKE,ABASHIAN,ABRAMS+///////// ILLINCIS
RUBBIA   67 PL  24B  531       C.RUBBIA,J.STEINBERGER/////////// CERN+COL
  ALSO   66 PL  20  2C7        ALFF-STEINBERGER,HEUER,KLEINKNECHT+///CERN
  ALSO   66 PL  21  595        ALFF-STEINBERGER,HEUER,KLEINKNECHT+///CERN
  ALSO   66 PL  23  167        C.RUBBIA,J.STEINBERGER ///////////CERN+COL
SCHMIDT  67 NEVIS 16C(THESIS)  P. SCHMIDT ////////////////////// COLUMBIA
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                 14  ETA (549,JPG=0-+)  I=C

                 14  ETA MASS  (MEV)

M       53  549.0      1.2            BASTIEN   62 HBC
M       35  546.0      4.0            PICKUP    62 HBC
M       91  548.0      1.0            ALFF      62 HBC
M           549.3      2.9            DELCOURT  63 CNTR
M      148  549.0      0.7            FOELSCHE  64 HBC
M      325  552.0      3.0            KRAEMER   64 DBC
M           548.2      0.65           FOSTER3   65 HBC
M      250  555.0      2.0            JAMES     66 HBC
M           . . . . . . . . . .
M   AVG     548.8176    .5570   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.4)

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                 14  ETA  WICTH (MEV)

W       91   10.0   CR LESS           ALFF      62 HBC
W      148   10.0   CR LESS           FOELSCHE  64 HBC
W       31   12.0   CR LESS           JAMES     66 HBC
W             4.0   CR LESS           BALTAY    66 DBC
W              .9   CR LESS           JONES     66 CNTR    .95 CONF.LEVEL    8/67

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                 14  ETA PARTIAL DECAY MODES

P1     ETA INTO 2GAMMA                                   S 0S 0
P2     ETA INTO 3PIC                                     S 9S 9S 9
P3     ETA INTO PI+ PI- PIO                              S 8S 8S 9
P4     ETA INTO PI+ PI- GAMMA                            S 8S 8S 0
P5     ETA INTO   E+E-PIO        VICLATES C IN E.M.I.    S 9S 3S 3
P6     ETA INTO E+E-PI+PI-                               S 8S 8S 3S 3
P7     ETA INTO PIO 2GAMMA                               S 9S 0S 0
P8     ETA INTO E+E-GAMMA                                S 3S 3S 0
P9     ETA INTO 2PIO GAMMA       VICLATES C              S 9S 9S 0
P10    ETA INTO PI+PI-PIO GAMMA                          S 8S 8S 9S 0
P11    ETA INTO PI+PI- 2GAMMA                            S 8S 8S 0S 0

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                 14 ETA DECAY RATES

W1   *  ETA INTO 2GAMMA (UNITS KEV)                       (P1)
W1           0.93     0.2           BEMPORAC  67 CNTR    PRIMAKOFF EFFECT 11/67
     *    ASSUMES THAT  2GAMMA/TCTAL =C.41+/- C.C2

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Eta decay into neutrals

If we use all of the data in the card listings in our constrained fitting program, we find that the overall eta-decay fit has $\chi^2/\langle\chi^2\rangle$ of 59/27, which corresponds to a confidence level of $\sim 10^{-4}$! The difficulty is that there have recently been reported some new results from experiments on etas decaying into neutrals which seriously disagree with the set of older data on these modes. These experiments are:

"Old" experiments	"New" experiments
DiGiugno 66	Buniatov 67
Grunhaus 66	Baltay1 67
Feldman 67	Jacquet 67
Bacci 63	
Muller 63	

The primary difference between these two sets is that the newer experiments all give $\eta \to \pi^0\gamma\gamma \approx 0$, whereas the older experiments gave $\eta \to \pi^0\gamma\gamma \approx 20\%$.

If we delete either the "old" data or the "new" data, we find $\chi^2 \approx \langle\chi^2\rangle$, and thus reasonable probabilities. The results of these fits are as follows:

Mode	Using "new" data	Using "old" data
$\gamma\gamma$	0.42±.02	0.34±.02
$\pi^0\gamma\gamma$	0.01±.02	0.19±.03
$3\pi^0$	0.28±.03	0.18±.03
$\pi^+\pi^-\pi^0$	0.24±.01	0.23±.01
$\pi^+\pi^-\gamma$	0.06±.005	0.05±.005

We thus cannot quote meaningful central values or errors on the neutral modes at this time. However, it seems reasonable that the final central values for these modes will lie between the two extremes listed above, once the inconsistancies among the various experiments are finally resolved.

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                    14 ETA   BRANCHING RATIOS

            (P9) IS ASSUMED = 0 IN ALL RATIOS

R1   *    ETA.INTC NEUTRALS/CHARGED                        (P1+P2+P7)/(P3+P4)
R1   N   10    2.5       1.0            PICKUP    62 HBC
R1   N   53    3.20      1.26           BASTIEN   62 HBC
R1   N         2.7       0.8            SHAFER    62 HBC
R1             2.6        .9            BUSCHBECK 63 HBC
R1   N  280    4.5       1.0            JAMES     66 HBC
R1   N    THIS EXPERIMENT HAS NOT BEEN USED IN COMPUTING THE AVERAGES
R1   N  AS IT WAS UNABLE TO CLEARLY SEPARATE PARTIAL MODES (3) AND (4)
R1   N  FROM EACH OTHER.  THE REPORTED VALUE THUS PROBABLY CONTAINS
R1   N  SOME (UNKNOWN) FRACTION OF MODE (4), AS POINTED OUT BY E.C. FOWLER
R1          '  2.64      0.23           BALTAY2   67 DBC                    11/67
R1          . . . . . . . . . .
R1   AVG       2.6375    .2228    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R1   FIT       2.465     .161     VALUE FROM CONSTRAINED FIT

R2   *  ETA INTO 2GAMMA/CHARGED                            (P1)/(P3+P4)
R2             0.99      0.48           CRAWFORD  63 HBC
R2          . . . . . . . . . .
R2   FIT       1.281     .110     VALUE FROM CONSTRAINED FIT

R3   *    ETA INTO PIO 2GAMMA/NEUTRALS                     (P7)/(P1+P2+P7)
R3             0.375     0.072          DIGIUGNO  66 CNTR   ERROR DOUBLED
R3   *    THE ERRORS OF DIGIUGNO+ 66 HAVE BEEN INCREASED BY A FACTOR
R3   *  OF TWO, TO TAKE INTO ACCOUNT POSSIBLE SYSTEMATIC ERRORS, AS
R3   *  SUGGESTED BY THE AUTHORS.
R3              .27       .10           GRUNHAUS  66 SPRK                   8/67
R3              .244      .05           FELDMAN   67 SPRK                   8/67
R3              .028      .044          BUNIATOV  67 SPRK                  11/67
R3          . . . . . . . . . .
R3   AVG        .1748     .0773   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.7)
R3   FIT        .142      .047    VALUE FROM CONSTRAINED FIT
                    (SEE IDEOGRAM)

R4   *  ETA INTO (PI+ PI- GAMMA)/(PI+ PI- PIO)             (P4)/(P3)
R4             0.14      0.08           FOELSCHE  64 HBC
R4   M   24    0.73      0.25           PAULI     64 DBC
R4   M    THIS EXPERIMENT HAS NOT BEEN INCLUDED IN THE AVERAGES SINCE
R4   M  IT IS NOT CLEAR THAT THEIR CLASS B EVENTS ARE ACTUALLY FROM ETAS.
R4             0.30      0.06           CRAWFORD  66 HBC
R4              .10       .10           KRAEMER   64 DBC
R4              .196      .041          FOSTER3   65 HBC
R4              .25       .035          LITCHFIEL 67 DBC                    8/67
R4             0.28      0.04           BALTAY2   67 DBC                   11/67
R4          . . . . . . . . . .
R4   AVG        .2377     .0229   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
R4   FIT        .235      .021    VALUE FROM CONSTRAINED FIT

R5   *    ETA INTO (3PIO + 2/3 PIO 2GAMMA)/ PI+PI-PIO      (P2+2/3P7)/P3
R5             0.83      0.32           CRAWFORD  63 HBC
R5             2.0       1.0            FOELSCHE  64 HBC
R5             0.90      0.24           FOSTER1   65 HBC
R5          . . . . . . . . . .
R5   AVG        .9148     .1886   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R5   FIT       1.318      .109    VALUE FROM CONSTRAINED FIT

R6   *  ETA INTO 3PIO/2GAMMA                               (P2)/(P1)
R6              .90  OR MORE            CHRETIEN  62 PBC
R6   P         0.42  OR LESS            STRUGALSK 67 HBC  PRELIMINARY REPORT  4/67
R6             0.88      0.16           BALTAY1   67 DBC                   11/67
R6          . . . . . . . . . .
R6   FIT        .651      .103    VALUE FROM CONSTRAINED FIT

R7   *  ETA INTO 2GAMMA/(PI+ PI- PO)                       (P1)/(P3)
R7             1.61      0.39           FOSTER1   65 HBC
R7          . . . . . . . . . .
R7   FIT       1.581      .137    VALUE FROM CONSTRAINED FIT

R8   *    ETA INTO NEUTRAL/(PI+ PI- PIO)                   (P1+P2+P7)/(P3)
R8      280    3.6       0.8            KRAEMER   64 DBC
R8             3.8       1.1            PAULI     64 DBC
R8             2.89      0.56           ALFF-STEI 66 HBC
R8          . . . . . . . . . .
R8   AVG       3.2237     .4234   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R8   FIT       3.043      .200    VALUE FROM CONSTRAINED FIT

R9   *  ETA INTO  (E+E-PIO)/(PI+PI-PIO)  (UNITS 10**-2) (P5)/(P3)
R9             1.1   OR LESS            PRICE     65 HBC
R9        0    0.77  OR LESS            FOSTER2   65 HBC
R9              .42  OR LESS            BAGLIN1   67 HLBC   .9 CONF.LEVEL   8/67
R9        0     .16  OR LESS            BILLING   67 HLBC   .9 CONF.LEVEL  11/67

R10 *     ETA INTO (E+E-PI+PI-)/TOTAL  (UNITS 10**-2)      (P6)/TOTAL
R10            0.7 OR LESS              RITTENBER 65 HBC

R11 *     ETA INTO (E+E-PI+PI-)/(PI+PI-GAMMA)              (P6)/(P4)
R11       1    0.026     0.026          GROSSMAN  66 HBC

R12 *     ETA INTO 2 GAMMA/NEUTRALS                        (P1)/(P1+P2+P7)
R12            0.416     0.044          DIGIUGNO  66 CNTR   ERROR DOUBLED
R12             .44       .07           GRUNHAUS  66 SPRK                   8/67
R12             .579      .052          FELDMAN   67 SPRK                   8/67
R12 T          0.39      0.06           JONES     66 CNTR                   8/67
R12 T  THIS RESULT FROM COMBINING CROSS-SECTIONS FROM TWO DIFFERENT EXPTS.
R12             .59       .033          BUNIATOV  67 SPRK                  11/67
R12         . . . . . . . . . .
R12 AVG         .5280     .0456   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.0)
R12 FIT         .520      .027    VALUE FROM CONSTRAINED FIT
                    (SEE IDEOGRAM)

R13 *     ETA INTO 3PIO/NEUTRALS                           (P2)/(P1+P2+P7)
R13 R          0.209     0.054          DIGIUGNO  66 CNTR   ERROR DOUBLED
R13 R           .29       .10           GRUNHAUS  66 SPRK                   8/67
R13 R           .177      .035          FELDMAN   67 SPRK                   8/67
R13 R           .41       .033          BUNIATOV  67 SPRK                  11/67
R13 R REDUNDANT INFORMATION FROM THIS EXPERIMENT
R13         . . . . . . . . . .
R13 FIT         .338      .045    VALUE FROM CONSTRAINED FIT

R14 *       ETA INTO PIO 2GAMMA/2GAMMA                     (P7)/(P1)
R14             .5   OR LESS            WAHLIG    66 SPRK    .9 CONF LEVL
R14 P          0.86      0.47           STRUGALSK 67 HBC  PRELIMINARY REPORT  4/67
R14            0.0       0.14           BALTAY1   67 DBC                   11/67
R14 *          0.05      0.04           BONAMY    67 SPRK                  11/67
R14         . . . . . . . . . .
R14 FIT         .274      .097    VALUE FROM CONSTRAINED FIT

R15 *       ETA INTO (E+E-PIO)/TOTAL (UNITS 10**-2)        (P5)/TOTAL
R15            0.7 OR LESS              RITTENBER 65 HBC
R15            0.13  OR LESS            BAZIN     67 DBC                   11/67

R16 *     ETA INTO 2GAMMA/(3PIO + PIO 2GAMMA)              (P1)/(P2+P7)
R16            0.80       .25           BACCI     63 CNTR
R16         . . . . . . . . . .
R16 FIT        1.082      .114    VALUE FROM CONSTRAINED FIT

R17 *     ETA INTO (PI+PI-PIO GAMMA)/(PI+PI-PIO)           (P10)/(P3)
R17             .07  OR LESS            FLATTE    67 HBC                    8/67
R17             .009 OR LESS            PRICE     67 HBC                    8/67
R17             .016 OR LESS            BALTAY2   67 DBC    .95 CONF LEVL  11/67
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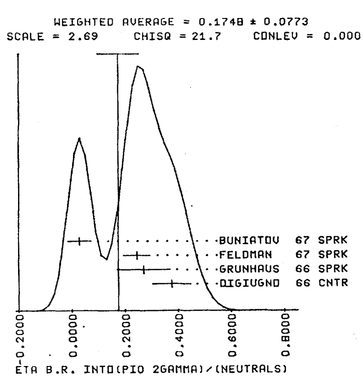

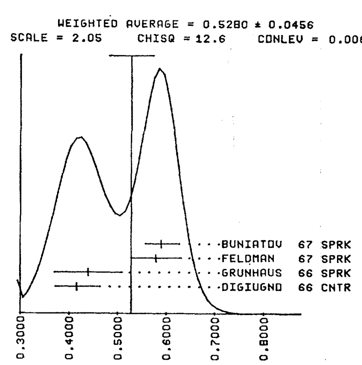

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED

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R18 *    ETA INTO (PI+PI- 2GAMMA)/(PI+PI-PIO)              (P11)/(P3)
R18             .009 CR LESS           PRICE     67 HBC                        8/67
R18             .016 CR LESS           BALTAY2   67 DBC       .95 CONF LEVL   11/67

R19 *  ETA INTO 3PIO/(PI+ PI- PIO)                          (P2)/(P3)
R19           1.05      .25            MICHAEL   67 HLBC                       8/67
R19           1.3       .4             BAGLIN2   67 HLBC                       8/67
R19         . . . . . . . . . .
R19 AVG       1.1202    .2120   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R19 FIT       1.029     .140    VALUE FROM CONSTRAINED FIT

R20 *    ETA INTO 2GAMMA/(3PIO +2/3 PIO 2GAMMA)            (P1)/(P2+2/3P7)
R20           1.10      0.5            MULLER    63 DBC
R20         . . . . . . . . . .
R20 FIT       1.200     .124    VALUE FROM CONSTRAINED FIT

R21 *  ETA INTO NEUTRALS/TOTAL                             (P1+P2+P7)/TOTAL
R21            .79      .08            BUNIATOV  67 SPRK                      11/67
R21         . . . . . . . . . .
R21 FIT        .711     .013    VALUE FROM CONSTRAINED FIT

R22 *  ETA INTO PIZRC 2GAMMA/TOTAL                          (P7)/TOTAL
R22            .12  CR LESS            JACCUET   67 HLBC                      11/67
R22         . . . . . . . . . .
R22 FIT        .101     .034    VALUE FROM CONSTRAINED FIT

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                    14  ETA C-NCNCONSERVING DECAY PARAMETER

A   CECAY ASYMMETRY PARAMETER FCR PI+ PI- PIO   (UNITS 1C**-2)
A     1351    7.2       2.8            BALTAY    66 DBC
A      355    8.7       5.3            FOWLER    66 HBC
A      705   -6.1       4.0            LARRIBE   66 HBC                        8/67
A    10665    0.3       1.0            CNOPS     66 SPRK                       8/67
A     1300    5.8       3.4            OTHERS    66 HBC
A           . . . . . . . . . .
A   AVG       1.2564    1.5470  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.8)
                   (SEE IDEOGRAM)

B   CECAY ASYMMETRY PARAMETER FCR PI+ PI- GAMMA
B       33   -0.02      C.17           CRAWFORC  66 HBC                       11/66
B     1620    .C15      .C25           BOWEN     67 SPRK                       8/67
B   N AEOVE EXPERIMENT IS SENSITIVE ONLY TC UPPER .4 OF GAMMA-RAY SPECTRUM
B             -.04      .08            LITCHFIEL 67 DBC                        8/67
B           . . . . . . . . . .
B   AVG       .0095     .0236   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

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                               REFERENCES
                               14 ETA(549,JPG=C-+)I=0

PEVSNER  61 PRL 7 421          PEVSNER,KRAEMER,NUSSBAUM,RICHARCSON +//JHU

ALFF     62 PRL 9 322          ALFF,EERLEY,COLLEY,BRUGGER +///CCL+RUTGERS
BASTIEN  62 PRL 8 114          BASTIEN,BERGE,DAHL,FERRO-LUZZI + ///// LRL
CHRETIEN 62 PRL 9 127          CHRETIEN+ //BRANC+BROWN+HARVARD+MIT+PACCVA
PICKUP   62 PRL 8 329          E PICKUP,ROBINSCN,SALANT ///// NRC+CAN+BNL
SHAFER   62 CERN CONF 307      J SHAFER,FERRO-LUZZI,MURRAY + ///// UC+LRL

BACCI    63 PRL 11 37          BACCI,PENSO,SALVINI + //RCME U+CNEN FRASCA
BUSCHBEC 63 SIENA CONF 1 166   BUSCHBECK-CZAPP,COOPER + //VIENNA+CERN+AMS
CRAWFORC 63 PRL 10 546         F S CRAWFORC,LLCYD,FOWLER /////// LRL+DUKE
     ANC    PRL 16 9C7         F S CRAWFCRC,L LLCYD,E FCWLER   //LRL+DUKE
DELCCURT 63 PL 7 215           DELCOURT,LEFRANCCIS,PEREZ Y JORBA+// CRSAY
MULLER   63 SIENA CCNF 99      MULLER,PAULI + //LPCHE+SACLAY IF+ROME+INFN

FOELSCHE 64 PR 134 B 1138      H W FCELSCHE,H L KRAYBILL /////////// YALE
KRAEMER  64 PR 136 B 496       KRAEMER,MADANSKY,FIELDS + // JHU+NW U+WCOC
PAULI    64 PL 13 351          E PAULI,A MULLER //////////// LPCHE+SACLAY

FOSTER1  65 PR 138 B 652       FCSTER,PETERS,MEER,LOEFFLER +//WISC+PURCUE
FOSTER2  65 ATHENS             FCSTER,GOCD,MEER                //WISCCNSIN
FOSTER3  65 THESIS             M.C.FCSTER                      //WISCCNSIN
PRICE    65 PRL  15  123       L.R.PRICE,F.S.CRAWFORD               //LRL
RITTENBE 65 PRL 15 556         RITTENBERG,KALBFLEISCH /////////// LRL+BNL

ALFF-STE 66 PR 145 1C72        ALFF-STEINBERGER,BERLEY+//CCLUMBIA+RUTGERS
BALTAY   66 PRL 16 1224        +FRANZINI,KIM,KIRSCH+/COLUMBIA+STONY BROOK
CRAWFORC 66 PRL  16  333       F.S.CRAWFCRC,L.R.PRICE               //LRL
DIGIUGNC 66 PRL 16 767         DIGIUGNO,GIORGI,SILVESTRI+//NAP+TRST+FRASC
GROSSMAN 66 PR 146  593        R GROSSMAN,L PRICE,F CRAWFCRC //////// LRL
GRUNHAUS 66 THESIS             J.GRUNHAUS                      //CCLUMBIA
JAMES    66 PR 142   896       F E JAMES,H L KRAYBILL ////////// YALE+BNL
JONES    66 PL 23  597         JCNES,BINNIE,DUANE,HORSEY,MASON,+/ICL+RUTH
WAHLIG   66 PRL  17  221       WAHLIG,SHIBATA,MANNELLI          //MIT+PISA

BAGLIN1  67 PL 24B 637         BAGLIN,EEZAGUET,CEGRANGE,+      //E.POLY+UC
BAGLIN2  67 BAPS 12 567        BAGLIN,BEZAGUET,CEGRANGE,+      //E.POLY+UC
BALTAY1  67 PRL (TO BE PUB)    BALTAY,FRANZINI,KIM,NEWMAN,YEH,+    /COLUM
BALTAY2  67 PRL (TO BE PUB)    BALTAY,FRANZINI,KIM,NEWMAN+/COLUM+STONY BK
BAZIN    67 PRL 19 1157        BAZIN,GOSHAW,ZACHER,+     /PRINCETON,QUEENS
BEMPCRAC 67 PL 25B 38C         BEMPORAC,BRACCINI,FOA,LUBELSMEY+/PISA,BONN
    ANC     PRIVATE COMMUNICATICN
BILLING  67 PL 25B 435         BILLIG,BULLCCK,ESTEN,GOVAN,+       //UCL,OXF
BONAMY   67 HEICELBERG CONF.   BCNAMY,SONDEREGGER                 //SACLAY
BUNIATOV 67 PL 25E 560         BUNIATOV,ZAVATTINI,DEINET,+     /CERN,KARLS
FELCMAN  67 PRL 18 866         FELCMAN,FRATI,GLEESON,HALPERN,+       /PENN
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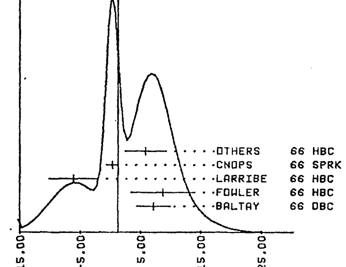
WEIGHTED AVERAGE = 1.26 ± 1.55
SCALE = 1.77   CHISQ = 12.6   CONLEV = 0.014



ETA C-NONCONSERVING DECAY PARAM. PERCENT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FLATTE   67 PRL 18 976         S.M.FLATTE                            /LRL
JACCUET  67 PL 25B 574         JACQUET,NGUYEN-KHAC,BAGLIN+/EC.POLY,BERGEN
MICHAEL  67 THESIS             W.B.MICHAEL                            //UC
PRICE    67 PRL 18 1207        L.R.PRICE,F.S.CRAWFORD                 /LRL
STRUGALS 67 JINR-E1-3100       STRUGALSKI,CHUVILO,IVANOVSKAJA,+   //DUBNA

        QUANTUM NUMEER DETERMINATICNS NOT REFERREC TC IN THE DATA CARCS

BASTIEN  62 PRL 8 114          BASTIEN,BERGE,DAHL,FERRC-LUZZI,MILLER+/LRL
CARMCNY  62 PRL 8 117          D CARMONY,A ROSENFELC,VAN CE WALLE /// LRL
ROSENFEL 62 PRL 8 293          A ROSENFELD,C CARMONY,VAN CE WALLE /// LRL

                REFERENCES ON ETA ASYMMETRY PARAMETERS

BALTAY   66 PRL  16  1224      BALTAY,FRANZINI,KIM,KIRSCH+/COLUM+STCNY BK
CNOPS    66 PL 22 546          CNOPS,FINOCCHIARS,LASSALLE,+/CERN+ZUR+SACL
CRAWFORC 66 PRL  16  333       F.S.CRAWFCRC,L.R.PRICE                //LRL
FOWLER   66 BAPS 11  38C       E.C.FCWLER                           //DUKE
LARRIBE  66 PL 23 60C          LARRIBE,LEVECUE,MULLER,PAULI,+  /SACL+RUTH
OTHERS   66 PR 149  1044       CCLUMBIA,LRL,PURCUE,WISCCNSIN,YALE

BOWEN    67 PL 24B 206         BCWEN,CNOPS ,FINOCCHIARO,+ //CERN+ZUR+SACL
LITCHFIE 67 PL 24B 486         LITCHFIELC,RANGAN,SEGAR,SMITH+/RUTH+SACLAY

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p

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                    16  PROTON  (938,J=1/2)  I=1/2

                    16  PROTON  MASS (MEV)

M           938.256    0.005           COHEN     65 RVUE

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                    16  PROTON LIFETIME  (UNITS 10**26 YR)

T    *      CVER  10**20  YRS          GOLDHABER 54 TH 232 FISS.MOCE INDEPEN
T    *      CVER  2.0 * 10**23 YRS     FLEROV    57 TH 232 FISS.MODE INDEPEN
T    *  CVER                 1.5       BACKENSTC 60 CNTR
T    *  CVER                60.0       KROPP     65 CNTR
T    *    KROPP ANC BACKENSTOSS SENSITIVE TO PARTICULAR CECAY MODES CF PROT

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                    16 PROTCN MAGNET. MCMENT(E/2MP)

MM          2.792763 C.000030          COHEN     65 RVUE

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                               REFERENCES
                               16 PRCTCN (938,J=1/2) I=1/2

GOLDHABER 54 PR 96 1157 FNOTE2 M GOLDHABER,F REINES+ /////LCS ALAMCS,BNL
FLERCV    57 SOV PHYS DOK 3 78 FLEROV,KLOCHKOV,SKOBKIN,TERENTEV //// USSR
BACKENST 6C NC    16   749     BACKENSTOSS,FRAUENFELDER,HYAMS + //// CERN
COHEN     65 RMP 37 537        E R CCHEN, J W M DUMOND //// NAASC+CALTECH
KROPP     65 PR 137 B 740      W R KROPP,F REINES ///CASE INST TECHNCLOGY

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                    17  NEUTRON (939,J=1/2)  I=1/2

                    17  NEUTRON-PROTON MASS DIF.(MEV)

D           1.2939   C.0004           BCNCELIC  60 CNTR
D           1.2933   C.0001           SALGC     64 CNTR
D         . . . . . . . . . .
D    AVG    1.2933    .0001   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.5)

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                    17  NEUTRON LIFETIME (UNITS 10**3 SEC)

T           1.01     C.03     0.03  SCSNOVSKI 59 PILE

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                    17  NEUTRON MAGNETIC MOMENT (MAGNETCNS,938.2 MEV)

MM        -1.913148 C.000066          COHEN     56 RVUE

AV   *   GA/GV FOR NEUTRCN BETA CECAY (SEE TEXT FCR SIGN CCNVENTION)
AV          -1.18     C.C2            BHALLA    66                         11/67

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                               REFERENCES
                               17 NEUTRON (939,J=1/2) I=1/2

COHEN    56 PR 104 283         V W CCHEN, CORNGCLC, RAMSEY // BNL+HARVARC
SOSNCVSK 59 JETP  9  717       SCSNOVSKII,SPIVAK,PROKOFEV + // IAE MCSCOW
BONCELIC 60 PR  120  887       BCNCELID,BUTLER,KENNECY +//USNRL+CATH UNIV
SALGC    64 NP   53  457       R SALGC, STAUB, WINKLER, ZAMBONI // ZURICH
COHEN    65 RMP 37 537         E R CCHEN,DUMCNC ///// NAASC+CAL INST TECH
BHALLA   66 PL 19  651         C P BHALLA /////////////////////// ALABAMA

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                    16  LAMBDA (1115,JP=1/2+)  I=0

                    18  LAMBDA  MASS (MEV)
    M   N SEE NCTE PRECECING SIGMA- MASS LISTINGS
M          1115.44     C.12            BHOWMIK   63 RVUE +  SEE NOTE L BELCW
M   L  ABOVE LAMBCA MASS HAS BEEN RAISEC 35 KEV TO ACCCUNT FOR 46 KEV
M   L  INCREASE IN PRCTON MASS ANC 11 KEV CECREASE IN CHARGED PION MASS.
M   *  635 1115.86     C.C9            BALTAY    65 HBC     ERRCR IS STATIS.
M   N      1115.61     C.C7            SCHMIDT   65 HBC
M   N SEE NCTE PRECECING LAMBCA MASS LISTINGS
M   S 1147 1115.74     0.04            CHIEN     66 HBC     6.9 PBAR P      9/67
M   S  972 1115.69     C.05            CHIEN     66 HBC     6.9 PBAR PANTIL 9/67
M   S      ERROR PURELY STATISTICAL
M          1115.6      0.4             LCNCCN    66 HBC
M   *      1116.0      C.2             BADIER    67 HBC     2.4 PBAR P,LLBAR 8/67
M       195 1115.39    C.12            MAYEUR    67 EMUL                    11/67
M        . . . . . . . . . .
M   AVG    1115.4230    .C830   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

                    16  LAMCA - ANTILAMBDA MASS CIFFERENCE (MEV)
DM          0.05       0.06            CHIEN     66 HBC      6.9 PBAR P      9/67
DM          0.25       0.15            BADIER    67 HBC     2.4 PBAR P       8/67
DM        . . . . . . . . . .
DM  AVG      .0831      .0828   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.5)

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.


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                  18  LAMBCA LIFETIME (UNITS 10**-10)

T      188    2.63     C.21     0.21  BCLCT      58 CC
T      825    2.72     0.16     0.16  CRAWFORC   59 HBC
T      140    2.72     0.29     0.27  BCWEN      60 CC
T      186    2.60     0.28     0.2C  C-C CHANG  62 HBC
T      799    2.69     C.11     0.11  HUMPFREY   62 FBC
T     2239    2.36     C.06     0.06  BLOCK      63 HEBC
T      706    2.76     0.20           CFRETIEN   63 PBC
T      794    2.59     0.09           HUBBARD    64 HBC
T     2260    2.31     C.10           KREISLER   64 SPRK
T     1378    2.59     C.07           SCHWARTZ   64 HBC
T      635    2.51     0.16           BALTAY     65 HBC
T     2534    2.6      0.1            HILL       65 SPRK
T   U 6473    2.62     0.05           ARMENTERC  66 HBC                        8/67
T      916    2.35     C.09           BURAN      66 HLBC
T   S 1147    2.5C     0.14           CHIEN      66 HBC      6.9 PEAR P        9/67
T   S  972    2.70     0.20           CHIEN      66 HBC      6.9 PBAR P,ANTI   9/67
T   S      ERROR PURELY STATISTICAL
T     2213    2.452    C.056    0.054 ENGELMANN  66 HBC
T      585    2.66     C.13     0.11  AUERBACH   67 SPRK                       8/67
T   *         2.44     0.15           BADIER     67 HBC     2.4 PBAR P         8/67
T   *         2.55     C.15           BADIER     67 HBC     2.4 PBAR P,ANTIL   8/67
T          . . . . . . . . . .
T   AVG     - 2.5191   .0351  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.4)
                   (SEE IDEOGRAM)

T   U  UNPUBLISHED MEASUREMENTS (EXCEPT THESES) NOT INCLUDED IN AVERAGE


                   18  LIFETIME CIFFERENCE,(LAMBDA-ANTILAMCA)/AVERAGE
DT            0.044    C.085          BADIER     67 HBC     2.4 PBAR P         8/67
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                   18  LAMBDA MAGNETIC MOMENT (MAGNETCNS,938.26 MEV)

MM            -1.5     0.5            CCOL       62 SPRK
MM             0.0     C.6            KERNAN     63 CC
MM     8553   -1.39    0.72           ANDERSON   64 HBC
MM      151   -0.5     0.28           CHARRIERE  65 EMUL
MM            -0.75    C.19           HILL       66 SPRK
MM         . . . . . . . . . .
MM  AVG        -.7289   .1654  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.2)

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                   18  LAMBCA PARTIAL CECAY MCDES

P1     LAMBCA INTO PRCTON PI-                                   S16S 8
P2     LAMBCA INTG NEUTRON PIC                                  S17S 9
P3     LAMBCA INTC PRCTON MU- NEUTRINO                          S16S 4S 2
P4     LAMBCA INTC PRCTON E- NEUTRINO                           S16S 3S 1

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                   18  LAMBCA ERANCHING RATICS

R1  *  LAMBCA INTC (P PI-)/((P PI-)+(N PIO))              (P1)/(P1+P2)
R1            0.627    C.031          CRAWFORC   59 HBC
R1            0.65     C.05           COLUMBIA   60 HBC
R1  U         0.685    C.017          ANDERSON   62 HBC
R1      9C3   0.643    C.016          HUMPHREY   62 HBC
R1         . . . . . . . . . .
R1  AVG        .6404    .0137  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R1  FIT        .653     .012   VALUE FROM CONSTRAINED FIT

R2  *  LAMBCA INTC (N PIO)/((P PI-)+(N PIC))              (P2)/(P1+P2)
R2            0.23     0.09           EISLER     57 PBC
R2            0.43     0.14           CRAWFORC   59 HBC
R2            0.28     0.08           BAGLIN     60 PBC
R2            0.35     C.05           BROWN      63 XBC
R2       75   0.251    C.034          CHRETIEN   63 PBC
R2         . . . . . . . . . .
R2  AVG        .3044    .0250  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R2  FIT        .347     .012   VALUE FROM CONSTRAINED FIT

R3  *  LAMBCA INTC (P E- NEU)/TCTAL    (UNITS  1C**-3)   (P4)/(P1+P2)
R3      15    2.0      0.5            HUMPHREY   61 RVUE
R3       8    2.9      1.5      1.2   AUBERT     62 FBC
R3     150    0.82     C.12     0.13  ELY        63 FBC
R3      20    1.55     0.34           LINC       64 HBC
R3     1C2    0.78     C.12           BAGLIN     64 FBC
R3         . . . . . . . . . .
R3  AVG        .8841    .1495  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.8)
                   (SEE IDEOGRAM)

R4  *  LAMECA INTC (P MU- NEU)/TOTAL   (UNITS  1C**-4)   (P3)/(P1+P2)
R4  *    1    0.2    CR GREATER       GCOC       62 HBC
R4  *    1    1.0    CR LESS          ALSTCN     63 HBC
R4  *    2    1.0    CR LESS          KERNAN     64 FBC
R4  *   BETWEEN 1.3 AND 6.0           LINC       64 HBC
R4       3    1.3      0.7            LINC       64 RVUE
R4       2    1.5      1.2            RONNE      64 FBC
R4         . . . . . . . . . .
R4  AVG       1.3508    .6046  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

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                  18  LAMBCA CECAY PARAMETERS

A-  *  ALPHA LAMBDA- (LAMBDA INTO PI- PROTON)
A-    1156    0.62     C.07           CRONIN     63 CNTR   LAMBCA FROM PI-P  8/67
A-    2529    0.747    C.086          MERRILL    66 HBC    FROM XI- CECAY    6/69
A-  *         0.663    C.022          BERGE      66 RVUE  INCLUCES ALL ABOVE
A-   10130    0.645    C.017          OVERSETH   67 SPRK   LAMBDA FROM PI-P  8/67
A-         . . . . . . . . . .
A-  AVG        .6473    .0162  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

AO  *  ALPHAO /ALPHA- FOR LAMBDA (L INTC PIO N/L INTO PI- P)
AO            1.10     0.27           CORK       60 CNTR

AE  *     ALPHA LAMBCA E- (LAMBDA INTC PROTON E- NEUTRINC)
AE            0.06     C.19           BARLCW     65 SPRK

F   *   PHI ANGLE (TAN(PHI) = BETA/GAMMA)    (CEGREE)
F     1156   13.0     17.0            CRONIN     63 SPRK   LAMBDA FROM PI-P 11/67
F    10130   -8.0      6.0            OVERSETH   67 SPRK   LAMBDA FROM PI-P 11/67
F          . . . . . . . . . .
F   AVG       -5.6738   6.5908  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.2)

AV  *   GA/GV FOR LAMBDA BETA DECAY (SEE TEXT FCR SIGN CCNVENTION)
AV           -1.14     C.23     0.33  CCNFCRTC   65                         11/67

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REFERENCES
18 LAMBCA (1115,JP=1/2+) I=C


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EISLER   57 NC     5 1700        EISLER,PLANO,SAMICS,SCHWARTZ + //COLUM+BNL
BOLDT    58 PRL    1  148        E BOLCT,D O CALCWELL,Y PAL //////////// MIT
CRAWFORC 59 PRL    2  266        CRAWFCRC,CRESTI,CCUGLASS,GCCC + /////  LRL

BAGLIN   60 NC    18 1043        BAGLIN,BLOCH,BRISSON,HENNESSY + //PARIS-EP
BOWEN    60 PR   119 2030        BCWEN,HARCY,REYNCLDS,SUN + ///// PRINCETON
CORK     60 PR   120 1000        CCRK,KERTH,WENZEL,CRONIN,CCCL //LRL+PR+BNL
COLUMBIA 60 ROCH CONF 726        M SCHWARTZ + ///////////////////// COLUMBIA
HUMPHREY 61 PRL    6  478        HUMPHREY,KIRZ,RCSENFELD,RHEE + //LRL+SYRAC

ANDERSON 62 CERN CONF 832        ANDERSON,CRAWFORC,GOLDEN,LLCYC + ///// LRL
ARMENTER 62 CERN CONF 236        ARMENTEROS+/CERN+EP+LONCCN+BIRM+CEN-SACLAY
AUBERT   62 NC    25  479        AUBERT,BRISSCN,HENNESSY,SIX + /// PARIS-EP
BALTAY   62 CERN CONF 233        BALTAY,FOWLER,SANDWEISS,CULWICK+//YALE+BNL
CHANG    62 THESIS CUKE          CHUEN CHUEN CHANG ///////////////////// DUKE
COOL     62 PR   127 2223        CCCL,HILL,MARSHALL + ///// BNL+MIT+NYU+ANL
GOOC     62 PRL    9  518        M L GCOC,V G LINC /////////////// WISCCNSIN
HUMPHREY 62 PR   127 1305        W E HUMPHREY,R R ROSS //////////////// LRL

ALSTON   63 UCRL 10926           ALSTCN,KIRZ,NEUFELD,SOLMITZ,WOHLMUT // LRL
BERGE    63 THESIS (BERKELEY) J PETER BERGE ////////////////////////// LRL
BHOWMIK  63 NC    28 1494        B BHOWMIK,D P GCYAL ///////////////// CELHI
BLOCK    63 PR   130  766        BLCCK,GESSAROLI,RATTI,KIKUCHI + //NW+BLGNA
BROWN    63 PR   130  769        BROWN,KADYK,TRILLING,ROE + ///LRL+MICHIGAN
CHRETIEN 63 PR   131  2208       CHRETIEN,CROUCH+///BRAND+BRCWN+HARVARC+MIT
CRONIN   63 PR   129 1795        J W CRONIN,O E CVERSETH //////// PRINCETON
ELY      63 PR   131  868        ELY,GIDAL,KALMUS,OSWALD,PCWELL + ///// LRL
KERNAN   63 PR   129  870        KERNAN,NOVEY,WARSHAW,WATTENBERG // ANL+ILL

ANDERSON 64 PRL   13  167        J A ANDERSON,F S CRAWFORC //////////// LRL
BADIER   64 DUBNA CONF 1 593     BADIER,BARLOUTAUC + //////EP+SACLAY+AMSTDM
BAGLIN   64 NC    35  977        BAGLIN,BINGHAM+//EP+CERN+UC LONC+RHEL+BERG
HUBBARD  64 PR   135 B 183       HUBBARD,BERGE,KALBFLEISCH,SHAFER + /// LRL
KERNAN   64 PR   133 B 1271      KERNAN,POWELL,SANCLER + //LRL+UN-COLL-LCNC
KREISLER 64 PR  136 B 1074       M N KREISLER,O CVERSETH,J CRCNIN ///PRINCE
LINC     64 PR   135 B 1483      LINC,BINFCRC,GOCC,STERN //////// WISCONSIN
RONNE .  64 PL    11   357       RCNNE+ /// CERN+EP+UCOL-LCNCCN+UNIV.BERGEN
SCHWARTZ 64 UCRL 11360 THESIS JCSEPH ADAM SCHWARTZ ////////////////// LRL

BALTAY   65 PR 140 B 1027        BALTAY,SANDWEISS,CULWICK,KCPP + //YALE+BNL
BARLCW   65 PL   18   64         J BARLOW,BLAIR,CUKE,MANN+//CERN+RUTH+PENNA
CHARRIER 65 PL    15     66      CHARRIERE,GIBSON+ //// EPUL+BRIST+CERN+MPI
   ALSC     NC   46A  205        CHARRIERE,GIBSON +////EPUL,BRIST,CERN, MPI
CONFCRTC 65 EC INT HERZEGNOVI G CONFORTO + ///////////////////////// CERN
HILL     65 PRL   15     85      D A HILL,K K LI //////////////////////// MIT
SCHMIDT  65 PR 140 B 1328        P SCHMIDT ////////////////////////// COLUMBIA

ARMENTER 66 PREPRINT             ARMENTEROS + ////// CERN,HEICELBERG,SACLAY
BERGE    66     BERKELEY CONF.   BERGE,CABIBBO                       // RVUE
BURAN    66 PL 20 318            BURAN,EIVINDSON,SKJEGGESTAC,TOFTE + //OSLC
CHIEN    66 PR   152  1171       +LACH,SANCWEISS,TAFT,YEH,CREN + //YALE+BNL
ENGELMAN 66 NC 45A  1038         ENGELMANN,FILTHUTH,ALEXANCER+/HEICBG+WEIZM
HILL     66  BERKELEY CCNF       HILL,LI,JENKINS,KYCIA,RUDERMAN      // BNL
LONDCN   66 PR 143 1034          LCNCON,RAU,GOLDBERG,LICHTMAN+//BNL+SYRACUS
MERRILL  66  BERKELEY CCNF       MERRILL,SHAFER,BERGE                // LRL
     CF. 66 UCRL 16455           DEANE MERRILL (THESIS, BERKELEY) ///// LRL

AUERBACH 67 NC  47A  19          AUERBACH,BOWEN,CCBBS,LANCE,MANN+ //U CF PA
BADIER   67 PL 25B 152           +BONNET,BRIANDET,SACOULET    // EP (PARIS)
MAYEUR   67 U.LIBR.BRUX.BUL32 C.MAYEUR,E.TOMPA,J.WICKENS//UL.BRUX+UC.LON
OVERSETH 67 PRL  19  391         O E OVERSETH, R F ROTH//MICHIGAN+PRINCETON

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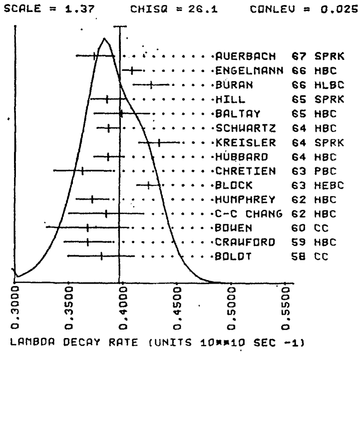
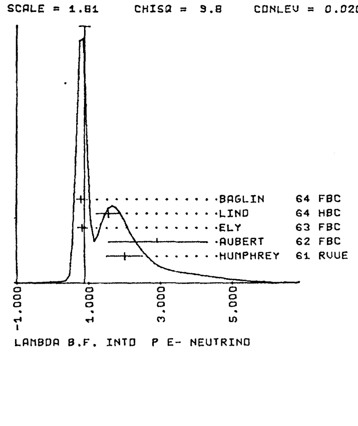
WEIGHTED AVERAGE = 0.39696 ± 0.00548
SCALE = 1.37   CHISQ = 26.1   CONLEV = 0.025



LAMBDA DECAY RATE (UNITS 10**10 SEC -1)

WEIGHTED AVERAGE = 0.884 ± 0.149
SCALE = 1.81   CHISQ = 9.8   CONLEV = 0.020



LAMBDA B.F. INTO P E- NEUTRINO

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                19  SIGMA+   (1189,JP=1/2+)  I=1

                19  SIGMA+ MASS (MEV)

M    N SEE NOTE PRECEDING SIGMA- MASS LISTINGS

M       144 1189.38     0.15            BARKAS    63 EMUL +  SEE NOTE S BELOW
M        58 1189.48     0.22            BHOWMIK   64 EMUL +  SEE NOTE S BELOW
M    S  ABOVE SIGMA+ MASSES HAVE BEEN RAISED 30  KEV TO ACCOUNT FOR 46 KEV
M    S  INCREASE IN PROTON MASS AND 21 KEV DECREASE IN PION MASS
M          1189.59     0.11             SCHMIDT   65 HBC
M    H     1189.16     0.12             HYMAN     67 HEBC                   11/67
M    H  VALUE NOT INCLUDED IN AVERAGE BECAUSE OF POSSIBLE PROBLEMS WITH
M    H  RANGE MEASUREMENTS IN HELIUM BUBBLE CHAMBER,AS FOR H2 BUBBLE CHAM-
M    H  BER.  SEE NOTE PRECEDING LAMBDA MASS LISTING.
M          . . . . . . . . . .
M    AVG   1189.5114.   .0623   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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                19  SIGMA+ LIFETIME (UNITS 10**-10)

T    *                                  GLASER     58 RVUE
T       127    0.98     0.16     0.12   PUSCHEL    60 EMUL
T        41    0.82     0.34     0.20   EVANS      60 EMUL
T       117    0.85     0.14     0.11   FREDEN     60 EMUL
T        54    0.80     0.10     0.067  KAPLON     60 EMUL
T        23    0.76     0.22     0.14   CHIESA     61 EMUL
T        49    0.75     0.13     0.09   BERTHELOT  61 PBC
T       140    0.82     0.10     0.08   BARKAS     61 EMUL
T       192    0.749    0.056    0.052  GRARD      62 HBC
T       456    0.765    0.04     0.04   HUMPHREY   62 HBC
T       203    0.84     0.12     0.08   BHOWMIK    64 EMUL
T       181    0.84     0.09            BALTAY     65 HBC
T       900    0.76     0.03            CARAYANNO  65 HBC
T              0.83     0.018           CHANG      65 HBC
T    S  125    0.86     0.15            CHIEN      66 HBC  +   6.9 PBAR P        9/67
T    S  117    1.10     0.24            CHIEN      66 HBC  -   6.9 PBAR P,ANTI   9/67
T    S      ERROR PURELY STATISTICAL
T       381    0.80     0.07            COOK       66 SPRK
T           . . . . . . . . . .
T    AVG       .8099    .0131   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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                19  SIGMA+ MAGNETIC MOMENT (MAGNETONS,938.26 MEV)

MM   *   43    1.2      1.5             BRISTOL    66 EMUL    PRELIMINARY RES.  8/67
MM      381    1.5      1.1             COOK       66 SPRK
MM       52    3.5      1.5             KOTELCHUC  67 EMUL    K-P AT 1.15BEV/C  8/67
MM       51    3.0      1.2             SULLIVAN   67 EMUL    PHOTOPRODUCTION   8/67
MM          . . . . . . . . . .
MM   AVG       2.4823   .7133   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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                19  SIGMA+ PARTIAL DECAY MODES

P1      SIGMA + INTO PROTON PI0                               S16S 9
P2      SIGMA + INTO NEUTRON PI+                              S17S 8
P3      SIGMA + INTO NEUTRON PI+ GAMMA                        S17S 8S 0
P4      SIGMA + INTO LAMBDA E+ NEU                            S18S 3S 0
P5      SIGMA + INTO PROTON GAMMA                             S16S 0
P6      SIGMA + INTO NEUTRON MU+ NEUTRINO                     S17S 4S 2
P7      SIGMA + INTO NEUTRON E+ NEUTRINO                      S17S 3S 1

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                19  SIGMA+  BRANCHING RATIOS

R1   *  SIGMA+  INTO (NEUTRON PI+)/(NUCLEON PI)               (P2)/(P1+P2)
R1   .  306    0.450    0.024           HUMPHREY  62 HBC
R1      534    0.46     0.02            CHANG     65 HBC
R1          . . . . . . . . . .
R1   AVG       .4723    .0154   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R2   *  SIGMA+ INTO (NEUT PI+ GAM)/(PI+N)  (UNITS 10**-3) (P3)/(P2)
R2   *  ABOUT  1.8                      BAZIN2    65 HBC                     8/67
R2   *  FOR PI+ MOM LESS THAN 166 MEV/C

R3   *   SIGMA+ INTO (LAMBDA E+ NEU)/TOTAL (UNIT 10**-5) (P4)/TOTAL
R3       4     3.3      1.7             WILLIS    64 HBC    STOP. K-
R3       6     2.0      0.8             BARASH    67 HBC    STOP K-          8/67
R3          . . . . . . . . . .
R3   AVG       2.2357   .7239   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R4   *  SIGMA+  INTO (N MU+ NEU)/(PI+N)    (UNITS 10**-4) (P6)/(P2)
R4   *   1       120 ANALYSED EVENTS   GALTIERI  62 EMUL    NO RATIO QUOTED  11/67
R4       0      1710 EFFECTIVE DENOM.  NAUENBERG 64 HBC     SEE NOTE E       11/67
R4       0     10150 EFFECTIVE DENOM.  COURANT   64 HBC     SEE NOTE E       11/67
R4       1     18750 EFFECTIVE DENOM.  EISELE    67 HBC                      11/67
R4   E                 EFFECTIVE DENOM.  TAKEN FROM EISELE 67                11/67

R5   *  SIGMA+  INTO (N E+ NEU)/(N PI+)  (UNITS 10**-4)  (P7)/(P2)
R5       0     16220 EFFECTIVE DENOM.  COURANT   64 HBC     SEE NOTE E       11/67
R5       1     11400 EFFECTIVE DENOM.  NAUENBERG 64 HBC     SEE NOTE E       11/67
R5       0      2720 EFFECTIVE DENOM.  MURPHY    64 HBC     SEE NOTE E       11/67
R5   E                 EFFECTIVE DENOM.  TAKEN FROM EISELE 67                11/67

R6   *  SIGMA+  INTO (P GAMMA)/(P PI0)  (UNITS 10**-2)   (P5)/(P1)
R6   *   1     0.68  OR LESS            CARRARA   64 HBC
R6      24     0.37     0.08            BAZIN     65 HBC
R6       4     0.17                     QUARENI   65 EMUL

R7   *  SIGMA+ INTO LEPTONS / SIGMA- INTO LEPTONS
R7   N   3      .023     .017           EISELE    67        SEE NOTE N       11/67
R7   N      AVERAGE OF ALL DATA IN R4 AND R5 UP TO EISELE 67                 11/67

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                19 SIGMA+ DECAY PARAMETERS

A+   *   ALPHA+/ALPHA0 FOR SIGMA+ (SIG+ TO PI+ N)/(SIG+ TO PI0 P)
A+           +0.04      0.11            CORK      60 CNTR    SIG+ FROM PI+P
A+   *       +0.20      0.24            TRIPP     62 HBC  +  REPLAC.BY BANGER
A+     3500  -.014      0.052           BANGERTER 66 HBC  +  SIG+ FROM K-P
A+     2600  -.047      .07             BERLEY    66 HBC  +  SIG+ FROM K-P
A+          . . . . . . . . . .
A+   AVG     -.0175     .0390   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

A0   *  ALPHA SIGMA0 (SIG+ INTO PI0 PROTON)
A0           -0.80      0.16            BEALL     62 CNTR
A0   *       -0.90      0.25            TRIPP     62 HBC     REPLAC. BY BANGER
A0     5200  -0.986     0.072           BANGERTER 66 HBC     K-P TO SIG+ PI-
A0          . . . . . . . . . .
A0   AVG     -.9547     .0696   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

F    *     PHI ANGLE (TAN(PHI)=BETA/GAMMA)  (DEGREE)
F       370  180.       30.             BERLEY    66 HBC  +  NEUTRON RESCATT.

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                          REFERENCES
               19  SIGMA + (1189,JP=1/2+)  I=1

GLASER    58 CERN CONF 270      GLASER,GOOD,MORRISON //////////// MICH+LRL
EVANS     60 NC 15 873          BRIST+BRUSS+IAS-L.COL-DUBLIN+LON+MILAN+PAD
FREDEN    60 NC 16 611          S FREDEN,H KORNBLUM,R WHITE ////////// LRL
KAPLON    60 ANP 9 139          M KAPLON,A MELISSINOS,YAMANOUCHI // ROCHES
CORK      60 PR 120 1000        CORK,KERTH,WENZEL,CRONIN,COOL /LRL+PRI+BNL
PUSCHELL  60 NP 20 254          W PUSCHEL //////////////// MAX PLANCK INST

BARKAS    61 PR 124 1209        BARKAS,DYER,MASON,NICHOLS,SMITH ////// LRL
BERTHELO  61 NC 21 693          BERTHELOT,DAUDIN,GOUSSU + /// SACLAY+ORSAY
CHIESA    61 NC 19 1171         CHIESA,QUASSIATI,RINAUDO ////// INFN-TURIN

BEALL     62 PRL 8 75           BEALL,CORK,KEEFE,MURPHY,WENZEL /////// LRL
GRARD     62 PR 127 607         F GRARD,G A SMITH ///////////////////// LRL
GALTIERI  62 PRL 9 26           GALTIERI,BARKAS,HECKMAN,PATRICK,SMITH//LRL
HUMPHREY  62 PR 127 1305        W E HUMPHREY,R R ROSS //////////////// LRL
TRIPP     62 PRL 9 66           R D TRIPP,M B WATSON,M FERRO-LUZZI /// LRL

BARKAS    63 PRL 11 26          W H BARKAS,J N DYER,H H HECKMANN ///// LRL
    ALSO  61 UCRL 9450          JOHN DYER (THESIS, BERKELEY)  ///////  LRL

BHOWMIK   64 NP 53 22           B BHOWMIK,P JAIN,P MATHUR,LAKSHMI // DELHI
CARRARA   64 PL 12 72           CARRARA,CRESTI,GRIGOLETTO,PERUZZO+//PADOVA
COURANT   64 PR 136 B 1791      COURANT,FILTHUTH+//CERN+HEIDLB+MD+NRL +BNL
MURPHY    64 PR 134 B 188       C THORNTON MURPHY ////////////// WISCONSIN
NAUENBER  64 PRL 12 679         NAUENBERG,MARATECK,BLUMENFELD+ /COL+RUT+PR
WILLIS    64 PRL 13 291         WILLIS,COURANT,ENGELMAN+//BNL+CERN+HEID+MD

BALTAY    65 PR 140 B 1027      BALTAY,SANDWEISS,CULWICK,KOPP + //YALE+BNL
BAZIN     65 PRL 14 154         BAZIN,BLUMENFELD,NAUENBERG +//PRINCE+COLUM
BAZIN2    65 PR 140  B1358        BAZIN,PLANO,SCHMIDT+//PRINCE,RUTG,COLUM
CARAYAN   65 PR 138 B 433       CARAYANNOPOULOS,TAUTFEST,WILLMANN// PURDUE
CHANG     65 NEVIS 145  THESIS  CHUNG YUN CHANG ////////////////// COLUMBIA
   ALSO   66 PR  151  1081      CHUNG YUN CHANG ////////////////// COLUMBIA
QUARENI   65 NC 40 A 926        QUARENI,CARTACCI + //////BOL+FIR+GEN+PARMA
SCHMIDT   65 PR 140 B 1328    . P SCHMIDT ///////////////////////// COLUMBIA

BANGERTE  66 PRL  17  495       BANGERTER,GALTIERI,BERGE,MURRAY+    // LRL
BERLEY    66 PRL 17 1071        +HERZBACH,KOFLER,YAMAMOTO +//BNL+MASS+YALE
BRISTOL   66  BERKELEY CONF     BRISTOL-CERN-LAUSANNE-MUNICH-ROME COLLABOR
CHIEN     66 PR  152  1171      +LACH,SANDWEISS,TAFT,YEH,OREN + //YALE+BNL
COOK      66 PRL  17  223       V COOK,EWART,MASEK,ORR,PLATNER//WASHINGTON

BARASH    67 PRL 19  181        BARASH,DAY,GLASSER,KEHOE,KNOP +///MARYLAND
EISELE    67 ZEIT.PHYS.205,409  +ENGELMANN,FILTHUTH,FOHLISH,HEPP+//HEIDELB.
HYMAN     67 PL 25 B 376        +LOKEN,PEWITT,MCKENZIE,KEYES+/ARG+CARN+NWU
KOTELCHU  67 PRL 18 1166        KOTELCHUCK,GOZA,SULLIVAN,ROSS//VANDERBILT
SULLIVAN  67 PRL 18 1163        SULLIVAN,MCINTURFF,KOTELCHUCH//VANDERBILT
    ALSO  64 PRL 13 246         A D MCINTURFF,C E ROOS        // VANDERBILT

      QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

TRIPP     62 PRL 8 175          R TRIPP,M WATSON,M FERRO-LUZZI /////// LRL
ALFF      63 SIENA CONF 1 205   ALFF,NAUENBERG,KIRSCH,BERLEY+/COLU+RUT+BNL
    ALSO  65 PR 137 B 1105      ALFF,GELFAND,BRUGGER,BERLEY+/COLUM+RUT+BNL
COURANT   63 SIENA CONF 1 73    COURANT,FILTHUTH,BURNSTEIN,DAY+//CERN+MARY

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Σ^-

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                20  SIGMA-  (1198,JP=1/2+)  I=1
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Hyperon Masses

For the Λ mass, there is a large discrepancy between the measurement of SCHMIDT 65 and the emulsion measurements reviewed by BHOWMIK 63. The former determination used range measurements in a hydrogen bubble chamber.

The Σ^- mass of SCHMIDT 65 (1196.53 ± 0.24 MeV) also obtained using HBC range measurements, is also in disagreement with previous emulsion determinations and with the one, by the same author, which does not use range measurements. Therefore, as a temporary procedure, we do not include any determinations of absolute masses which use range measurements in HBC. BURNSTEIN 64 has two sorts of measurements: absolute masses which again depend on HBC ranges, and mass differences; we have used only the latter. Both authors, P. Schmidt and G. Snow (representing Burnstein et al.) agree with this procedure.

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                20  SIGMA-   MASS (MEV) .

M          1197.47     0.11             SCHMIDT   65 HBC

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                20 SIGMA- MASS DIFFER.(-)-(+)(MEV)

D        87    8.25     0.40            BARKAS    63 EMUL
D      2500    8.25     0.25            DOSCH     65 HBC
D           . . . . . . . . . .
D    AVG       8.2500   .2120   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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                20  (SIGMA-) - (LAMBDA) MASS DIFFERENCE (MEV)

M    N SEE NOTE PRECEDING SIGMA- MASS LISTINGS

DL             81.70    0.19            BURNSTEIN 64 HBC

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                20  SIGMA- LIFETIME (UNITS 10**-10)

T              1.67     0.40     0.28   BROWN      58 PBC
T              1.89     0.33     0.25   EISLER     58 PBC
T        45    1.35     0.32     0.17   CHIESA     61 EMUL
T        41    1.75     0.39     0.30   BARKAS     61 EMUL
T      1208    1.58     0.06     0.06   HUMPHREY   62 HBC
T              1.666    0.026           CHANG      65 HBC
T    S   61    2.08     0.22            CHIEN      66 HBC  -   6.9 PBAR P        9/67
T    S   64    1.46     0.31            CHIEN      66 HBC  +   6.9 PBAR P,ANTI   9/67
T    S      ERROR PURELY STATISTICAL.
T           . . . . . . . . . .
T    AVG       1.6554   .0303   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                    (SEE IDEOGRAM)

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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      WEIGHTED AVERAGE = 0.6041 ± 0.0109
SCALE = 1.27     CHISQ =  1.6     CONLEV = 0.206
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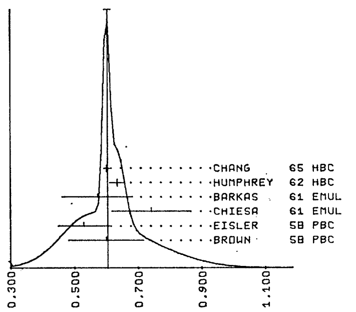

SIGMA - DECAY RATE (UNITS 10**10 SEC -1)

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                 2C  SIGMA- PARTIAL DECAY MCDES

P1      SIGMA - INTO  NEUTRON PI-                            S17S 8
P2      SIGMA - INTO  NEUTRON PI- GAMMA                      S17S 8S 0
P3      SIGMA - INTO  NEUTRON MU- NEUTRINO                   S17S 4S 2
P4      SIGMA - INTO  NEUTRON E- NEUTRINC                    S17S 3S 1
P5      SIGMA - INTO  LAMBCA E- NEUTRINO                     S18S 3S 1

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                 2C  SIGMA-  BRANCHING RATICS

R1   *  SIGMA - INTO (N MU- NEU)/(N PI-) (UNITS 10**-3)  (P3)/(P1)
R1       22    0.66      0.15           COURANT   64 HBC
R1       11    0.56      0.20           BAZIN     65 HBC      FROM STCP. K-
R1           . . . . . . . . . .
R1   AVG          .6240     .1200   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

R2   *  SIGMA - INTO (N E- NEU)/(N PI-)  (UNITS 10**-3)  (P4)/(P1)
R2        9    1.0       0.4       0.3  MURPHY    64 PBC
R2       16    1.37      0.34           NAUENBERG 64 HBC
R2       16    1.15      0.4            MILLER    64 FBC
R2       31    1.4       0.3            CCURANT   64 HBC
R2           . . . . . . . . . .
R2   AVG          1.2511    .1711   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

R3   *  SIGMA - INTO (LAMBCA E- NEU)/(N PI-) (UNITS 10**-4)(P5)/(P1)
R3       11    0.75      0.28           CCURANT   64 HBC      STCP. K-
R3       35    0.64      C.12           BARASH    67 HBC      STCP K-        8/67
R3           . . . . . . . . . .
R3   AVG          .6571     .1103   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

R4   *  SIGMA - INTO (N PI- GAMMA)/(NPI-) (UNITS 10**-3)(P2)/(P1)
R4   *  ABOUT  1.1                      BAZIN     65 HBC                     8/67
R4   *  FCR PI- MOM LESS THAN 166 MEV/C

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                 2C SIGMA- CECAY PARAMETERS

A-   *  ALPHA SIGMA-
A-   *         -0.16     0.21           TRIPP     62 HBC      REPL.BY BANGERTER
A-     6500    -0.010    0.043          BANGERTER 66 HBC      K-P TO SIG- PI+
A-     6068    -0.104    0.04           BERLEY    67 HBC      K-P TO SIG- PI+  11/67
A-           . . . . . . . . . .
A-   AVG          -.0604    .C469   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.6)

F    *  PHI ANGLE (TAN(PHI)=BETA/GAMMA)  (DEGREES)
F      1006  -22.        30.            BERLEY    67 HBC      K-P TO SIG- PI+  11/67

AV   *   GA/GV FOR SIGMA TO LAMBCA BETA DECAY (SEE TEXT FCR SIGN CONVENTICN)
AV   *   PRECICTED TC ZERO BY CCNSERVEC VECTOR CURRENT THECRY
AV       45    0.31      0.30           BARASH    67 HBC                     11/67
         44    0.3       C.4            EISELE    67 HBC                     11/67

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REFERENCES

2C SIGMA-(1198,JP=1/2+)I=1


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BROWN     58 CERN CONF 270      BROWN,GLASER,GRAVES,PERL,CRCNIN + /// MICH
EISLER    58 NC SERIC 10 150    EISLER,BASSI,CONVERSI + / CCL+BNL+BOL+PISA
BROWN     57 PR 108 1C36        J BROWN, C GLASER, M PERL / MICHIGAN + BNL

BARKAS    61 PR 124 1209        BARKAS,DYER,MASCN,NICKOLS,SMITH ////// LRL
CHIESA    61 NC 19 1171         A M CHIESA,B QUASSIATI,G RINAUDC /// TURIN
HUMPHREY  62 PR 127 13C5        W E HUMPHREY,R R ROSS ///////////////  LRL
TRIPP     62 PRL 9 66           R D TRIPP,M WATSCN,M FERRC-LUZZI ///// LRL

BARKAS    63 PRL 11 26          W H BARKAS,J N DYER,H H HECKMAN ////// LRL
BURNSTEI  64 PRL 13 66          BURNSTEIN,DAY,KEHCE,SECHI ZCRN,SNOW// MARY
COURANT   64 PR 136 B 1791      CCURANT,FILTHUTH+///CERN+HEIDLB+MD+NRL+BNL
MILLER    64 PL 11 262          MILLER,STANNARD,BEZAGUET+ /LCND+PARIS+BERG
MURPHY    64 PR 134 B 188       C THORNTON MURPHY ////////////// WISCCNSIN
NAUENBER  64 PRL 12 679         NAUENBERG,SCHMICT,MARATECK+ /COL+RUT+PRINC

BAZIN     65 PR 140 B 1358      BAZIN,PLANO,SCHMICT +    //PRINC+RUTG+CCLUM
CHANG     65 NEVIS 145  THESIS  CHUNG YUN CHANG ////////////////  CCLUMBIA
  ALSO    66 PR  151  1081      CHUNG YUN CHANG ///////////////// CCLUMBIA
DOSCH     65 PL 14 239          DCSCH,ENGELMANN,FILTHUTH,HEPP,KLUGE+ /HEIC
SCHMIDT   65 PR 140 B 1328      P SCHMIDT //////////////////////// COLLMBIA
BANGERTE  66 PRL  17  495       BANGERTER,GALTIERI,BERGE,MURRAY+   // LRL
CHIEN     66 PR  152  1171      +LACH,SANCWEISS,TAFT,YEH,CREN + //YALE+BNL

BARASH    67 PRL 19  181        BARASH,DAY,GLASSER,KEHOE,KNCP +///MARYLANC
BERLEY    67 PRL  19  979       BERLEY,HERTZBACH,KOFLER +////BNL,MASS,YALE
EISELE    67 HEIDELBERG CONF    EISELE,ENGELMANN,FILTHUTH+///// HEICELBERG
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               21  SIGMA 0  (1193,JP=1/2+)  I=1

               21  (SIGMA-) - (SIGMAO) MASS DIFFERENCE (MEV)
D1   *   SEE NOTE PRECEDING SIGMA-  MASS LISTINGS

D1       18    4.75      0.1            BURNSTEIN 64 HBC
D1       37    4.87      0.12           DOSCH     65 HBC
D1       12    4.95      C.12           SCHMIDT   65 HBC
D1           . . . . . . . . . .
D1   AVG          4.8547    .C706   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.1)

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               21  (SIGMA C) - (LAMBCA) MASS CIFFERENCE (MEV)

M    N SEE NCTE PRECECING SIGMA-  MASS LISTINGS

DL             76.61     0.28           SCHMIDT   65

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               21  SIGMAO LIFETIME (UNITS 1C**-14)

T    *     1.0 OR LESS                  DAVIS     62 EMUL

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          21  SIGMA C PARTIAL CECAY MOCES

P1       SIGMA O INTC LAMBDA GAMMA                           S18S 0
P2       SIGMA O INTC LAMBDA E+ E-                           S18S 3S 3

R1   *   SIGMA O INTC(LAMBCA E+ E-)/TOTAL                  (P2)/(P1+P2)

R1   *          0.00545   THECRET. CAL. FEINBERG  58         QUANTUM ELECT.

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REFERENCES

21 SIGMA C(1193,JP=1/2+)I=1


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FEINBERG 58 PR 105 1C19         G.FEINBERG                           // BNL
DAVIS    62 PR 127 6C5          D DAVIS,R SETTI,M RAYMONC,G TOMASIN ///CHI
COURANT  63 PRL 10 4C9          CCURANT,FILTHUTH,FRANZINI+//CERN+UMC+LSNRL
BURNSTEI 64 PRL 13 66           BURNSTEIN,DAY,KEHCE,SECHI ZCRN,SNOW //MARY
DOSCH    65 PL 14 239           DCSCH,ENGELMANN,FILTHUTH,HEPP,KLUGE+ /HEIC
SCHMIDT  65 PR 140 B 1328       P SCHMICT //////////////////////// COLLMBIA

       CLANTUM NUMBER CETERMINATICNS NOT REFERREC TO IN THE CATA CARCS

ALFF     65 PR 137 B1105        ALFF,GELFANC,NAUENBERG+//CCLUMBIA+RUTG+BNL P
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               22  XI-  (1321,JP=1/2 ) I=1/2

               22  XI-  MASS (MEV)

M    H   11 1317.0      2.2             WANG      61 PBC
M    H   18 1317.9      1.9             FCWLER    61 PBC
M    H (CLD CATA AND LCW STATISTICS CRCPPEC ON SUGGESTICN CF J R HUBBARD)
M    *    1 1322.0      1.3             BROWN     62 HBC     ANTI-XI-

M       517 1321.4      0.4             JAUNEAU   63 FBC
M        62 1321.1      C.65            SCHNEICER 63 HBC
M       241 1321.1      C.3             BADIER    64 HBC
M    *  ALL MASSES ABCVE WERE RAISEC 0.09 MEV BECAUSE LAMBCA MASS RAISED
M       149 1321.3      C.4             PJERROU   65 HBC                     11/67
M         5 1320.69     C.93            CHIEN     66 HBC  +  6.9 PBAR P,ANTI  9/67
M         6 1321.67     0.52            CHIEN     66 HBC  -  6.9 PBAR P       9/67
M       299 1321.4      1.1             LCNCCN    66 HBC
M    S   12 1321.7      0.6             SHEN      67 HBC     ANTI-XI-        10/67
M    S   THE ERROR IS STATISTICAL CNLY
M            . . . . . . . . . .
M    AVG      1321.2582    .1777   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

               22  MASS CIFFERENCE,(XI-)-(ANTI-XI-) IN MEV
DM             1.0       1.1            CHIEN     66 HBC     6.9 PBAR P       9/67

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               22  XI-  LIFETIME (UNITS 1C**-10)

T    H   11     3.5       3.4      1.23 WANG      61 PBC
T    H   18     1.28      0.41     0.25 FCWLER    61 PBC
T    H (CLD CATA AND LCW STATISTICS CRCPPEC ON SUGGESTICN CF J R HUBBARD)
T       517     1.86      0.15     0.14 JAUNEAU   63 FBC
T        62     1.55      0.31     0.31 SCHNEIDER 63 HBC
T    *  356     1.77      C.12          CARMONY   64 HBC    REP BY PJERROU 65
T       794     1.69      C.C7          HUBBARD   64 HBC
T       246     1.70      0.12          PJERROU   65 HBC                     11/67
T    S    6     1.37      0.51          CHIEN     66 HBC  -  6.9 PBAR P       9/67
T    S    5     1.51      0.55          CHIEN     66 HBC  +  6.9 PBAR P,ANTI  9/67
T       299     1.80      0.16          LCNCCN    66 HBC
T    S   12     1.9       0.7      0.5  SHEN      67 HBC     ANTI-XI-        10/67
T    S   THE ERROR IS STATISTICAL ONLY
T            . . . . . . . . . .
T    AVG          1.7298    .0540   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

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               22  XI- PARTIAL CECAY MODES

P1      XI- INTO LAMBCA PI-                                  S18S 8
P2      XI- INTO LAMBCA E- NEUTRINC                          S18S 3S 1
P3      XI- INTO NEUTRCN PI-                                 S17S 8
P4      XI- INTO LAMBCA MU- NEUTRINO                         S18S 4S 2
P5      XI- INTO SIGMAC E- NEUTRINC                          S21S 3S 1
P6      XI- INTO SIGMAC MU- NEUTRINO                         S21S 4S 2
P7      XI- INTO NEUTRCN E- NEUTRINO                         S17S 3S 1

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               22  XI- BRANCHING RATICS

R1   *  XI- INTO (LAMBCA E- NEU)/(LAMBCA PI-) (UNITS 10**-3) (P2)/(P1)
R1        1       155 EFFECTIVE DENOM.  CARMONY   63 HBC                     11/67
R1        0       260 EFFECTIVE CENCM.  JAUNEAU   63 HBC                     11/67
R1        0       220 EFFECTIVE CENOM.  BERGE     66 HBC                     11/67
R1        1       155 EFFECTIVE CENCM.  LCNCCN    66 HBC                     11/67
R1        2      1976 EFFECTIVE CENCM.  BERGE     67 HBC                     11/67
R1        0       717 EFFECTIVE CENCM.  TRIPPE    67 HBC                     11/67
R1        4    0.90      0.71      C.43 BERGE     67 RVUE                    11/67
R1   *   BERGE 67 (RVUE) INCLUCES ALL ABCVE EVENTS.
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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R2  *  XI- INTO (NEUTRON PI-)/(LAMBDA PI-)                (P3)/(P1)
R2  *      0.005   OR LESS         FERRO-LUZ 63 HBC

R3  *      XI- INTO (LAMBDA MU- NEUTRINO)/TOTAL            (P4)/TOTAL
R3  *      0.012   OR LESS         BERGE     66 HBC

R4  *      XI- INTO (SIGMAO E- NEUTRINO)/TOTAL             (P5)/TOTAL
R4  *      0.003   OR LESS         BERGE     66 HBC

R5  *      XI- INTO (SIGMAO MU- NEUTRINO)/TOTAL            (P6)/TOTAL
R5  *      0.005   OR LESS         BERGE     66 HBC

R6  *      XI- INTO (N E- NEUTRINO) / (LAMBDA PI-)         (P7)/(P1)
R6  *      0.01  OR LESS           BINGHAM   65 RVUE    CONF.LIMIT 0.9

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                     22  XI- DECAY PARAMETERS

A   *  ALPHA XI-
A          -0.44      0.11          JAUNEAU   63 FBC
A     62   -0.73      0.21          SCHNEIDER 63 HBC
A    240   -0.5       0.35          BADIER    64 HBC
A    356   -0.62      0.12          CARMONY   64 HBC
A   * 1004 -0.366     0.057         BERGE     66 HBC   - REPL. BY MERRILL
A   2529   -0.342     0.044         MERRILL   66 HBC     USED ALPHAL=.747
A    364   -0.47      0.12          LONDON    66 HBC  USING A-LAMB =0.62
A   *      -0.391     0.032         BERGE 2   66 RVUE   INCLUDES ALL ABOVE
A          . . . . . . . . . . .
A   AVG     -.4023    .0511   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)

F   *  PHI ANGLE (TAN(PHI)=BETA/GAMMA)   (DEGREE)
F         -16.        37.           JAUNEAU   63 FBC
F     62   45.0       30.0          SCHNEIDER 63 HBC
F    356   54.0       25.0          CARMONY   64 HBC
F   * 1004  0.45      10.7          BERGE     66 HBC   - REPL. BY MERRILL
F    364    0.0       17.0          LONDON    66 HBC     USED ALPHAL=.62
F   2529    1.2        7.5          MERRILL   66 HBC     USED ALPHAL=.747
F          . . . . . . . . . . .
F   AVG      5.9177   7.9657  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)

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REFERENCES

22 XI - (1321,JP=1/2) I=1/2


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FOWLER   61 PRL 6 134          FOWLER,BIRGE,EBERHARD,ELY,GOOD,POWELL+/LRL
WANG     61 JETP 13 512        K WANG,T WANG,VIRYASOV,TING,SOLOVEV+//JINR
BERTANZA 62 PRL 9 229          BERTANZA,BRISSON,GOLDBERG,GRAY+/BNL+SYRACU
BROWN    62 PRL 8 255          BROWN,CULWICK,FOWLER,GAILLOUD +///BNL+YALE

CARMONY  63 PRL  10  361       CARMONY,PJERROU                       // UCLA
FERROLUZ 63 PR 130 1566        FERRO-LUZZI,ALSTON,ROSENFELD,WOJCICKI//LRL
JAUNEAU  63 SIENA CONF 4       JAUNEAU+ ///// PARIS+CERN+LOND+RUTH+BERGEN
JAUNEAU1 63 PL  5  261         JAUNEAU,MORELLET+//EP,CERN,LON,RUTH,BERGEN
SCHNEIDE 63 PL 4 360           H SCHNEIDER ///////////////////////// CERN

CARMONY  64 PRL 12 482         CARMONY,PJERROU,SCHLEIN,SLATER,STORK+/UCLA
BADIER   64 DUBNA CONF         BADIER,DEMOULIN,BARLOUTAUD+ /PARIS+SAC+ZEE
HUBBARD  64 PR 135 B 183       HUBBARD,BERGE,KALBFLEISCH,SHAFER +/////LRL
BINGHAM  65 PRSL  285  202     H H BINGHAM                           // CERN
PJERROU  65 PRL 14 275         + SCHLEIN,SLATER,SMITH,STORK,TICHO // UCLA
PJERROU  65 THESIS             G M PJERROU ///////////////////////// UCLA

BERGE    66 PR  147  945       BERGE,EBERHARD,HUBBARD,MERRILL + ///// LRL
BERGE 2  66    BERKELEY CONF.  BERGE,CABIBBO                         // RVUE
CHIEN    66 PR  152  1171      +LACH,SANDWEISS,TAFT,YEH,OREN + //YALE+BNL
LONDON   66 PR 143 1034        LONDON,RAU,GOLDBERG,LICHTMAN+//BNL+SYRACUS
MERRILL  66  BERKELEY CONF     MERRILL,SHAFER,BERGE                  // LRL
     CF. 66 UCRL 16455         DEANE MERRILL (THESIS, BERKELEY) ///// LRL
BERGE   67 PREPRINT            BERGE,DAUBER,HUBBARD ///////////////// LRL
SHEN     67 PL 25 B 443        B.C.SHEN,A.FIRESTONE,G.GOLDHABER// UCB+LRL

      QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

CARMONY  64 PRL 12 482         CARMONY,PJERROU,SCHLEIN,SLATER,STORK+/UCLA  J
SHAFER   65 UCRL 11884         J BUTTON SHAFER, DEANE MERRILL  /////  LRL  J
MERRILL  66 UCRL 16455         DEANE MERRILL (THESIS, BERKELEY)  ///  LRL  J
BERGE    67 PRIV COMM          BERGE,DAUBER,HUBBARD ///////////////// LRL
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                 23  XI 0  (1314,JP=1/2 ) I=1/2

                 23  XI        MASS DIFFERENCE (-)-(0)(MEV)

D       23    6.6       1.6            JAUNEAU   63 FBC
D   *   45    6.1       1.6            CARMONY   64 HBC    REP BY PJERROU 65
D       88    6.1       0.9            PJERROU   65 HBC                       11/67
D       29    6.9       2.2            LONDON    66 HBC
D          . . . . . . . . . . .
D   AVG     6.3395    .7389   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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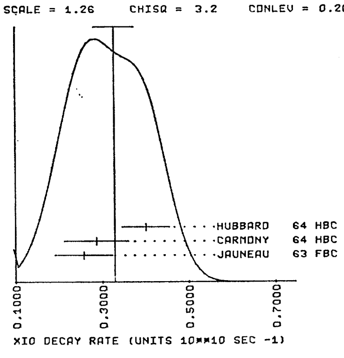
WEIGHTED AVERAGE = 0.3283 ± 0.0465
SCALE = 1.26   CHISQ = 3.2   CONLEV = 0.203



XIO DECAY RATE (UNITS 10**10 SEC -1)

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                 23  XI 0 LIFETIME (UNITS 10**-10)

T      24     3.9       1.4       0.80  JAUNEAU   63 FBC
T   *  45     3.5       1.0       0.8   CARMONY   64 HBC    REP BY PJERROU 65
T     101     2.5       0.4       0.3   HUBBARD   64 HBC
T      60     3.0       0.5             PJERROU   65 HBC                      11/67
T          . . . . . . . . . . .
T   AVG     2.9468    .3874   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
                   (SEE IDEOGRAM)

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                 23  XI 0  PARTIAL DECAY MODES

P1      XI 0 INTO LAMBDA PIO                                 S18S 9
P2      XI 0 INTO PROTON PI-                                 S16S 8
P3      XI 0 INTO PROTON E- NEU                              S16S 3S 1
P4      XI 0 INTO SIGMA+ E- NEU                              S19S 3S 1
P5      XI 0 INTO SIGMA- E+ NEU                              S20S 3S 1
P6      XI 0 INTO SIGMA+ MU- NEUTRINO                        S19S 4S 2
P7      XI 0 INTO SIGMA- MU+ NEUTRINO                        S20S 4S 2
P8      XI 0 INTO PROTON MU- NEUTRINO                        S16S 4S 2

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                 23  XI 0  BRANCHING RATIOS

R1  *  XI 0 INTO(PROTON PI-)/(LAMBDA PIO)                  (P2)/(P1)
R1  *    0     0.027  OR LESS          TICHO     63 HBC
R1  *    0     0.005  OR LESS          HUBBARD   66 HBC

R2  *  XI 0 INTO(PROTON E- NEU)/(LAMBDA PIO)               (P3)/(P1)
R2  *    0     0.027  OR LESS          TICHO     63 HBC
R2       0     0.006 OR LESS           HUBBARD   66 HBC

R3  *  XI 0 INTO(SIGMA+ E- NEU)/(LAMBDA PIO)               (P4)/(P1)
R3  *    0     0.013  OR LESS          TICHO     63 HBC
R3       0     0.007 OR LESS           HUBBARD   66 HBC

R4  *       XI 0 INTO (SIGMA- E+ NEUTRINO)/TOTAL           (P5)/TOTAL
R4  *    0     0.006  OR LESS          HUBBARD   66 HBC

R5  *       XI 0 INTO (SIGMA+ MU- NEUTRINO)/TOTAL          (P6)/TOTAL
R5  *    0     0.007  OR LESS          HUBBARD   66 HBC

R6  *       XI 0 INTO (SIGMA- MU+ NEUTRINO)/TOTAL          (P7)/TOTAL
R6  *    0     0.006  OR LESS          HUBBARD   66 HBC

R7  *       XI 0 INTO (PROTON MU- NEUTRINO)/TOTAL          (P8)/TOTAL
R7  *    0     0.006  OR LESS          HUBBARD   66 HBC

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                 23  XI 0 DECAY PARAMETER

A   *  ALPHA XI 0
A          -0.09      0.42          PJERROU   65 HBC
A   *      -0.149     0.154         BERGE     66 HBC
A      46  -0.2       0.4           LONDON    66 HBC  USING A-LAMB=0.62
A     490  -0.33      0.10          MERRILL   66 HBC  A-LAM=0.690+-.048
A          . . . . . . . . . . .
A   AVG     -.3106    .0945   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

F   *  PHI ANGLE XIO  (TAN(PHI)=BETA/GAMMA)  (DEGREE)
F   N  146   -2.9     23.5          BERGE     66 HBC
F   N  490  107.0     38.0          MERRILL   66 HBC  USING A-LAMB=0.642
F   N  THE LIKELIHOOD FUNCTION FOR COMBINED DATA IS VERY NON-GAUSSIAN. THE
F   N    DATA ARE CONSISTENT (2.2 S.D.) WITH PHI BETWEEN -25 AND +225 DEG.

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REFERENCES

23 XI 0(1314,JP=1/2)I=1/2


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ALVAREZ  59 PRL 2 215          ALVAREZ,EBERHARD,GOOD,GRAZIANO,TICHO+//LRL
JAUNEAU  63 SIENA CONF 1 1     JAUNEAU+ ///// PARIS+CERN+LOND+RUTH+BERGEN
    ALSO 63 PL 4 49            JAUNEAU+ ///// PARIS+CERN+LOND+RUTH+BERGEN
TICHO    63 BNL CONF 410       HAROLD K TICHO /////////////////////////UCLA

CARMONY  64 PRL 12 482         CARMONY,PJERROU,SCHLEIN,SLATER,STORK+/UCLA
HUBBARD  64 PR 135 B 183       HUBBARD,BERGE,KALBFLEISCH,SHAFER +/////LRL
PJERROU  65 PRL 14 275         + SCHLEIN,SLATER,SMITH,STORK,TICHO // UCLA
PJERROU  65 THESIS             G M PJERROU ///////////////////////// UCLA

BERGE    66 PR  147  945       BERGE,EBERHARD,HUBBARD,MERRILL + ///// LRL
HUBBARD  66 UCRL 11510         J RICHARD HUBBARD (THESIS,BERKELEY) // LRL
LONDON   66 PR 143 1034        LONDON,RAU,GOLDBERG,LICHTMAN+//BNL+SYRACUS.
MERRILL  66  BERKELEY CONF     MERRILL,SHAFER,BERGE                  // LRL
     CF. 66 UCRL 16455         DEANE MERRILL (THESIS, BERKELEY) ///// LRL
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                 24  OMEGA- (1675,JP=3/2+)   I=0

    *            QUANTUM NUMBERS ASSIGNED FROM SU3

                 24  OMEGA-  MASS (MEV)

M   *    1 1620.0     25.0      10.0  EISENBERG 54 EMUL
M   S    1 1673.0      8.0            ABRAMS    64 HBC     INTO XI- PIO
M   S    1 1677.0      9.0            BARNES 1  64 HBC    INTO XIO PI-
M   *      BARNES 1 CHANGED FROM 1686+-12.0 BY SAMIOS 65
M   S    1 1674.0      3.0            BARNES 2  64 HBC     INTO LAMBDA K-
M   S    1 1666.0      8.0            COLLEY    65 HBC     INTO XIO PI-
M   S    1 1671.0      5.0            RICHARDSO 65 HBC     INTO LAMBDA K-
M   S      ABOVE EVENTS INCLUDED IN SAMIOS RVUE
M        6 1674.0      3.0            SAMIOS    65 RVUE
M        1 1674.0      2.0            COLLEY    67 HBC    INTO LAMBDA K-    11/67
M        1 1669.0      4.0            ABCLV COL 67 HBC    INTO LAMBDA K-
M        1 1678.0     14.0            ABCLV COL 67 HBC    INTO LAMBDA K-    11/67
M        1 1671.0      7.0            ABCLV COL 67 HBC    INTO LAMBDA K-    11/67
M        1 1670.0      2.0            ABCLV COL 67 HBC    INTO LAMBDA K-    11/67
M        3 1671.8      1.0            SCHULTZ   67 HBC    SEE NOTE C BELOW 11/67
M   C   ALL THREE SCHULTZ EVENTS DECAY K- LAMBDA
M          . . . . . . . . . . .
M   AVG    1671.9087    .7672   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    24  OMEGA- LIFETIME  (UNITS 10**-1C SEC)

T   A   1    1.63                       ABRAMS     64 HBC
T   A   1    0.7                        BARNES 1   64 HBC
T   A   1    1.4                        BARNES 2   64 HBC
T   A   1    1.85                       CCLLEY     65 HBC
T   A   1    1.5                        RICHARDSC  65 HBC
T   A   1    0.93                       ABCLV CCL  67 HBC               11/67
T   A   1    2.6                        ABCLV CCL  67 HBC               11/67
T   A    ALLISON 66 INCLUDES ALL THE ABOVE + 5 OTHERS NCT LISTED HERE
T      12    1.1       0.6      0.5     ALLISON    66 RVUE              11/67
T       1    1.6                        ABCLV CCL  67 HBC               11/67
T       1    0.21                       ABCLV CCL  67 HBC               11/67
T       1    1.2C                       SCHULTZ    67                   11/67
T       1    0.06                       SCHULTZ    67                   11/67
T       1    0.63                       SCHULTZ    67                   11/67

                    24 OMEGA- PARTIAL DECAY MCDES

P1  CMEGA- INTO LAMBCA K-                                  S18S10
P2  CMEGA- INTO XI C PI-                                   S23S 8
P3  CMEGA- INTO XI- PI 0                                   S22S 9

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                                    REFERENCES
                                    24 OMEGA-(1675,JP=3/2+)  I=C

EISENBER 54 PR 96 541          Y EISENBERG ///////////////////////CORNELL
ABRAMS   64 PRL 13 670         + BURNSTEIN,GLASSER + ///// MARYLAND+USNRL
BARNES 1 64 PRL  12  204       V E BARNES,CONNCLLY,CRENNELL,CULWICK+//BNL
BARNES 2 64 PL 12 134          V E BARNES,CONNCLLY,CRENNELL,CULWICK+//BNL
COLLEY   65 PL 19 152          CCLLEY,COCD +  //  BIR+GLA+IC+MUN+OXF+RHEL
RICHARDS 65 BAPS 10 115        RICHARDSON,BARNES,CRENNEL+ // BNL+SYRACUSE
SAMICS   65 ARGONNE CCNF 189   N P SAMIOS //////////////////// (RVUE) BNL
ABCLV CC 67  SUBMITTEC TO NP   AACHEN+BERLIN+CERN+LONDON IMP.COLL.+VIENNA
ALLISON  66 PREPRINT           J. ALLISON ////////////////////////// CXFORC
COLLEY   67  PRIV. COMM. FROM  D.C.CCLLEY//BIRM+GLASG+LCN.IC+MUN+OXF+RHEL
SCHULTZ  67 PR  TO BE PUB      SCHULTZ+ /// ILL,ARGONNE,NCRTHWESTERN,WISC

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DATA ON MESON RESONANCES

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CODE EVENTS QUANTITY  ERRCR+  ERRCR-  REFERENCE YR TECN SIGN COMMENTS      CATE
   ABCVE                                                                  PUNCHED
 BACKGRCUND
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π±

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             8  CHARGEC PICN  (14C, JPG=C--)  I=1
             SEE LISTINGS CF STABLE PARTICLES
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π0

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             9  NEUTRAL PICN  (135, JPG=C--)  I=1
             SEE LISTINGS CF STABLE PARTICLES

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σ(410)

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             7  SIGMA MESON (410, JPG=C++)  I = C

   *         NC COMPELLING EVICENCE FOR NARROW RESCNANCE.
   *         CMITTEC FROM TABLE.
   *         SEE NCTE CN SIGMA(410) ANC EPSILON(7CC) BELOW

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                           REFERENCES FCR SIGMA

SAMICS    62 PRL 9 139          +BACHMAN,LEA+ ///////////// BNL+CCNY+CC+KY
BLOKHINT  63 JETP 17 8C         BLOKHINTSEVA,GREICINNIK,ZHUKCV +  // CUBNA
BOOTH     63 PR 132 2314        + ABASHIAN ////////////////////////// LRL
KIRZ      63 PR 13C 2481        +SCHWARTZ + TRIPP /////////////////// LRL
BARISH    64 PR 135 B 416       BARISH,KURZ,PEREZ-MENDEZ,SCLCMON    // LRL
CRAWFORC  64 PRL 13 421         +GRCSSMAN,LLCYC,PRICE,FOWLER ///////// LRL
DEL FAER  64 PRL 12 674         CEL FABRO,DE PRETIS,JONES+       FRASCATI
KALMUS    64 PRL 13  99         +KERNAN,PU,POWELL,COWD ///// LRL+WISCCNSIN
BROWN     65 CORAL GABLES 219   BROWN+FAIER //////////////// NCRTHWESTERN
KOPELMAN  66 PL   22  118       +ALLEN,GCCCEN,MARSHALL +  // COLORACC+ICWA
LOVELACE  66 PL   22  332       LCVELACE,HEINZ,CCNNACHIE             // CERN
ANDERSCN  67 PRL 18 89          +FUKUI+KESSLER+ // CHIC+ANL+CTT+MCGILL+CMC
MALAMUC   67 PRL 19 1C56        E.MALAMUD + P.E.SCHLEIN ///////////// UCLA

   FOR NEGATIVE EVICENCE FROM PI PI PHASE SHIFT DETERMINATIONS, SEE

BIRGE     65 PR 139 B 1600      +ELY+GICAL+KALMUS+CAMERINI+ ///// LRL+WISC
WOLF      65 PL 19 328          WCLF //////////////////////////////// DESY
BIRGE     66  BERKELEY CONF     +ELY+GICAL+HAGOPIAN+ / LRL+LCNDCN(UC)+WISC
JACCBS    66 PRL 16 669         +SELOVE ///////////////////////////// LRL
JONES     66 PL 21 59C          +CALDWELL+ZACHARCV+HARTING+BLEULER+ / CERN
CORBETT   67 PR 156 1451        +CAMERELL+MICCLEMAS+NEWTCN     CXF+RUTHERF
WALKER    67 PRL 18 630         +CARRCLL,GARFINKEL,OH ////////// WISCCNSIN

   SEE ALSC CISCUSSICN BY G. GCLCHABER, BERKELEY CONF. 1966, MESCN REVIEW

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η

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             14  ETA    (549,   JPG=0-+)   I=0
             SEE LISTINGS CF STABLE PARTICLES

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ε (730)

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             14      EPSILON (730,JPG=0++)  I=0
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σ(410) and ε(730)

Narrow $J^P = 0^+$ pion pion resonances have been claimed at each of these energies, but the evidence is controversial.

There is, however, evidence from several studies of

$$\pi^- p \to n\pi^+\pi^-,\ n\pi^0\pi^0$$
$$\pi^+ p \to \Delta^{++}\pi^+\pi^-$$

that δ_{00} (the I=0, s-wave, ππ phase shift) is large and slowly varying between 400 and 600 MeV, and that it is large around 700 MeV.

The most complete and recent study is MALAMUD 67. Malamud and Schlein find three solutions for δ_{00}, two of which suggest a broad resonance at 730 MeV. The slightly preferred solution also hints at a lower resonance, e.g. the σ(400).

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                 14      EPSILON MASS (MEV)

M   F        700.0                   FELCMAN   65 SPRK    1.52 PI- P
M   F        NO EPSILCN SEEN BY BUHLER 67 (IN EXPERIMENT AT SAME ENERGY).   11/67
M   F        FCR ANOTHER NEGATIVE RESULT SEE BUNIATOV 67                    11/67
M            600.   APPROX.          CCRBETT   67 SPRK    1.7-2.5 PI-P       7/67
M            730.   APPROX.          MALAMUD   67 RVUE  (PREFERREC SOLUT.)   7/67
M   P   20   709.     18.            STRUGALSK 67 HLBC    2.3 PI+ N          7/67
M   P        PRELIMINARY RESULT

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                 14      EPSILCN WICTH (MEV)

W   F         50.0                   FELCMAN   65 SPRK (SEE NOTE F ABOVE)
W            400.   APPROX.          CCRBETT   67 SPRK    1.7-2.5 PI- P      7/67
W            150.   APPROX.          MALAMUD   67 RVUE  (PREFERREC SOLUT.)   7/67

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                           REFERENCES FCR EPSILCN

CLARK     65 PR 139 B1556       +CHRISTENSON+CRCNIN+TURLAY ///// PRINCETON
COHN      65 PRL 15 9C6         H D CCHN,BUGG+//CRNL+TENN+UNCAR+COLU+EFINS
DURAND    65 PRL 14 329         L. CURANC ANC Y.T. CHIU ///////////// YALE
FELCMAN   65 PRL 14 869         FELCMAN,FRATI,HALPERN,CHCLCRY+/PENNA+COLUM
FORINO    65 PL 19 65           +CESSARCLI,LENCINARA+ /// ECL+ORSAY+SACLAY
HAGCPIAN  65 PRL 14 1077        HAGCPIAN,SELOVE,ALIT+/PENNA+SACLAY+BOLCGNA
WOLF      65 PL 19 328          G WCLF ////////////////////////////// CESY

GOLCHABE  66 BERKELEY CONF 102  G.GCLCHABER, MESCN REVIEW //////////// LRL
JABIOL    66 PRL 17 1C65        +JAMES+NGUYEN HUU KHANH /SACLAY+YALE+CRSAY
JACCBS    66 UCRL-16877         L.C.JACCBS ////////////////////////// LRL
JONES     66 PL 21 59C          +CALCWELL+ZACHARCV+HARTING+BLEULER+ / CERN
LOVELACE  66 PL   22  332       LCVELACE,HEINZ,CCNNACHIE             // CERN
OLSSCN    66  PREPRINT          MARTIN G. OLSSON /////////////// WISCCNSIN

BANCER    67 PR 155 1675        M.BANCER + G.L.SHAW ////////////////// UCI
BUHLER    67 NC 49A 183         +CALPIAZ,MASSAM,ZICHICHI+  // CERN+BCLCGNA
BUNIATCV  67  HEIDELBERG CONF.  +ZAVATTINI,CEINET,MULLER+ //// CERN+KARLSR
CORBETT   67 PR 156 1451        +CAMERELL+MICCLEMAS+NEWTCN     CXF+RUTHERF
GUTAY     67 PRL 18 142         +JOHNSON+LOEFFLER+MCILWAIN+ // PURDUE+UCRL
JOHNSON   67  PREPRINT          +EISNER+GUTAY+KLEIN+PETERS+SAHNI+ / PURCUE
MALAMUC   67 PRL 19 1C56        E.MALAMUD + P.E.SCHLEIN ///////////// UCLA
STRUGALS  67  JINR E1-31C0      STRUGALSKI+CHUVILO+IVANGVSKAJA+ //// CUBNA
   SEE ALSC G. GOLDHABER, MESON REVIEW, PROC. 1966 BERKELEY CONF.
WALKER    67 PRL 16 63C         +CARRCLL,GARFINKEL,OH ////////// WISCCNSIN
WALKER    67 RMP 39 695         W.D.WALKER ///////////////////// WISCCNSIN

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ρ(765)

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             9 RHO (765,JPG=1-+)  I=1

             9 RHO  MASS (MEV)

THERE ARE WIDE FLUCTUATICNS IN THE MEASURED VALUES FOR MASS AND WICTH CF
THE RHC. REPORTEC MASS VALUES RANGE FRCM 730 TC 780 MEV, CEPENCING ON TYPE
OF REACTICN ANC CN KINEMATICS. WITHOUT A BETTER UNDERSTANCING CF PRCCUC-
TICN DYNAMICS, BACKGROUNC INTERFERENCE AND FINAL STATE INTERACTICNS, THE
DETERMINATION OF THE RHC MASS ANC WICTH WILL SUFFER FRCM SYSTEMATIC UN-
CERTAINTIES WHICH SEEM TC BE CF THE ORCER OF AT LEAST 1C MEV.

NOTE IN PARTICULAR THE FCLLOWING ENTRIES.

   AUSLANCER 67 (RHC 0 FROM E- E+ COLLIDING BEAMS)
   BATCN 67     (RHC - IN CHEW-LCW EXTRAPOLATICN)
   MALAMUC 67   (RHC 0 FROM PICN-PION PHASE SHIFT ANALYSIS)
   ROCS 67      (COMPILATICN ANC CISCUSSICN CF RHC+-C IN PI NUCL CCLL.)

M+  R      760.0      9.0          CARMONY   64 HBC  +          TCUT 4
M+         760.      10.           ARMENISE  65 HBC  +
M+  R      765.0      5.0          ALFF-STEI 66 HBC  +   2-3 PI+ P
M+  *      783.0      6.0          JAMES     66 HBC   + 2.1 PI+ P
M+         756.0     10.0          JAMES     66 HBC             TCUT 2.5
M+         . . . . . . . . . .
M+  AVG    759.0C00   7.C711   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

M+  S      750.0      3.C          BALTAY    66 HBC  +-  C.C PBARP
M+         755.      10.           ALLES-BCR 67 HBC  +-  5.7 PBAR P    12/66
M+         730.      11.           BARLCW    67 HBC  +- 1.2 PBAR P     11/66
M+         748.0     12.0          FCSTER    67 HBC  +-  PBAR P AT REST  9/67
M+  A      774.       2.           RCOS      67 RVUE +-  PI N CL-2-BCDY  7/67
M+  A  SEE ROOS 67 RVUE FOR DEPENDENCE CN MOM.TRANSFER ANC TYPE OF REACTICN  7/67
M+         . . . . . . . . . .
M+  AVG    744.8757   7.6124   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.2)
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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M-  *       748.0                        KENNEY    62 HBC  -
M-  *  130  775.0                        GUIRAGOSS 63 HBC  -
M-  R       768.0     5.0                BLIEDEN   65 MMSP -  3-5 PI- P
M-          772.0    19.0                FIDECARO  66 SPRK -  2.5 PI-,T CUT18 11/66
M-  R       760.0     5.0                HAGOPIAN1 66 HBC  -  3.0 PI- P
M-  R       770.0     5.0                HAGOPIAN2 66 HBC  -  2.14 PI-P         9/67
M-  R       765.0     5.0                HAGOPIAN2 66 HBC  -  2.14 PI-P,LOW T   9/67
M-  R 1054  754.      5.                 JACOBS    66 HBC  -  2-3 PI-,T CUT 6   1/67
M-  R       749.0     3.0                WEST      66 HBC  -  2.1 PI- P
M-          752.0    14.0                BANNER    67 MMS  -  1.8 PI-P,  C+MM   9/67
M-  C       755.0     5.0                BATON     67 HBC  -  2.8 PI- P        10/67
M-          751.      5.                 CLEAR     67 HBC  -  3 PI- P           7/67
M-          764.      4.                 EISNER    67 HBC  -  4.2 PI-P          9/67
M-  R       777.0     6.0                MILLER    67 HBC  -  2.7 PI-,T CUT 5
M-  R       775.0     5.0                MILLER    67 HBC  -  2.7 PI-,T CUT10
M-  R       766.0     5.0                MILLER    67 HBC  -  2.7 PI-,T CUT20
M-          . . . . . . . . . .
M-  AVG     758.9347  4.4480   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)

MO  *  190  750.0    20.0                SAMIOS    62 HBC   0
MO  R  300  760.0    10.0                ABOLINS   63 HBC   0
MO  *  160  775.0                        GUIRAGOSS 63 HBC   0
MO  R  500  770.0    10.0                GOLDHABER 64 HBC   0
MO  *       735.0    10.0                ALYEA     65 DBC   0 2.2 K- P
MO          750.0                        CLARK     65 SPRK  0
MO  N       736.0                        CLARK     65 SPRK  0 1.5 PI- P
MO  N  AT PI PI SCATT.ANGLE OF 90 DEG.WITHOUT INTERFERENCE WITH NONRES.BACKGD
MO  M       753.0                        CLARK     65 SPRK  0 1.5 PI- P
MO  M  AT PI PI SCATT.ANGLE OF 90 DEG. ALLOWING FOR INTERF.WITH NONRES.BACKGD
MO          763.0                        DERADO    65 DBC   0 4.0 PI- P
MO  S       750.0    15.0                GUTAY     65 HBC   0 2.0 PI- P
MO          768.0    14.0                ACCENSI   66 HBC   0 5.7 PBARP
MO  R       750.0     5.0                ALFF-STEI 66 HBC   0 2-3 PI+ P
MO  S       751.      6.                 BALTAY    66 HBC   0 0.0 PBARP
MO  S       773.0    12.0                CASON     66 HBC   0 7.0 PI- P
MO  R       775.0     5.0                HAGOPIAN1 66 HBC   0 3.0 PI- P
MO  R       770.0     5.0                HAGOPIAN2 66 HBC   0 2.14 PI-P         9/67
MO  R       770.      5.                 HAGOPIAN2 66 HBC   0 2.1 PI-,TCUT 12   2/67
MO  R 1500  756.      5.                 JACOBS    66 HBC   0 2-3 PI-,T CUT 4   1/67
MO  R       765.0     8.0                JAMES     66 HBC   0 2.1 PI+ P
MO  R       760.0     3.0                WEST      66 HBC   0 2.1 PI- P
MO  R       776.0     2.0                ARMENISE  67 DBC   0 5.1 PI+D          9/67
MO  S       764.0    11.0                AUSLANDER 67 SPRK    E+E- COLLID.BEAM 10/67
MO  R       768.0     2.0                BACON     67 HBC   0 1.7 PI-P          9/67
MO          745.      9.                 BARLOW    67 HBC   0 1.2 PBAR P       11/66
MO          766.      3.                 CLEAR     67 HBC   0 3 PI- P           7/67
MO     327  750.     10.                 DANYSZ    67 HBC   0 3,3.6 PBAR P      7/67
MO  W  184  755.      5.                 DANYSZ    67 HBC   0 3,3.6 PBAR P      7/67
MO  W    WIDTH UNUSUALLY SMALL
MO          781.      3.                 EISNER    67 HBC   0 4.2 PI-P          9/67
MO          755.0    12.0                FOSTER    67 HBC   0 PBAR P AT REST    9/67
MO  R       761.      3.                 HUWE      67 HBC   0 2.4 PI- P         7/67
MO          766.      4.                 LAMSA     67 HBC   0 8.0 PI-P         11/67
MO  C       765.0     4.0                MALAMUD   67 RVUE  0 PI+P,SEE NOTE C   7/67
MO  C       767.0     2.0                MALAMUD   67 RVUE  0 PI-P,SEE NOTE C   7/67
MO  R       770.0     4.0                MILLER    67 HBC   0 2.7 PI-,T CUT20
MO          777.0     5.0                POIRIER   67 HBC   0 8.0 PI- P        11/67
MO  B       780.      2.                 ROOS      67 RVUE  0 PI N QU-2-BODY    7/67
MO  B  SEE ROOS 67 RVUE FOR DEPENDENCE ON MOM.TRANSFER AND TYPE OF REACTION     7/67
MO          . . . . . . . . . .
MO  AVG     770.5145  3.5335   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)

MO  P       740.0    10.0                LANZEROTT 65 CNTR  0 GAMMA P
MO  P       728.0     8.0                CAMBRIDGE 66 HBC   0 1.0-6.0 GAMMA P
MO  P       728.0     6.0                ERBE      67 HBC   0 3.5-5.8 GAMMA P
MO  P  IN GAMMA P TO RHO 0 P, THE RHO MASS APPEARS SHIFTED.
MO  P  FOR CORRECTED VALUES SEE BELOW.
MO  P       765.      5.                 ASBURY 2  67 CNTR  0 GAMMA + PB        8/67
MO  P       ASBURY 67 CORRECT FOR MASS DEPENDENCE OF PRODUCTION PROCESS
MO  P 1500  774.      3.                 ERBE      67 HBC   0 1.4-5.8 GAMMA P   7/67
MO  P       ERBE 67 TAKE INTERFERING BACKGROUND INTO ACCOUNT.

M      290  755.0                        CHADWICK  63 HBC  +-0
M           730.0     5.0                CLAYTON   67 HBC     2.5 P(BAR)P       9/67
M           744.      9.                 FRENCH    67 HBC  +-0 3-4 PBAR P       6/67
M           . . . . . . . . . .
M   AVG     733.3019  5.9434   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)

M      240  752.0                        ALITTI    63 HBC  -0
M           765.0                        LEE       65 HBC  -0

M   *   ----------NOTES----------

M   C   FROM CHEW-LOW EXTRAPOLATION
M   P   PHOTOPRODUCTION
M   C   FROM PHASE SHIFT ANALYSIS
M   R   INCLUDED IN ROOS 67 RVUE
M   S   S-WAVE BREIT-WIGNER FIT, CANNOT BE COMBINED WITH OTHER VALUES

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                  9  RHO(0) - RHO(+-) MASS DIFFERENCE (MEV)

D   A         5.7       2.2              ROOS      67 RVUE    PI N QUASI-2-BDY  7/67
D   A   ERROR STATISTICAL ONLY. SEE COMMENT ON RHO MASS ABOVE.

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                  9  RHO  WIDTH (MEV)

W   *   SEE NOTE ON RHO MASS ABOVE

W+           90.0     10.0               SACLAY    63 HBC  +
W+  R        77.0     20.0               CARMONY   64 HBC  +          TCUT 4
W+          160.      10.                ARMENISE  65 HBC  +
W+  R       100.0                        ALFF-STEI 66 HBC  +   2-3 PI+ P
W+  *       177.0     15.0               JAMES     66 HBC    + 2.1 PI+ P
W+          147.0     19.0               JAMES     66 HBC             TCUT 2.5
W+          . . . . . . . . . .
W+  AVG     127.6764  23.7454  AVERAGE (ERROR INCLUDES SCALE FACTOR = 3.6)

W+  S       150.0     30.0               BALTAY    66 HBC  +-  0.0 PBARP
W+          146.      31.                ALLES-BOR 67 HBC  +-  5.7 PBAR P      12/66
W+          130.      25.                BARLOW    67 HBC  +- 1.2 PBAR P       11/66
W+          166.0     10.0               FOSTER    67 HBC  +-  PBAR P AT REST   9/67
W+          . . . . . . . . . .
W+  AVG     159.7968  8.9020   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

W-  *  130  125.0                        GUIRAGOSS 63 HBC  -
W-      98  180.0                        BONDAR    64 HBC  -
W-  R       127.0      5.0               BLIEDEN   66 MMSP -  3-5 PI- P
W-  R       150.0     20.0               HAGOPIAN1 66 HBC  -  3.0 PI- P
W-  R       130.0     20.0               HAGOPIAN2 66 HBC  -  2.14 PI-P         9/67
W-  R       135.0     20.0               HAGOPIAN2 66 HBC  -  2.14 PI-P,LOW T   9/67
W-  R 1054  146.      10.                JACOBS    66 HBC  -  2-3 PI-,T CUT 6   1/67
W-  R       149.0      13.0              WEST      66 HBC  -  2.1 PI- P
W-          100.0     30.0               BANNER    67 MMS  -  1.8 PI-P,  C+MM   9/67
W-  C       110.0      9.0               BATON     67 HBC  -  2.8 PI- P        10/67
W-          133.      11.                EISNER    67 HBC  -  4.2 PI-P          9/67
W-  R       137.0     17.0               MILLER    67 HBC  -  2.7 PI-,T CUT 5
W-  R       145.0     12.0               MILLER    67 HBC  -  2.7 PI-,T CUT10
W-  R       153.0     13.0               MILLER    67 HBC  -  2.7 PI-,T CUT20
W-          . . . . . . . . . .
W-  AVG     129.0891  10.6660  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

WO  *  190  150.0     20.0               SAMIOS    62 HBC    0
WO  *  160  175.0                        GUIRAGOSS 63 HBC    0
WO  R  300   90.0     10.0               ABOLINS   63 HBC    0
WO  R   96  210.0                        BONDAR    64 HBC    0
WO  R  500  130.0                        GOLDHABER 64 HBC    0
WO          110.0     20.0               ALYEA     65 DBC    0 2.2 K- P
WO          130.0                        CLARK     65 SPRK   0
WO          150.0                        DERADO    65 HBC    0 4.0 PI- P
WO  S        80.0     15.0               GUTAY     65 HBC    0 2.0 PI- P
WO  P       150.0     10.0               LANZEROTT 65 CNTR   0
WO           72.0     30.0               ACCENSI   66 HBC    0 5.7 PBARP
WO  R       100.0                        ALFF-STEI 66 HBC    0 2-3 PI+ P
WO  S       174.      31.                BALTAY    66 HBC    0 0.0 PBARP
WO  P       175.0                        CAMBRIDGE 66 HBC    0 5-6 GAM P
WO  S        57.0     25.0      15.0     CASON     66 HBC    0 7.0 PI- P
WO  R       120.0     10.0               HAGOPIAN1 66 HBC    0 3.0 PI- P
WO  R       130.0     20.0               HAGOPIAN2 66 HBC    -  2.14 PI-P         9/67
WO  R       135.0     20.0               HAGOPIAN2 66 HBC    -  2.14 PI-P,LOW T   9/67
WO  R 1500  141.      10.                JACOBS    66 HBC    0 2-3 PI-,T CUT 4    1/67
WO  R       103.0     13.0               JAMES     66 HBC    0 2.1 PI+ P
WO  R       173.0     13.0               WEST      66 HBC    0 2.1 PI- P
WO  R       164.0      5.0               ARMENISE  67 DBC      5.1 PI+D           9/67
WO  P       130.       5.                ASBURY 2  67 CNTR   0 GAMMA + PB         8/67
WO  P       ASBURY 67 CORRECT FOR MASS DEPENDENCE OF PRODUCTION PROCESS
WO  S        93.0     15.0               AUSLANDER 67 SPRK     E+E- COLLID.BEAM 10/67
WO  R       148.0      8.0               BACON     67 HBC    0 1.7 PI-P           9/67
WO           92.      42.                BARLOW    67 HBC    0 1.2 PBAR P        11/66
WO  P       150.0     30.0               BLECHSCHM 67 SPRK       GAMMA(H+C+AL) 10/67
WO     327  135.      25.                DANYSZ    67 HBC    0 3,3.6 PBAR P       7/67
WO  W  184   28.      15.                DANYSZ    67 HBC    0 3,3.6 PBAR P       7/67
WO  W    WIDTH UNUSUALLY SMALL
WO          166.      11.                EISNER    67 HBC    0 4.2 PI-P           9/67
WO          153.0     10.0               FOSTER    67 HBC    0 PBAR P AT REST     9/67
WO  R       152.      15.                HUWE      67 HBC    0 2.4 PI- P          7/67
WO          111.       8.                LAMSA     67 HBC    0 8.0 PI-P          11/67
WO  C       149.0      5.0               MALAMUD   67 RVUE   0 PI-P,SEE NOTE C    7/67
WO  C       154.0      8.0               MALAMUD   67 RVUE   0 PI+P,SEE NOTE C    7/67
WO  R       160.0     15.0               MILLER    67 HBC    0 2.7 PI-,T CUT20
WO          135.0     10.0               POIRIER   67 HBC    0 8.0 PI- P         11/67
WO          . . . . . . . . . .
WO  AVG     133.0736   9.3518  AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)

W      290  110.0                        CHADWICK  63 HBC  +-0
W            98.      30.                FRENCH    67 HBC  +-0 3-4 PBAR P       6/67

W           125.0     15.                LEE       65 HBC   -0

W   C       170.0                        WOLF      65 RVUE
W   A       128.       5.                ROOS      67 RVUE +-0 PI N QU-2-BODY   7/67
W   A   THIS VALUE IS FROM COMBINED DATA ON NEUTRAL AND CHARGED RHOS. NO DE-    7/67
W   A   PENDENCE OF THE RHO WIDTH ON ITS CHARGE HAS BEEN DETECTED WITHIN THE    7/67
W   A   EXPERIMENTAL ACCURACIES OF ABOUT 10 MEV. SEE ROOS 67 RVUE.              7/67

W   *   ----------NOTES----------

W   C   FROM CHEW-LOW EXTRAPOLATION
W   P   PHOTOPRODUCTION (SEE ALSO UNDER RHO 0 MASS)
W   C   FROM PHASE SHIFT ANALYSIS
W   R   INCLUDED IN ROOS 67 RVUE
W   S   S-WAVE BREIT-WIGNER FIT, CANNOT BE COMBINED WITH OTHER VALUES

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                  9  RHO PARTIAL DECAY MODES

P1      RHO INTO 2PI                                      S 8S 8
P2      RHO INTO 4PI                                      S 8S 8S 8S 8
P3      RHO INTO PI GAMMA                                 S 8S 0
P4      RHO INTO E+ E-                                    S 3S 3
P5      RHO INTO PI ETA (VIOLATES G)                      S 8S14
P6      RHO INTO MU+ MU-                                  S 4S 4

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                  9  RHO BRANCHING RATIOS

R1  *   RHO INTO 4PI/2PI                                (P2)/(P1)

R1  *   RHO+- INTO (PI+- PI+ PI- PI0) / (PI+- PI0)
R1            0.026 OR LESS              BLIEDEN   66 MMSP -  3-5 PI- P
R1            0.01 OR LESS               DEUTSCHMA 66 HBC  +  8.0 PI+ P
R1            0.002 OR LESS              FERBEL    66 HBC  +- PI+- P ABOVE 2.5
R1            0.0035    0.004            JAMES     66 HBC  +                   11/66

R1  *   RHO 0 INTO  (PI+ PI- PI+ PI-) / (PI+ PI-)
R1            0.008 OR LESS              JAMES     66 HBC   0
R1            0.002 OR LESS              CHUNG     67 HBC   0 3.2,4.2 PI-P       7/67
R1            0.0015  OR LESS,CL=0.90 HILPERT      67 HBC     2.5-5.8 GAMMA P 10/67

R2  *   RHO INTO PI GAMMA/2PI                            (P3/P1)
R2            0.02  OR LESS              DAUDIN    64 HBC  +
R2  N         0.02 OR LESS               LANZEROTT 65 CNTR                     11/66
R2  N      ONE PION EXCHANGE MODEL USED IN THIS ESTIMATION
R2            0.005 OR LESS            . FIDECARO  66 SPRK  - 0.97 CONF LEV
R2            0.007 OR LESS              HUSON     66 HLBC  -
R2  M         0.004 OR LESS              ERBE      67 HBC    0 3.5-5.5 GAMMA P
R2  M      ONE PION EXCHANGE MODEL USED IN THIS ESTIMATION

R3  *   RHO INTO(E+ E-)/(PI+PI-)      (UNITS 10**-4)      (P4)/(P1)
R3      94    0.65      0.14             ASBURY 1  67 CNTR     PHOTOPRODUCTION  9/67
R3      99    0.62      0.11             AUGUSTIN  67 SPRK    E+E- COLLID.BEAM 11/67
R3  *         0.49      0.08             AUSLANDER 67 SPRK    E+E- COLLID.BEAM 10/67
R3            0.65      1.1       0.5    HERTZBACH 67 SPRK ASSUME SU(3)+MIXING
R3      13    0.39      0.12      0.39   KHACHATUR 67 SPRK ASSUME SU(3)+MIXING  5/67
R3

R4  *    RHO INTO (PI ETA)/(2PI)                          (P5)/(P1)
R4            0.03 OR LESS               DEUTSCHMA 66 HBC  +    8.0 PI+ P
R4            0.008  OR LESS             FERBEL    66 HBC  +- PI+- P ABOVE 2.5 11/66

R5  *    RHO INTO (MU+ MU-)/(PI+ PI-) (IN 10**-4)         (P6)/(P1)
R5  D         0.33      0.16      0.07   DE PAGTER 66 CNTR   0 5.2 GAM P
R5  D       DE PAGTER 66 SUPERSEDED BY WEINSTEIN 67 BELOW
R5          14.0 OR LESS                 HERTZBACH 67 SPRK
R5            0.97      0.31      0.33   HYAMS     67 SPRK    11 PI- LI H        6/67
R5            0.51      0.12             WEHMANN   67 SPRK   0 12 PI- ON C,FE   6/67
R5  W       A CORRECTION OF 11 PER CENT FOR OMEGA CONTAMINATION IN THE
R5  W       DATA OF WEHMANN 67 IS BASED ON SU(3).
R5            0.59      0.15             WEINSTEIN 67 CNTR    PHOTOPRODUCTION  10/67
R5          . . . . . . . . . .
R5  AVG        .5751     .0899   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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REFERENCES FOR RHO


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ANDERSON 61 PRL 6 365        ANDERSON,BANG,BURKE,CARMONY,SCHMITZ // LRL
KENNEY   62 PR 126 736       V P KENNEY,W D SHEPHARD,C D GALL /KENTUCKY
SAMIOS   62 PRL 9 139        SAMIOS,BACHMAN,LEA+ // BNL+CCNY+COLUM+KENT
XUONG    62 PR 126 1849      NGUYEN HUU XUONG,GERALD R LYNCH ////// LRL
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.


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ABOLINS  63 PRL 11 381         ABOLINS,LANCER,MEHLHOP,NGLYEN,YAGER / UCSD
ALITTI   63 NC 29 515          ALITTI,BATON,ARMENISE+/SAC+CRSAY+BARI+BOLO
CHACWICK 63 PRL 10 62          CHACWICK,CAVIES,CERRICK,CRESTI + / CXF+PAC
GUIRAGOS 63 PRL 11 85          ZAVEN GLIRAGOSSIAN ////////////////// LRL
SACLAY   63 SIENA CONF 1 239   SACLAY+ORSAY+BARI + BOLOGNA(COLLABORATICN)

BATON    64 NC 35 713          BATON,BERTHELOT,ALLES,BORELLI + /CEN+BOLOG
BONCAR   64 NC 31 729          BCNCAR+//AACHEN+BIRM+BONN+CESY+IMP-COL+MPI
CARMCNY  64 DUBNA CONF 1 486   CARMONY,HOA,LANCER,NG H XLCNG,YAGER //UCSD
DAUDIN   64 REPORT CEA-R-2525  CAUCIN,JABIGL,MCNGELLI + ///// SACLAY+BARI
GOLCHABE 64 PRL 12 336         GCLCHABER,BROWN,KADYK,SHEN,TRILLING/LRL+UC

ALYEA    65 PL 15 82           ALYEA,CRITTENDEN,MARTIN,RHCCE + // INCIANA
ARMENISE 65 NC 37 361          SACLAY+CRSAY+BARI+BOLOGNA (CCLLABORATION )
BLIEDEN  65 PL 19 444          CERN MISSING MASS SPECTRCMETER GROUP//CERN
CLARK    65 PR 139 B 1556      A CLARK,CHRISTENSON,CRONIN,TLRLAY/PRINCETC
DERACO   65 PRL 14 872         DERADC,KENNEY,PCIRIER,SHEPHARD//NOTRE DAME
GUTAY    65 NC 39 381          GLTAY,LANNUTTI,TLLI ////////////// FLCRIDA
LANZEROT 65 PRL 15 21C         LANZEROTTI,BLUMENTHAL,EHN,FAISSLER +/HARVC
LEE      65 MICH 04938         YCNG-YUNG LEE /////////////////// MICHIGAN
WOLF     65 PL 19 328          G WOLF ///////////////////////////// DESY
ZDANIS   65 PRL 14 721         ZCANIS,MACANSKY,KRAEMER + //////// JHL+BNL

ACCENSI  66 PL 20 557          ACCENSI,ALLES-BCRELLI,FRENCH,FRISK+// CERN
ALFF-STE 66 PR 145 1072        ALFF-STEINBERGER,BERLEY,BRLGGER+//COL+RUTG
BALTAY   66 PR 145 11C3        +FRANZINI,LUTJENS,SEVERINS,TYCKO+/COLLMBIA
BLIEDEN  66 NC 43 71           CERN MISSING MASS SPECTRCMETER GROUP//CERN
CAMBRICG 66 PR  146  994       CAMBRIDGE BUBBLE CHAMBER GRCLP //MIT+HARV+
CASCN    66 PR  148  1282      N M CASCN                     // WISCCNSIN
DE PAGTE 66 PRL 16 35          DE PAGTER+//CAM EL ACC+MIT+NORTHEAST+ SLAC
DEUTSCHM 66 PL 20 82           DEUTSCHMANN,STEINBERG +//AACH+BERLIN+ CERN
FERBEL   66 PL 21 111          FERBEL ////////////////////////// ROCHESTER
FIDECARC 66 PL  23  163        G+M FIDECARC,J PCIRIER,P SCHIAVCN  // CERN
HAGCPIA1 66 PR 145 1128        HAGCPIAN,SELCVE,ALITTI,BATCN+//PENN+SACLAY
HAGOPIA2 66 PR  152  1183      HAGCPIAN,PAN  // PENNSYLVANIA,LRL-BERKELEY
HUSCN    66 PL 20 91           HLSON,ALLARC,DRIJARD,HENNESSY + //ORSAY+EP
JACOBS   66  UCRL-16877        L.D.JACOBS //////////////////////////// LRL
JAMES    66 PR 142 896         F E JAMES,KRAYBILL /////// YALE+BROOKHAVEN
WEST     66 PR 149 1C89        WEST,BOYD,ERWIN,WALKER ///////// WISCCNSIN

ALLES-BO 67 NC 50 A 776        ALLES-BORELLI,FRENCH,FRISK,+ /// CERN+BCNN
ARMENISE 67  HEIDELBERG CONF.  +GHICINI,FORINO+//BARI+BCLCGN+FIRENZ+CRSAY
ASBURY 1 67 PRL 19 869         +EECKER+BERTRAM+JOOS+JORCAN+TING+/DESY+COL
ASBLRY 2 67 PRL 19 865         +EECKER+BERTRAM+JOOS+JORCAN+TING+/DESY+COL
AUGUSTIN 67  PREPRINT LAL1181  +BIZOT+BUON+HAISSINSKI+LALANNE+  /// CRSAY
AUSLANDE 67 PL 25 B 433        ALSLANDER,BUCKER,PESTOV,SICCROV+/NOVOSIBIR
    ALSC 67  HEIDELBERG CONF.  (CUCTED IN RAP.TALK BY H. JCCS)
BANNER   67 PL  25 B  300      +FAYOLX,HAMEL,ZSEMBERY,CHEZE+//SACLAY+CAEN
BACCN    67 PR 157 1263        +FICKINGER,HILL,HOPKINS,RCBINSON+   // BNL
BARLCW   67 NC 50A 7C1         +LILLESTOL+MCNTANET+/CERN+CCF+IR+LIVERPOOL
BATCN    67 PL 25 B 419        J.BATCN,G.LAURENS,J.REIGNIER    //  SACLAY
    ALSC 67 NP B 3  349
BLECHSCH 67  HEIDELBERG CONF.  BLECHSCHMIDT,DOWC,ELSNER,HEINLOTH+ // DESY
CHUNG    67  UCRL-16881        S.U.CHUNG,O.I.DAHL,J.KIRZ,C.H.MILLER / LRL
CLAYTON  67  HEIDELBERG CONF.  +MASON,MUIRHEAD,FILIPPAS+ //  LPOOL+ATHENS
CLEAR    67 NC 49A 399         +JOHNSTCN+COOPER+MANNER+WALKER+/TO+ANL+WIS
DANYSZ   67 NC TO BE PUBL.     DANYSZ+FRENCH+SIMAK ////////////////// CERN
EISNER   67 PR TO BE PUBL.     +JOHNSON+KLEIN+PETERS+SAHNI+YEN+ // PLRCUE
ERBE     67 NC 48A 262         +BOTTCHER+MCEBES+HARIGEL+LLKE+ /// ABECHHM
FRENCH   67  CERN/TC/PH.66-31  +KINSCN+MCDONALC+RIDDIFORC+ //// CERN+BIRM
FOSTER   67  HEIDELBERG CONF.  +GAVILLET,LABROSSE,MONTANET+  //  CERN+COF
HERTZBAC 67 PR 155  1461       HERTZBACH,KRAEMER,MACANSKI,ZCANIS+/JHL+BNL
   (SEE ALSC ZOANIS 65)
HILPERT  67  HEIDELBERG CONF.  HILPERT+// AACH+BERL+BONN+HAMB+HEID+MLNICH
HUWE     67 PL 24B 252         +MARGLIT+CPPENHEIMER+SCHLLTZ+WILSON // COL
HYAMS    67 PL 24B 634         +KOCH+PELLETT+PCTTER+VONLINCERN+ /CERN+MUN
KHACHATL 67 PL 24B 349         KHACHATLRYAN+AZIMCV+BALCIN+BELOUSOV+/CUBNA
LAMSA    67  PREPRINT          +CASON+BISWAS+CERADO+GROVES+ /// NOTREDAME
MALAMUD  67  HEIDELBERG CONF.  +SCHLEIN,TRIPPE,BROWN,GICAL   //  UCLA+LRL
MILLER   67 PR 153 1423        MILLER,GUTAY,JOHNSON,LOEFFLER +  // PLRCUE
POIRIER  67  PREPRINT          +BISWAS,CASON,DERADO,KENNEY+//NCTRDAM+PENN
ROOS     67 NP B 2  615        M. ROCS                             // CERN
WEHMANN  67 PRL 18 929         +ENGELS+ /// HARVARD+CWRL+SLAC+CORN+MCGILL
WEINSTEI 67  SLAC SYMPOSIUM    R.WEINSTEIN,RAP.TALK //// CEA+NORTHEASTERN
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ω(783)

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                    1  OMEGA (783,JPG=1--)  I=C

                    1  OMEGA  MASS (MEV)

M      400  782.0      1.0            ALFF       62 HBC
M       64  779.4      1.4            ARMENTERC  62 HBC
M      650  782.0                     MURRAY     63 HBC
M       34  784.0      1.0            ARMENTERC  63 HBC
M      220  781.0      2.0            KRAEMER    64 DBC
M           785.6      1.2            MILLER C   65 HBC    SEEN WITH K+K-
M   M       780.8      2.0            MILLER C   65 HBC    SEEN WITH K1 K1
M   M       DATA INCLUDED IN BARASH 67 BELOW
M      333  786.0      1.0            JAMES      66 HBC
M     2198  783.4      C.7            BALTAY     67 HBC    C.0 PBAR P
M      155  779.5      1.5            BARASH     67 HBC    0 PBAR TC K1K1CM 11/66
M           784.0      2.8            CLAYTON    67 HBC     2.5 P(BAR)P      9/67
M           785.5      3.3            GCSHAW     67 HBC    3.5 K+ P          7/67
M   *       782.0      5.0            JACCUET    67 HLBC                    1C/67
M   *       784.8      1.1            KEY        67 HBC   -  3 PI-P         11/67
M           . . . . . . . . . .
M   AVG     783.2915   .6729   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.8)
                    (SEE IDEOGRAM)
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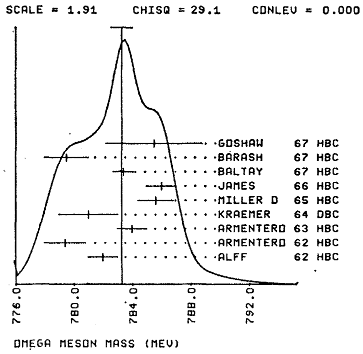
WEIGHTED AVERAGE = 783.279 ± 0.719
SCALE = 1.91 CHISQ = 29.1 CONLEV = 0.000



OMEGA MESON MASS (MEV)

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                    1  CMEGA FULL WIDTH (MEV)

W       34   9.0      3.0             ARMENTERC 63 HBC
W            13.4     2.0             MILLER C  65 HBC    SEEN WITH K+ K-
W   M        11.6     3.0             MILLER C  65 HBC     SEEN WITH K1 K1
W   M        DATA INCLUCEC IN BARASH 67 BELOW
W      333   20.0   CR LESS           JAMES     66 HBC
W      155   12.3     2.C             BARASH    67 HBC     SEEN WITH K1 K1
W            . . . . . . . . . .
W   AVG      12.1500  1.2792  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

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                    1  CMEGA PARTIAL CECAY MOCES

P1     CMEGA INTC PI+ PI- PIO                              S 8S 8S 9
P2     OMEGA INTO PI+ PI- (VICLATES G)                     S 8S 8
P3     CMEGA INTO PI+ PI- GAMMA                            S 8S 8S 0
P4     CMEGA INTO PIO GAMMA                                S 9S 0
P5     CMEGA INTO 2PIC GAMMA                               S 9S 9S 0
P6     OMEGA INTO MU+ MU-                                  S 4S 4
P7     CMEGA INTO E+ E-                                    S 3S 3
P8     CMEGA INTC ETA GAMMA                                S14S 0
P9     CMEGA INTO ETA PIO (VICLATES C)                     S14S 9
P10    CMEGA INTO 3 GAMMA                                  S 0S 0S 0

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                    1  OMEGA  BRANCHING RATIOS

R1  *  CMEGA INTO NEUTRAL/(PI+ PI- PIO)                 (P4+P5)/(P1)
R1           0.17     0.04            ARMENTERC 63 HBC
R1     20    0.11     0.02            BUSCHBECK 63 HBC
R1     35    0.08     0.03            KRAEMER   64 DBC
R1  *        0.13     0.035           MILLER C  65 HBC
R1     65    0.10     C.04            ALFF-STEI 66 HBC CCRR.BY SCHLLTZ(COL)
R1    850    0.134    0.026           DIGIUGNC  66 CNTR
R1    348    0.097    0.016           FLATTE    66 HBC
R1           0.06     0.05     0.02   JAMES     66 HBC
R1     19    0.10     C.03            BARASH    67 HBC                      7/67
R1           . . . . . . . . . .
R1  AVG      .1043    .0091   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

R2  *  CMEGA INTO (PI+ PI-)/(PI+ PI- PIC)               (P2)/(P1)
R2           0.010 OR LESS            BUTTCN    62 HBC
R2           0.07                     ALITTI    63 HBC
R2           0.05 OR LESS             ARMENTERC 63 HBC
R2    100    0.05 OR GREATER          FICKINGER 63 HBC
R2           0.05 CR LESS             KRAEMER   64 DBC
R2  *        0.005 CR LESS            LUTJENS   64 RVLE NC INTERFERENCE
R2           0.018    0.012    0.0C6  WALKER    64 RVUE
R2           0.04 OR GREATER          BATCN     65 HBC
R2           0.010 CR LESS            CLARK     65 SPRK
R2           0.035 CR LESS            MILLER C  65 HBC
R2           0.02 OR LESS             ALFF-STEI 66 HBC                      11/66
R2           0.029    0.011    0.0C9  FLATTE    66 HBC  INTERFERENCE
R2  *        0.082    C.02C           FLATTE    66 HBC  NC INTERFERENCE
R2  *        0.07     0.06     C.11   ROOS      67 RVUE  NC INTERF. T.LT.10  7/67
R2           0.017    0.035    0.C26  RCOS      67 RVUE  INTERF.    T.LT.1C  7/67
R2  *        0.0C     C.01            ROOS      67 RVUE  NC INTERF. T=10-3C  7/67
R2           0.12     0.04     0.22   RCOS      67 RVUE  INTERF.    T=1C-3C  7/67
R2           . . . . . . . . . .
R2  AVG      .0229    .0065   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

R3  *  CMEGA INTO (PIC GAMMA) / (PI+ PI- PIO)           (P4)/(P1)
R3  *        0.125    0.C25           BARMIN    64 PXBC
R3  N  13    0.15     C.06            BAGLIN    66 HLBC
R3  N        BAGLIN 66 SUPERSECED BY JACQUET 67 BELOW                       10/67
R3           0.13     0.04            JACCUET   67 HLBC                     10/67

R4  *  CMEGA INTO (PI+ PI- GAMMA)/(PI+ PI- PIC)         (P3)/(P1)
R4           0.05   OR LESS           FLATTE    66 HBC

R5  *  CMEGA INTO(E+ E-)/(PI+ PI- PIO)  (UNITS 10**-3)  (P7)/(P1)
R5  *        3.9      1.5    CR LESS  BARMIN    63 PBC
R5      1    2.8   CR LESS            BEZAGUET  64 FBC
R5      3    0.20     0.12            BINNIE    65 SPRK
R5           1.4   CR LESS            GALTIERI  65 HBC
R5           0.3 OR LESS              FLATTE    66 HBC
R5  A  20    0.11     C.03            AZIMOV    66 SPRK    4 PI- P
R5  A        RESLLT GOT CHANGEC BY MCRE THAN 1 S.D.(SEE KHACHATURIAN 67)    5/67
R5           0.10     C.17     0.075  HERTZBACH 67 SPRK ASSUME SU(3)+MIXING
R5     13    0.048    0.015    0.048  KHACHATLR 67 SPRK ASSUME SU(3)+MIXING  5/67
R5

R6  *  CMEGA INTO (MU+ MU-)/(PI+ PI- PIC)(UNITS 10**-3) (P6)/(P1)
R6           1.2   CR LESS            GALTIERI  65 HBC
R6           1.7 OR LESS              FLATTE    66 HBC

R7  *  CMEGA INTO (2PIO GAMM)/(PIO GAMMA)                (P5)/(P4)
R7           0.1   OR LESS            BARMIN    64 PXBC

R8  *  CMEGA INTO(ETA PIO +ETA GAM)/(PI+PI-PIC)          (P8+P9)/(P1)
R8           0.017  CR LESS           FLATTE    66 HBC
R8           0.026 CR LESS            JACCUET   67 HLBC    CL=0.9C          10/67

R9  *  CMEGA INTO (NEUTRALS) / (CHARGED)
R9           0.124    C.021           FELDMAN   67 SPRK     1.2 PI- P        3/67

R10 *  CMEGA INTO (2PIO GAMMA)/(PI+PI-PIO)               (P5)/(P1)
R10          0.1   OR LESS            JACQUET   67 HLBC    CL=0.90          10/67

R11 *  CMEGA INTO (3 GAMMA)/(PIC GAMMA)                  (P10)/(P4)
R11 *        0.35  CR LESS            KANAREK   66 XEBC                     11/67

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REFERENCES FCR CMEGA


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MAGLIC   61 PRL 7 178          B MAGLIC,ALVAREZ,ROSENFELC,STEVENSON //LRL
PEVSNER  61 PRL 7 421          PEVSNER,KRAEMER,NUSSBAUM,RICHARC+///JHU+NW
XUONG    61 PRL 7 327          NGUYEN HUU XUONG,GERALD R LYNCH /////  LRL
ALFF     62 PRL 9 325          ALFF,BERLEY,COLLEY,GELFANC +//COLU+RUTGERS
ARMENTER 62 CERN CONF 90       R ARMENTEROS,R BLCCE + // CERN+COLL+FRANCE
BUTTON   62 PR 126 1858        BLTTON,KALBFLEISCH,LYNCH,MAGLIC + /// LRL
STEVENSO 62 PR 125 687         STEVENSCN,ALVAREZ,MAGLIC,RCSENFELD /// LRL

ALITTI   63 NC 29 515          ALITTI,BATON,BERTHELOT+//LPCHE+PAR+BARI+BC
ARMENTER 63 SIENA CONF 1 296   ARMENTEROS,ECWARCS,JACOBSEN+ // CERN+PARIS
BARMIN   63 SIENA CCNF 1 207   BARMIN,COLGOLENKC,KRESTNIKCV+ //////  ITEP
BERTHELC 63 SIENA CCNF 2 60    A BERTHELCT //////////////////// CEN-SACLAY
BUSCHBEC 63 SIENA CONF 1 166   BLSCHBECK,CZAPP+ /// VIENNA+CERN+AMSTERCAM
FICKINGE 63 PRL 1C 457         W J FICKINGER,D K ROBINSCN,E SALANT // BNL
GELFAND  63 PRL 11 436         GELFAND,MILLER,NLSSBAUM,RATAU+ /COLUM+RUTG
MURRAY   63 PL 7 358           MLRRAY,FERROLUZZI,HUWE,SHAFER,SOLMITZ+/LRL

BARMIN   64 JETP 18 1289       BARMIN,COLGOLENKC,KRESTNIKCV + /////  ITEP
BEZAGUET 64 PL 12 7C           BEZAGLET,NGUYEN KHAC,ROUSSET+//PAR+BERG+LC
KRAEMER  64 PR 136 B 496       KRAEMER,MADANSKY,MEER,FIELCS+//JHU+NW+WOOC
LUTJENS  64 PRL 12 517         G LUTJENS,J STEINBERGER  ///////  COLLMBIA
WALKER   64 PL 8 208           WALKER,BOYD,ERWIN,SATTERBLCM +// WISCCNSIN
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.


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BATCN     65 NC 35 713           BATCN,BERTHELOT,DELER,BENEDETTI+/SAC+BOLOG
BINNIE    65 PL 18 348           BINNIE,DUANE,JANE,W JONES+//IC-LOND+MANCHS
CLARK     65 PR 139 B 1556       CLARK,CHRISTENSON,CRONIN,TURLAY//PRINCETON
GALTIERI 65 PRL 14 279           A BARBARO GALTIERI,R D TRIPP ///////// LRL
MILLER D 65 CU-237(NEVIS 131) DAVID C MILLER  (THESIS) //////// COLUMBIA
   MILLER 65 INCLUDES DATA OF GELFAND 63 ABOVE
ZDANIS    65 PRL 14 721          ZDANIS,MADANSKY,KRAEMER,HERTZBACH+/JHU+BNL

ALFF-STE 66 PR 145 1072          ALFF-STEINBERGER,BERLEY,BRUGGER+//COL+RUTG
AZIMOV    66 BERKELEY CONF.      AZIMOV,BALDIN,BELOUSOV,CHUVILO + //  DUBNA
BAGLIN    66 PL  23  286         +BEZAGUET,DEGRANGE,HAATUFT +  // EP+BERGEN
DIGIUGNO 66 NC 44A 1272          DI GIUGNO,PERUZZI,TROISE+ //NAPL+FRAS+TRST
FLATTE    66 PR  145  1050       +HUWE,MURRAY,BUTTON-SHAFER,SOLMITZ+ // LRL
JAMES     66 PR 142 896          F E JAMES,KRAYBILL //////  YALE+BROOKHAVEN
KANAREK   66  PREPRINT P1-2948 +LOSKEVICH,MARTYNOV,NICHIPORUK+  //  DUBNA

BALTAY    67 PRL  18  93         +FRANZINI,SEVERIENS,YEH,ZANELLO //COLUMBIA
BARASH    67 PR  156  1399       BARASH,KIRSCH,MILLER,TAN /////////COLUMBIA
CLAYTON   67  HEIDELBERG CONF. +MASON,MUIRHEAD,FILIPPAS+ //  LPOOL+ATHENS
FELDMAN   67 PR 159 1219         +FRATI,GLEESON,HALPERN,NUSSBAUM+ /// PENNA
GOSHAW    67  PREPRINT           +ERWIN+WALKER+WEINBERG ////////////// WISC
HERTZBAC 67 PR 155, 1461         HERTZBACH,KRAEMER,MADANSKI,ZDANIS+/JHU+BNL
   (SEE ALSO ZDANIS 65)
JACQUET   67  HEIDELBERG CONF. +NGUYEN-KHAC,BAGLIN,HAATUFT+ // EPP+BERGEN
KEY       67  PREPRINT           +PRENTICE+COOPER+MANNER+WALKER+/TO+ANL+WIS
KHACHATU 67 PL 24B 349           KHACHATURYAN+AZIMOV+BALDIN+BELOUSOV+/DUBNA
ROOS      67 NP B 2  615         M. ROOS                              // CERN
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η′(958)

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          2   ETA PRIME (958,JPG=0-+)  I=0

              KNOWN EARLIER AS XO OR ETA*

          2   ETA PRIME MASS (MEV)

M   *   85  957.0                       DAUBER    64 HBC
M           958.0      1.0              KALBFLEIS 64 HBC
M           957.0      3.0              BADIER    65 HBC
M        8  960.0      2.0              TRILLING  65 HBC       3.65 PI+ P
M        7  955.0     10.0              COHN      66 DBC
M           959.0      3.0              LONDON    66 HBC
M           . . . . . . . . . .
M   AVG     958.3171    .8214   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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          2   ETA PRIME WIDTH (MEV)

W       85    4.0 OR LESS               DAUBER    64 HBC
W             7.0 OR LESS               KALBFLEIS 64 HBC
W            30.0 OR LESS               BADIER    65 HBC
W            15.0 OR LESS               LONDON    66 HBC

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          2   ETA PRIME PARTIAL DECAY MODES

P1        ETA PRIME INTO  PI+ PI- ETA(NEUTRAL DECAY)    S 8S 8S14
P2        ETA PRIME INTO  PI+ PI- ETA(CHARGED DECAY)    S 8S 8S14
P3        ETA PRIME INTO  PI+ PI- NEUTRALS
                          (EXCLUDING  PI+ PI- ETA(NEUTRAL DECAY))
P4        ETA PRIME INTO  NEUTRALS
P5        ETA PRIME INTO  PI+ PI- GAMMA (INCL. RHO GAM) S 8S 8S 0
P6        ETA PRIME INTO  PI0 E+ E- (VIOLATES C IN      S 9S 3S 3
                                BORN APPROX.)
P7        ETA PRIME INTO  ETA E+ E- (VIOLATES C IN      S14S 3S 3
                                BORN APPROX.)
P8        ETA PRIME INTO  PI0 RHO 0 (VIOLATES C)        S 9U 9
P9        ETA PRIME INTO  PI0 OMEGA (VIOLATES C)        S 9U 1
P10       ETA PRIME INTO  PI+ PI- E+ E-                 S 8S 8S 3S 3
P11       ETA PRIME INTO  2 PI                          S 8S 8
P12       ETA PRIME INTO  3 PI                          S 8S 8S 9
P13       ETA PRIME INTO  4 PI                          S 8S 8S 8S 8
P14       ETA PRIME INTO  6 PI                          S 8S 8S 8S 8S 8S 8
P15       ETA PRIME INTO  PI0 GAMMA GAMMA               S 9S 0S 0

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          2   ETA PRIME BRANCHING RATIOS

R1  *     ETA PRIME INTO (PI+ PI- ETA (NEUTRAL DEC.))  NUM 1
R1  *                   / TOTAL                        DEN 12345
R1      68   0.36     0.05          KALBFLEIS 64 HBC
R1           . . . . . . . . . .
R1  FIT        .329     .027    VALUE FROM CONSTRAINED FIT

R2  *     ETA PRIME INTO (PI+ PI- NEUTRALS) / TOTAL    NUM 1 3
R2  *                                                  DEN 12345
R2      33   0.35     0.06          BADIER    65 HBC
R2      39   0.4      0.1           LONDON    66 HBC
R2           . . . . . . . . . .
R2  AVG        .3632    .0514   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R2  FIT        .388     .027    VALUE FROM CONSTRAINED FIT

R3  *     ETA PRIME INTO (PI+ PI- ETA (CHRGD.DECAY))   NUM  2
R3  *                   / TOTAL                        DEN 12345
R3      44   0.12     0.02          KALBFLEIS 64 HBC
R3       7   0.07     0.04          BADIER    65 HBC
R3      10   0.1      0.04          LONDON    66 HBC
R3           . . . . . . . . . .
R3  AVG        .1083    .0163   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R3  FIT        .120     .010    VALUE FROM CONSTRAINED FIT

R4  *     ETA PRIME INTO (PI+ PI- NEUTRALS (EXCLUDING  NUM   3
R4  *     PI+ PI- ETA (NEUTR.DEC.))) / TOTAL           DEN 12345
R4      10   0.05     0.04          KALBFLEIS 64 HBC
R4           . . . . . . . . . .
R4  FIT        .059     .029    VALUE FROM CONSTRAINED FIT

R5  *     ETA PRIME INTO (NEUTRALS) / TOTAL            NUM    4
R5  *                                                  DEN 12345
R5      54   0.25     0.05          KALBFLEIS 64 HBC
R5      16   0.24     0.17          BADIER    65 HBC
R5      32   0.3      0.1           LONDON    66 HBC
R5           . . . . . . . . . .
R5  AVG        .2587    .0432   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R5  FIT        .273     .034    VALUE FROM CONSTRAINED FIT

R6  *     ETA PRIME INTO (PI+ PI- GAMMA (INCLUDING     NUM     5
R6  *                   RHO GAMMA)) / TOTAL            DEN 12345
R6  *     THIS MODE SEEMS TO BE CONSISTENT WITH BEING ENTIRELY RHO GAMMA
R6      42   0.22     0.04          KALBFLEIS 64 HBC
R6  B   35   0.34     0.09          BADIER    65 HBC
R6  B     CONTROVERSIAL BACKGROUND SUBTRACTION
R6      20   0.2      0.1           LONDON    66 HBC
R6           . . . . . . . . . .
R6  AVG        .2172    .0371   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R6  FIT        .219     .029    VALUE FROM CONSTRAINED FIT

R7  *     ETA PRIME INTO (PI+ PI- GAMMA (INCLUDING     NUM     5
R7  *                   RHO GAMMA)) /(PI PI ETA)       DEN 1234
R7           0.25     0.14          DAUBER    64 HBC
R7           . . . . . . . . . .
R7  FIT        .328     .068    VALUE FROM CONSTRAINED FIT

R8   *     ETA PRIME INTO (PI0 E+ E-)/TOTAL                NUM      6
R8            0.013  OR LESS          RITTENBER 65 HBC  DEN 12345

R9   *     ETA PRIME INTO (ETA E+ E-)/TOTAL                NUM       7
R9            0.011  OR LESS          RITTENBER 65 HBC  DEN 12345

R10 *     ETA PRIME INTO (PI0 RHO0)/TOTAL                  NUM        8
R10           0.04   OR LESS          RITTENBER 65 HBC  DEN 12345

R11 *     ETA PRIME INTO (PI0 OMEGA) /TOTAL                NUM         9
R11           0.08   OR LESS          RITTENBER 65 HBC  DEN 12345

R12 *     ETA PRIME INTO (PI+ PI- E+ E-)/TOTAL             NUM          0
R12           0.006  OR LESS          RITTENBER 65 HBC  DEN 12345

R13 *     ETA PRIME INTO (2 PI)/TOTAL                      NUM           1
R13           0.07   OR LESS  COMP.BY LONDON    66 HBC  DEN 12345

R14 *     ETA PRIME INTO (3 PI)/TOTAL                      NUM            2
R14           0.07   OR LESS  COMP.BY LONDON    66 HBC  DEN 12345

R15 *     ETA PRIME INTO (4 PI)/TOTAL                      NUM             3
R15           0.01   OR LESS  COMP.BY LONDON    66 HBC  DEN 12345

R16 *     ETA PRIME INTO (6 PI)/TOTAL                      NUM              4
R16           0.01   OR LESS  COMP.BY LONDON    66 HBC  DEN 12345

R17 *     ETA PRIME INTO (PI0 GAMMA GAMMA) / TOTAL         NUM               5
R17 *                                                      DEN 12345
R17 *  21 (POSSIBLY SEEN (PRELIM.))  STRUGALSK 67 HLBC    2.3 PI+ N          7/67
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η′ branching ratios

Only two partial decay modes of the η' have been established, namely, $\eta' \to \eta\,\pi\pi$ and $\eta' \to \pi^+\pi^-\gamma$. (This electromagnetic mode may be mainly $\rho^0\gamma$.) In addition a recent experiment indicates a possible $\eta' \to \pi^0\gamma\gamma$ decay. In calculating the constrained branching fractions, in a previous edition of this data summary (RMP 39, 1(1967); see note on η' branching ratios on p. 23) we assumed that only the $\eta\,\pi\pi$ and $\pi^+\pi^-\gamma$ decay modes are present, and therefore that $\eta' \to$ (all neutrals) is entirely due to $\eta' \to \pi^0\pi^0\eta$, with $\eta \to$ (neutrals). We now feel, however, compelled to determine the branching fractions without this assumption. This results in the values given in the Meson Table. In the fit we have not used the constraint $\Gamma(\eta' \to \eta\,\pi^+\pi^-)/\Gamma(\eta' \to \eta\,\pi^0\pi^0) = 2$ from I-spin conservation, although the results of the fit are in perfect agreement with it (the ratio actually being 2.0 ± 0.2).

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REFERENCES FOR ETA PRIME


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DAUBER    64 PRL 13 449          DAUBER,SLATER,SMITH,STORK,TICHO ///// UCLA
    ALSO 64 DUBNA CONF 1 418     DAUBER,SLATER,L T SMITH,STORK,TICHO //UCLA
KALBFLEI 64 PRL 13 349           G.R.KALBFLEISCH,O.DAHL,A.RITTENBERG // LRL

BADIER    65 PL 17 337           BADIER,DEMOULIN,BARLOUTAUD +/PAR+SAC+ZEEMA
KIENZLE   65 PL 19 438           KIENZLE,MAGLIC,LEVRAT,LEFEBVRES + /// CERN
RITTENBE 65 PRL 15 556           RITTENBERG,KALBFLEISCH //////////  LRL+BNL
TRILLING 65 PL 19 427            +BROWN,GOLDHABERS,KADYK,SCANIO       // LRL

COHN      66 PL 21 347           COHN,MCCULLOCH,BUGG,CONDO//ORNL+TENN+UNCAR
LONDON    66 PR 143 1034         LONDON,RAU,SAMIOS,GOLDBERG +//BNL+SYRACUSE

STRUGALS 67  JINR E1-3100        STRUGALSKI+CHUVILO+IVANOVSKAJA+ //// DUBNA
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QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS


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GALTIERI 67  UCRL-17614          GALTIERI,MATTISON,RITTENBERG ///////// LRL I=0
MARTIN    66 PL 22,352           MARTIN,CRITTENDEN,SCHROEDER   // INDIANA U I
HOOGLAND 67  HEIDELBERG CONF. +KLUYVER+/ZEEMAN+BOLOGNA+EPP+WEIZMANN+SACL I=0
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δ (963)

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          36  DELTA MESON (963,JPG=    )  I = 1,2
    *
              CONFIRMATION STILL LACKING.

          36  DELTA (963) MASS (MEV)

M    N        910.                     TURKOT    63 MMS  +  3.3 PP TO D + MM
M    N        AT EDGE OF PHASE SPACE. AUTHORS DID NOT CLAIM A RESONANCE.
M       262   962.0      5.0           KIENZLE   65 MMS  -  3-5 PI- P
M    B        NOTE THAT BANNER 1 AT 1.6 PI-P DOES NOT SEE IT.
M    A   36   965.0                    ALLEN     66 HBC  -  1.7 PI- P
M    A  106   965.0   COMPILATION BY   ALLEN     66 HBC +-0 1-8 PI  P
M    A        FOR RESULTS WHICH CONTRADICT ALLEN 66,
M    A        SEE JACOBS 66, WEST 66, BANNER1 67, CLEAR 67, AND ROOS 67.
M    C        966.0      8.0           OOSTENS   66 MMS  +  3.6 PP TO D + MM
M    C        FOR A CONTRADICTORY RESULT SEE BANNER2 67      3.8 PP TO D + MM 11/67
M    *
M    V    NOTE THAT THE PI(1016) AS SEEN BY ASTIER 67, IF INTERPRETED AS A   11/67
M    V    VIRTUAL BOUND STATE RESONANCE, WOULD CORRESPOND TO A NARROW RESO-  11/67
M    V    NANCE OF  M = 975 (+15/-10) MEV.                                   11/67

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          36  DELTA (963) WIDTH (MEV)

W    N         50.                     TURKOT    63 MMS  +  SEE NOTE N ABOVE
W       262     5.0    OR LESS         KIENZLE   65 MMS  -   3-5 PI- P
W    A   36    25.     OR LESS         ALLEN     66 HBC  -  SEE NOTE A ABOVE
W    O         10.0    OR LESS         OOSTENS   66 MMS  +  SEE NOTE O ABOVE

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          36  DELTA MESON PARTIAL DECAY MODES

P1        DELTA MESON INTO 2 PI                            S 8S 8
P2        DELTA MESON INTO 3 PI                            S 9S 9S 9
P3        DELTA MESON INTO 4 PI                            S 9S 9S 9S 9
P4        DELTA MESON INTO 5 PI
P5        DELTA MESON INTO ETA PI                          S14S 9
P6        DELTA MESON INTO RHO PI                          L 9S 9

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          36  DELTA MESON BRANCHING RATIOS

R1        CHARGED DELTA INTO (1 CHARGED) / (3 OR MORE CHARGED)
R1          1.3       0.9        0.7   KIENZLE   65 MMS   -  3-5 PI- P

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    36  SIGMA(MICROB.) FOR PI- P -- P X-

CS  *      15 +- 5 BRANCH.RATIO ABOVE.KIENZLE    65  MMS  -   3-5 PI-           7/67
CS  * KIENZLE 15. REVISED  TO A FEW...FOCACCI    66  MMS  -   3-5 PI-           7/67
CS         17 OR LESS (2 PRONGS)      JACOBS     66  HBC     3.2  PI-           7/67
CS            3.0 OR LESS /(GEV/C)**2 BANNER 1   67 MMS   -  1.8 PI-P,  P+MM    9/67
CS         3.3 +- 1.7 PI- PI+ PI- ETA CHUNG      67  HBC                        7/67
CS         .2 OR LESS PI- PI+ PI- MM  CHUNG      67  HBC  .  3.2-4.2 PI-        7/67
CS         1.5OR LESS PI- PI+ PI- PIO CHUNG      67  HBC      3.2 PI-           7/67
CS         14+-6  OR LESS             HOOGLAND   67 DBC   - 3 K-D,LMEDA+P+MM    9/67

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                        REFERENCES FOR DELTA(963)

TURKOT    63 SIENNA CONF 1 661 +COLLINS,FUJII,KEMP+ ////// BNL+PITTSBURGH
KIENZLE   65 PL  19  438       + MAGLIC,LEVRAT,LEFEBVRES +         // CERN
ALLEN D   66 PL 22  543        +GP FISHER,G GOODEN,L MARSHALL,SEARS//CCLC G=+
FOCACCI   66 PL    17  890     + KIENZLE,LEVRAT,MAGLIC,MARTIN     // CERN
OOSTENS   66 PL   22  708      +CHAVANON,CROZON,TOCQUEVILLE  // SACLAY,CF I=1
ASTIER    67 PL   25 B  294    +MONTANET,BAUBILLIER,DUBOC+ //CDF+CERN+IDR

                        REFERENCES AGAINST 2PI DECAYS OF DELTA(963)

JACOBS    66 UCRL 16877-THESIS  +D.DAHL, J. KIRZ, D.H.MILLER //////// LRL
WEST      66 PR 149 1089        WEST,BOYD,ERWIN,WALKER ///////// WISCONSIN
CLEAR     67 NC 49A 399         +JOHNSTON+PILCHER+COOPER+/TORONTO+ANL+WISC
ROOS      67 NP B 2  615        M. ROOS                           // CERN

                        REFERENCES AGAINST DELTA(963)

BANNER 1 67 PL  25 B  300      +FAYOUX,HAMEL,ZSEMBERY,CHEZE+//SACLAY+CAEN
BANNER 2 67 PL 25 B 569        +CHEZE,HAMEL,MAREL,TEIGER,CROZON+/CDF+SACL
CHUNG S  67 UCRL 16881          +D.DAHL, J. KIRZ, D.H.MILLER //////// LRL
HOOGLAND 67  HEIDELBERG CONF. HOOGLAND+/ZEEMAN+BOLOGNA+EPP+WEIZMANN+SACL

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H(990)

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35  H (990, JPG=  -)  I=0

FOR COMPILATION SEE APPENDIX A OF JANUARY 1967 EDITION
(RMP 39, 1) OF THIS DATA SUMMARY.

                    35  H  MASS  (MEV)

M   C   50  975.0     15.0               BARTSCH   64 HBC      4.0 PI+ P
M   C   30  975.0   APPROX               GOLDHABER 65 HBC      3.65 PI+P
M   C   30  998.      10.                BENSON    66 DBC      3.65 PI+D
M   C   EXPERIMENTS ABOVE COMPILED IN JAN 67 EDITION (RMP 39,1)
M           996.    APPROX.              CHADWICK  67 DBC     2.1,2.6 K- D    11/67
M           980.    APPROX.              COHN      67 DBC      3.3 PI+ D       1/67

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                    35  H  WIDTH  (MEV)

W   C   90  120.0                        BARTSCH   64 HBC      4.0 PI+ P
W   C   30   45.0    30.0                BENSON    66 DBC      3.65 PI+ D
W   C   EXPERIMENTS ABOVE COMPILED IN JAN 67 EDITION (RMP 39,1)
W            55.    OR LESS              CHADWICK  67 DBC     2.1,2.6 K- D    11/67
W            60.    OR LESS              COHN      67 DBC      3.3 PI+ D       1/67

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                    35  H  PARTIAL DECAY MODES

P1          H INTO 3 PI                                  S 8S 8S 9
P2          H INTO RHO PI                                D 9S 8

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                    H MESON CROSS SECTION (MICROBARNS)

CS          75.0     15.0                BENSON    66 DBC  3.65 PI+D TO HPP
CS          50.                          COHN      67 DBC     3.3 PI+D TO HPP   1/67

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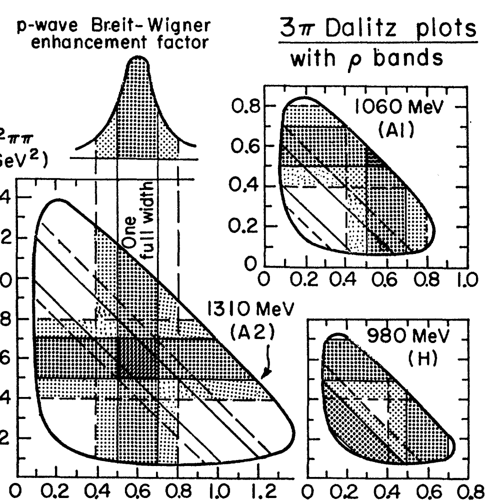

Dalitz plots for three-pion states of total mass 980 MeV, 1060 MeV, and 1310 MeV, illustrating the overlap of the ρ bands.

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                        REFERENCES FOR H MESON

BARTSCH  64 PL  11  167        AACHEN-ZEUTHEN-BIRM-BONN-HAMB-MUNCHEN COLL
GOLDHABE 65 CORAL GABLES P 76 G. GOLDHABER                          // LRL
BENSON   66 PRL 17 1234        +MARGLIT,ROE,SINCLAIR,VANDER VELDE / MICH. IJP
   BENSON 66 ANALYSIS FAVORS JP=1+
GOLDHABE 66  BERKELEY CONF     G.GOLDHABER,SAMIOS,ASTIER,SHEN,LAI.MESON REVIEW
ARMENISE 67  HEIDELBERG CONF.  +GHIDINI,FORINO+//BARI+BOLOGN+FIRENZ+ORSAY
CHADWICK 67  SLAC-PUB-347      +GUIRAGOSSIAN+PICKUP+GALTIERI+ // SLAC+LRL I=0
COHN     67 NP B1 57           +MC CULLOCH,BUGG,CONDO // OAK R.+UNIV.TENN
ROSENFEL 67 RMP 39 1            ROSENFELD,BARBARO-GALTIERI+/LRL+CERN+YALE

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π_V(1016)

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16 PI(1016,JPG=C+-) I=1

STILL NOT DECIDED WHETHER (K KBAR) RESONANCE, VIRTUAL
BOUND STATE OR ANTIBOUND STATE.

                    16 PI(1016) MASS  (MEV)

M    *  143 1003.3       7.0+SYSTEMATIC ROSENFELD 65 RVUE +-
M           SCAT. LENGTH 2 TO 6 FERMIS.BALTAY    66 HBC       3.7 PBAR P
M           SCAT. LENGTH 2.5+-.5 FERMI BARLOW    66 HBC  +- 1.2 PBAR P      11/66
M    A  100 1016.       10.            ASTIER    67 HBC  +-  0 PBAR P        7/67
M    A   SCATT.LENGTH ALSO FITS, SEE BELOW
M        SCATT.LENGTH +2.5 +-1. FERMI  ASTIER    67 HBC  +-  0-1.2 PBAR P    7/67
M         OR CMPLX, RE PART=-2.3 F     ......    .. ...  ..  ..... .... .    7/67
M                   IM PART=.5F OR LESS ......   .. ...  ..  ..... .... .    7/67

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                    16 PI(1016) WIDTH (MEV)

W    *  143   57.0      13.0+SYSTEMATIC ROSENFELD 65 RVUE +-
W    A  100   25.         5.0          ASTIER    67 HBC  +- SEE NOTE A ABOVE  9/67

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                    16 PI(1016) PARTIAL DECAY MODES

P1          PI(1016) INTO K KBAR                         S10S11
P2          PI(1016) INTO ETA PI                         S14S 8

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                    16 PI(1016) BRANCHING RATIOS

R1   *      PI(1016) INTO (ETA PI) / (K KBAR)            NUM  2
R1   *                                                   DEN 1
R1              3.0   OR LESS              FOSTER    67 HBC      0. PBAR P    9/67

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                        REFERENCES FOR PI(1016)

ARMENTER 65 PL 17 344          ARMENTEROS,EDWARDS,JACOBSEN +///CERN+PARIS
BARASH   65 PR  139 B  1659    +FRANZINI,KIRSCH,MILLER,STEINBERGER+/COLUM
ROSENFEL 65 OXFORD CONF 58     A H ROSENFELD ////////////////// LRL--RVUE
BALTAY   66 PR  142 B  932     +LACH,SANDWEISS,TAFT,YEH,STONEHILL+ //YALE
ASTIER   67 PL  25 B  294      +MONTANET,BAUBILLIER,DUBOC+ //CDF+CERN+IDR
  ASTIER 67 INCLUDES DATA OF CONFORTO 67 AND ARMENTEROS 65
BAILLON  67 NC 50A 393         +EDWARDS+D.ANDLAU+ASTIER+ /// CERN+CDF +IR
BARLOW   67 NC  50 A  701      +MONTANET,D-ANDLAU+/CERN+CDF+IDR+LIVERPOOL
CONFORTO 67  CERN 67-11 TO NP CONFORTO,MARECHAL,MONTANET+/CERN+PARIS+LIV
FOSTER   67  HEIDELBERG CONF. +GAVILLET,LABROSSE, MONTANET+  // CERN+CDF

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ϕ(1019)

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4  PHI (1019,JPG=1-- ) I=0

                    4  PHI  MASS (MEV)

M           1017.0      2.0            ARMENTERO 63 HBC
M           1019.0      2.0            SCHLEIN   63 HBC     2.0 K- P
M           1018.6      0.5            MILLER D  65 HBC
M           1020.0      2.0            LONDON    66 HBC
M           1021.5      0.8            ABRAMS    67 HBC      4.2 K- P        11/67
M           1019.       3.             BARLOW    67 HBC       1.2 PBAR P     11/66
M           1021.0      4.0            DAHL      67 HBC       1-4 PI- P
M           . . . . . . . . . .
M    AVG    1019.3363   .5824   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)
                    (SEE IDEOGRAM)

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                    4  PHI  WIDTH (MEV)

W             3.4      1.7             ARMENTERO 63 HBC
W       34    5.0   OR LESS            SCHLEIN   63 HBC
W             3.5      1.0             MILLER D  65 HBC
W             6.0      4.0             LONDON    66 HBC
W             1.8      3.0      1.5    ABRAMS    67 HBC      4.2 K- P        11/67
W            10.   OR LESS             BARLOW    67 HBC       1.2 PBAR P     11/66
W           . . . . . . . . . .
W    AVG      3.3667   .7891   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
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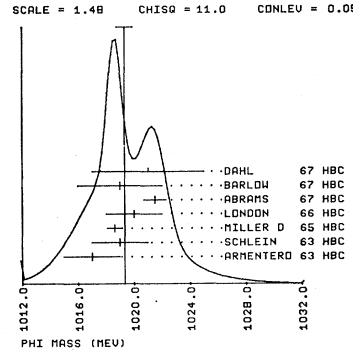
WEIGHTED AVERAGE = 1019.336 ± 0.582
SCALE = 1.48 CHISQ = 11.0 CONLEV = 0.051



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    4  PHI PARTIAL CECAY MOCES

P1      PHI INTO K+ K-                                       S1CS10
P2      PHI INTO KC1 KC2                                     S11S11
P3      PHI INTO PI+ PI- PIO (INCLUCING RHO PI)              S 8S 8S 9
P4      PHI INTO PI+ PI- (VICLATES G)                        S 8S 8
P5      PHI INTO E+  E-                                      S 3S 3
P6      PHI INTO MU+ MU-                                     S 4S 4
P7      PHI INTO PIO GAMMA                                   S 9S 0
P8      PHI INTO ETA GAMMA                                   S14S 0
P9      PHI INTO PI+PI-GAMMA                                 S 8S 8S 0
P10     PHI INTO OMEGA GAMMA (VICLATES C)                    L 1S 0
P11     PHI INTO ETA PIO (VICLATES C)                        S14S 9
P12     PHI INTO RHO GAMMA (VIOLATES C)                      L 9S 0

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                    4  PHI  BRANCHING RATICS

R1   *       PHI INTO (K+ K-)/TOTAL                         NUM 1
R1   *                                                      CEN 123
R1   B   27     0.26      0.06          BADIER    65 HBC     (SEE NOTE B BELOW)
R1      252     0.46      C.04          LINCSEY   66 HBC
R1              . . . . . . . . . .
R1   FIT           .473      .032    VALLE FROM CONSTRAINED FIT

R2   *       PHI INTO (K1 K2)/TCTAL                         NUM  2
R2   *                                                      CEN 123
R2   B   25     0.23      0.06          BADIER    65 HBC     (SEE NOTE B BELCW)
R2      167     0.4C      C.04          LINDSEY   66 HBC
R2              . . . . . . . . . .
R2   FIT           .389      .031    VALLE FROM CONSTRAINEC FIT

R3   *       PHI INTO (PI+ PI- PIC (INCL.RHC PI))/TOTAL     NUM   3
R3   *                                                      CEN 123
R3   B   57     0.51      C.09          BADIER    65 HBC
R3   B       CONTROVERSIAL BACKGRCUND SUBTRACTICN
R3       30     0.12      0.08          LINDSEY   66 HBC
R3              . . . . . . . . . .
R3   FIT           .138      .043    VALLE FROM CONSTRAINEC FIT

R5   *       PHI INTO (K1 K2)/(K KBAR)                      NUM  2
R5   *                                                      CEN 12
R5       10     0.40      C.10          SCHLEIN   63 HBC
R5       52     0.48      0.07          BADIER    65 HBC                        11/67
R5              0.44      C.07          LCNDCN    66 HBC
R5              . . . . . . . . . .
R5   AVG           .4482     .0444   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R5   FIT           .452      .026    VALLE FROM CONSTRAINEC FIT

R6   *       PHI INTO (PI+ PI- PIC (INCL.RHO PI))/(K KBAR)NUM   3
R6   *                                                      CEN 12
R6              0.30      0.15          LCNDON    66 HBC
R6              . . . . . . . . . .
R6   FIT           .160      .058    VALLE FROM CONSTRAINEC FIT

R7   *       PHI INTO (PI+ PI- PIC (INCL.RHC PI))/(K1 K2) NUM   3
R7   *                                                      CEN  2
R7              0.3    CR LESS          BERLEY    65 HBC

R8   *       PHI INTC (PI+ PI-)/(K KBAR)                    NUM    4
R8   *                                                      CEN 12
R8              0.2    CR LESS          LCNCCN    66 HBC

R9   *       PHI INTO (E+ E-)/(K KBAR)                      NUM     5
R9   *                                                      CEN 12
R9              0.0036 CR LESS          GALTIERI  65 HBC
R9              INDICATION SEEN         HERTZBACH 67 SPRK                       7/67
R9              0.002  CR LESS          KHACHATUR 67 SPRK

R10 *        PHI INTO (MU+ MU-)/(K KBAR)                    NUM      6
R10 *                                                       CEN 12
R10             0.0053 CR LESS          GALTIERI  65 HBC
R10             SEEN                    WEHMANN   67 SPRK     12 K- CN C,FE     6/67

R11 *        PHI INTO (ETA GAMMA)/TCTAL                     NUM         8
R11 *                                                       CEN 123
R11             0.2    CR LESS          BADIER    65 HBC
R11             0.08   CR LESS          LINCSEY   66 HBC

R12 *        PHI INTO (PI+ PI- GAMMA)/(K KBAR)    .         NUM          9
R12 *                                                       CEN 12
R12             0.05   CR LESS          LINCSEY   65 HBC

R13 *        PHI INTO (ETA NEUTRALS)/(K KBAR)               NUM         8  1
R13 *                                                       CEN 12
R13             0.15   CR LESS          LINCSEY   66 HBC

R14 *        PHI INTO (CMEGA GAMMA) / TCTAL                 NUM           0
R14 *                                                       CEN 123
R14             0.05   CR LESS          LINCSEY   66 HBC

R15 *        PHI INTO (RHO GAMMA) / TCTAL                   NUM            2
R15 *                                                       CEN 123
R15             0.02   CR LESS          LINCSEY   66 HBC

R16 *        PHI INTO (E+ E-)/TCTAL                         NUM     5
R16 *                                                       CEN 123
R16             0.0C2 CR LESS           BINNIE    67 SPRK    CL=0.95            10/67

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                         REFERENCES FCR PHI

BERTANZA 62 PRL 9 18C          BERTANZA,BRISSON,CONNOLLY,HART + //BNL+SYR
ARMENTER 63 SIENA CONF 2 70    ARMENTEROS,EDWARCS,ASTIER+//CERN+CDF-PARIS
GELFAND  63 PRL 11 438         GELFANC,MILLER,NUSSBAUM,KIRSCH+//COLU+RUTG
   GELFAND 63 DATA INCLUDED IN MILLER 65 BELOW
SCHLEIN  63 PRL 10 368         SCHLEIN,SLATER,SMITH,STORK,TICHO //// UCLA

BADIER   65 PL 17 337          BADIER,DEMOULIN,BARLOUTAUC+//PAR+LPCHE+ZEE
BERLEY   65 PR 139 B 1097      D BERLEY,N GELFANC ////////// BNL+COLUMBIA
GALTIERI 65 PRL 14 279         A BARBARO GALTIERI,R D TRIPP ///////// LRL
LINCSEY  65 PRL 15 221         JAMES S LINCSEY,GERALD A SMITH /////// LRL
   LINDSEY 65 DATA INCLUDEC IN LINCSEY 66 BELOW
MILLER C 65 CU-237(NEVIS 131) DAVID C MILLER  (THESIS) //////// COLUMBIA

LINCSEY  66 PR  147  913       JAMES S LINCSEY, GERALD A SMITH  ////  LRL
LINCSEY1 66 PL 20 93           J.S.LINCSEY, G.A.SMITH ////////////// LRL
   LINCSEY 1 66 DATA INCLUDEC  IN LINCSEY 66 ABOVE
LONDCN   66 PR 143 1C34        LCNDCN,RAU,SAMICS,GOLDBERG +//BNL+SYRACUSE

ABRAMS   67  MD TECH REP 720   GERALC ABRAMS , THESIS ////////// MARYLANC
BARLOW   67 NC 50A 701         +LILLESTOL+MONTANET+/CERN+CDF+IR+LIVERPOOL
BINNIE   67  HEICELBERG CONF.  +DUANE,HORSEY,JCNES,MASON,RAHMAN+/ICL+RHEL
DAHL     67  UCRL-16978        +HARDY+HESS+KIRZ+MILLER ////////////// LRL
HERTZBAC 67 PR 155  1461       HERTZBACH,KRAEMER,MADANSKI,ZDANIS+/JHU+BNL
KHACHATU 67 PL 248 349         KHACHATURYAN+AZIMOV+BALDIN+BELOUSOV+/DUBNA
WEHMANN  67 PRL 18 929         +ENGELS+ /// HARVARC+CWRL+SLAC+CORN+MCGILL

        QUANTUM NUMBER DETERMINATICNS NOT REFERREC TO IN THE DATA CARDS

GRAY, L  66 PRL  17  501       +HAGERTY,BIZZARRI,CIAPETTI +   // SYR+ROME JPG

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$\eta_V(1070)$

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                    3 ETA (1070,JPG=0++)I=C

                    NAMED S* BY CRENNELL ET AL.
                    SCME DATA STILL FAVOR LARGE S-WAVE K KBAR SCATTERING
                    LENGTH.

                    3 ETA (1070) MASS (MEV)

M    *       1000.0     APPROX              BINGHAM    62 PBC
M    *       1000.0     APPROX              BIGI       62 HBC
M    *       1000.0                         ERWIN .    62 HBC
M    *    30 1030.0     APPROX.             BALTAY     64 HBC
M    *   .   1025.0     APPROX.             BARMIN     64 HLBC
M         20 1068.0      1C.0               CRENNELL   66 HBC           6.C PI- P
M    H   120  SCATT.LENGTH FITS BETTER.     HESS       66 HBC       1.6-4.2 PI- P
M         35 1045.       9.                 BARLOW     67 HBC       1.2 PBAR P      11/66
M        730 1079.0      6.0       5.0      BEUSCH     67 SPRK     5,7,12 PI-P       9/67
M    P    70 1090.0     10.0                BIRD       67 SPRK     3.2 PI-P,PI+PI-N 10/67
M    P       PI+PI- MODE
M

                    (SEE IDEOGRAM)

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                    3 ETA (1070) WIDTH (MEV)

W         20   80.0      15.0               CRENNELL   66 HBC
W         35   50.       24.       .        BARLOW     67 HBC       1.2 PBAR P      11/66
W    S        168.0      21.0      19.0     BEUSCH     67 SPRK     5,7,12 PI-P       9/67
W    S   ASSUME NO S WAVE SCATTERING LENGTH.WITH S WAVE THE WIDTH IS NARRCWER
W    P         25.0   OR LESS               BIRC       67 SPRK     3.2 PI-P,PI+PI-N 10/67
W    P          PI+PI- MODE           .
W

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                    3 ETA (1070) PARTIAL CECAY MODES

P1          ETA (1070) INTO KKBAR                                S1CS11
P2          ETA (1070) INTO PIPI                                 S 8S 9

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                    3 ETA (1070) BRANCHING RATICS.

R1   *      ETA (107C) INTC (PI PI)/(K KBAR)                (P1)/(P2)
R1              2.5    CR LESS          CRENNELL  66 HBC     90 PCT CCNF LEV

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                         REFERENCES FCR ETA(1070)

BIGI     62 CERN CONF 247      A BIGI,S BRANDT, R CARRARA + ///////  CERN
BINGHAM  62 CERN CONF 240      H H BINGHAM,M BLOCH + //PARIS+EC POLY+CERN
ERWIN    62 PRL 9 34           ERWIN,HOYER,MARCH,WALKER,WANGLER //WIS+BNL

BALTAY   64 DUBNA CCNF 1 409   BALTAY,LACH,CRENNELL,OREN,STUMP +/YALE+BNL
BARMIN   64 DUBNA CCNF 1 433   BARMIN,DOLGOLENKC,YEROFEEV,KRESTNI+// ITEP

CRENNELL 66 PRL 16 1C25        CRENNELL,KALBFLEISCH,LAI,SCARR,SCHU+ //BNL
HESS     66 PRL 17 1109        +DAHL+HARDY+KIRZ+MILLER ////////////// LRL
  HESS REPLACES  PRL 9 460     ALEXANDER,DAHL,JACOBS,KALBFLEISCH + // LRL

BARLOW   67 NC 50A 7C1         +LILLESTOL+MONTANET+/CERN+CDF+IR+LIVERPOOL
BEUSCH   67 PL 25 B 357        +FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
BIRC     67  HEIDELBERG CONF.  +WHITEHEAD,AULD+//AERE+RHEL+STHAMPT+UC.LON
DAHL     67  UCRL-16978        +HARDY+HESS+KIRZ+MILLER ////////////// LRL

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A I (1080)

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1C   A1 MESON (1C79, JPG=1+-)  I=1

                    1C  A1 MESON  MASS (MEV)

M    *    MASS AND WIDTH MIGHT HAVE LARGE SYSTEMATIC
M    *    ERRCRS DUE TC COMPLICATED BEHAVIOUR OF BACKGROUNC.

M          1080.0     .                     ACERHOLZ  64 HBC
M    A     1076.0    14.0                   DEUTSCH 2 66 HBC  +
M    A     NOT SUPPORTEC BY ADDITIONAL DATA (MORRISON 67)
M    .     1090.     APPROX.                CHUNG     67 HBC  -  3.2,4.2 PI-P      2/67
M    C     1126.     APPROX.                CONTE 1   67 HBC  - 11 PI- P           8/67
M    C     BACKGNC SUBTRCTN DIFFICULT. REPLACEC BY CONTE 2 BELOW.
M          1088.C    1C.C                   CCNTE 2   67 HBC  - 11.0 PI- P        10/67
M          1054.      7.                    DANYSZ    67 HBC +-  3,3.6 PBAR P      7/67
M    *     1020.     PRELIM.                FRIEMAN   67 HBC +- 5.7 PBAR P         7/67
M    *     1105.0                           HCOGLANC  67 HBC    C 3.0 K-P TO LAMB  9/67
M    K     1119.      30.                   KEY       67 HBC  -  3 PI-P           11/67
M    K     SHOULDER CN A2 ONLY
M
M

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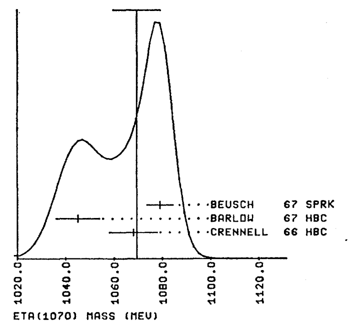
WEIGHTED AVERAGE = 1069.44 ± 9.70
SCALE = 2.28 CHISQ = 10.4 CONLEV = 0.005



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                  10  A1 MESON  WIDTH (MEV)

W    *   SEE NOTE UNDER A1 MESON MASS.

W              80.0                      ADERHOLZ  64 HBC
W    A        130.0     50.0     40.0    DEUTSCH 2 66 HBC  +
W    A        NOT SUPPORTED BY ADDITIONAL DATA (MORRISON 67)
W             125.    APPROX.            CHUNG      67 HBC  -  3.2,4.2 PI-P     2/67
W    C        130.    APPROX.            CONTE 1    67 HBC  - 11 PI- P          8/67
W    C        CONTE1 SUPERSEDED BY CONTE2 BELOW
W    *        100.0   APPROX.            CONTE 2    67 HBC  - 11.0 PI- P       10/67
W              33.      19.              DANYSZ     67 HBC +-  3,3.6 PBAR P     7/67
W    *        105.0                      HOOGLAND   67 HBC   C 3.0 K-P TO LAMB  9/67
W    K         76.      46.              KEY        67 HBC  - SEE NOTE K ABOVE 11/67

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                  10  A1 PARTIAL DECAY MODES

P1       A1 INTO RHO PI                                        L 9S 8
P2       A1 INTO KBAR K                                        S10S11
P3       A1 INTO ETA PI                                        S14S 8
P4       A1 INTO ETA PRIME PI                                  L 2S 8
P5       A1 INTO 3 PI                                          S 8S 8S 8

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                  10  A1 BRANCHING RATIOS

R1   *   A1 INTO (KBAR K)/(RHO PI)                            (P2)/(P1)
R1   *        0.01 OR LESS               DEUTSCH 1 66 HBC  +
R1            0.0025 OR LESS             DAHL       67 HBC  -  4.0 PI- P

R2   *    A1 INTO (ETA PI)/(RHO PI)                           (P3)/(P1)
R2   *        0.015 OR LESS              DEUTSCH 1 66 HBC  +

R3   *    A1 INTO (ETA PRIME PI)/(RHO PI)                     (P4)/(P1)
R3   *        0.015 OR LESS              DEUTSCH 1 66 HBC  +

R    *FOR 1+ NONET SU3 RATES SEE E.G. GOLDHABER, REVIEW BERKELEY CONF.1966

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                          REFERENCES FOR A1

ADERHOLZ 64 PL 10 226           AACH+BERL+BIRM+BONN+DESY+HAMB+IMP.COL+ MPI
DEUTSCH1 66 PL 20 62            DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
DEUTSCH2 66 PL 22 112           DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
GOLDHABE 66 BERKELEY CONF.      G. GOLDHABER, MESON REVIEW /////////// LRL

CHUNG    67  UCRL-16881 REV     S.U.CHUNG,O.DAHL,J.KIRZ,D.H.MILLER /// LRL
CONTE 1  67 NC  51 A  175       +TOMASINI,CORDS+//GENOVA+HAM+MILANO+SACLAY
CONTE 2  67  HEIDELBERG CONF.   +TOMASINI+CORDS+ //// GENOVA+HAMB+MIL+SACL
DAHL     67  UCRL-16978         +HARDY+HESS+KIRZ+MILLER ////////////// LRL
DANYSZ   67 NC 51 A 801         DANYSZ+FRENCH+SIMAK ///////////////// CERN
FRIDMAN  67  PREPRINT           +MAURER+MICHALON+OUDET+SCHIBY+/HEID+STRASB
HOOGLAND 67  HEIDELBERG CONF.   +KLUYVER,TENNER               //  ZEEMAN LAB
KEY      67  PREPRINT           +PRENTICE+COOPER+MANNER+WALKER+/TO+ANL+WIS
MORRISON 67  PRIV. COMM.        C.R.C.MORRISON ////////////////////// CERN

                  PAPERS NOT REFERRED TO IN DATA CARDS

BELLINI  63 NC 29 696           BELLINI,FIORINI,HERZ,NEGRI,RATTI /// MILAN
ALLARD   64 PL 12 143           ALLARD+ // PARIS+CERN+MILAN+CEA-SAC+UC-BKY
   ALLARD 64 DATA SUPERSEDED BY ALLARD 66
GOLDHABE 64 PRL 12 336          GOLDHABER,BROWN,KADYK,SHEN,TRILLING/LRL+UC
HESS     64 DUBNA CONF  1 422   HESS,CHUNG,DAHL,HARDY,KIRZ,MILLER //// LRL
   HESS 64 DATA SUPERSEDED BY CHUNG 66
LANDER   64 PRL 13 346 A        LANDER,ABOLINS,CARMONY,HENDRICKS +/// UCSD  JP

ABOLINS  65 ATHENS(OHIO)CONF.   +CARMONY,LANDER,XUONG,YAGER ///// LA JOLLA I=1
ALITTI   65 PL 15 69            ALITTI,BATON,DELER,CRUSSARD+ ///// SAC+BOL

ALLARD   66 NC 46A 737          +DRIJARD+HENNESSY+ // ORSAY+MILAN+SAC+BERK
   ALLARD+ 66 GET GOOD FIT TO M(PI RHO) ONLY WHEN ASSUMING ADDITIONAL RESO-
   NANCES BETWEEN 940 AND 1315 MEV
HESS     66 UCRL-16832          R I HESS (THESIS, BERKELEY)           // LRL

SLATTERY 67 NC 50A 377          +KRAYBILL+FORMAN+FERBEL //////// YALE+ROCH   JP

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B(1210)

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11  B MESON (1210,JPG=A +) I=1

                  11  B MESON  MASS (MEV)

M        60 1220.0                       ABOLINS    63 HBC  +
M           1220.0                       GOLDHABER 65 HBC
M           1259.0     27.0              ABC COLL. 67 HBC  +   8.0 PI+ P       10/67
M       376 1200.      20.               BALTAY     67 HBC +- 0.0 PBAR P        2/67
M    *      1270.                        BISWAS     67 HBC      8. PI- P       11/67
M           1220.      20.               CHUNG      67 HBC  - 3.2,4.2 PI- P     9/67
M           1220.0     20.0              FOSTER     67 HBC     P(BAR)P,REST     9/67
M           . . . . . . . . .
M    AVG    1220.3943  10.7663   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

M    *  IN THE 3-4 PI-P DATA,THE B ENHANCEMENT MAY BE DECK EFFECT (CHUNG 67)

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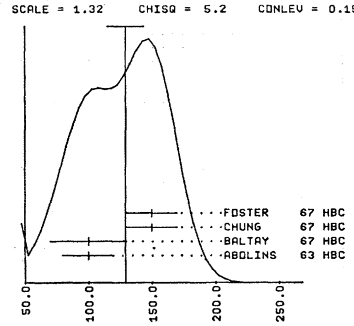
WEIGHTED AVERAGE = 129.0 ± 14.2
SCALE = 1.32   CHISQ = 5.2   CONLEV = 0.155



B WIDTH(MEV)

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                  11  B MESON  WIDTH (MEV)

W        60 100.0      20.0              ABOLINS    63 HBC  +
W            80.0                        GOLDHABER 65 HBC
W    *      204.       75.               ABC COLL. 67 HBC  +   8. PI+ P        11/67
W       376 100.       30.               BALTAY     67 HBC +- 0.0 PBAR P        2/67
W    *      250.                         BISWAS     67 HBC     8. PI- P        11/67
W           150.       20.               CHUNG      67 HBC  - 3.2,4.2 PI- P     9/67
W           150.0      20.0              FOSTER     67 HBC     P(BAR)P,REST     9/67
W           . . . . . . . . . .
W    AVG    129.0323  14.2448   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                      (SEE IDEOGRAM)

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                  11  B MESON PARTIAL DECAY MODES

P1       B MESON INTO OMEGA+PI                                 L 1S 8
P2       B MESON INTO 2PI+ 2PI-                                S 8S 8S 8S 8
P3       B MESON INTO K KBAR                                   S10S10
P4       B MESON INTO PI PI                                    S 8S 8
P5       B MESON INTO PI PHI                                   S 9U 4
P6       B MESON INTO ETA PI (FORBIDDEN BY G)                  S14S 8
P7       B MESON INTO K KBAR PI                                S10S10S 8

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                  11  B MESON  BRANCHING RATIOS

R1   *  B INTO  4PI/(OMEGA PI)                               (P2)/(P1)
R1            0.5   OR LESS              ABOLINS    63 HBC  +

R2   *  B MESON INTO (K KBAR)/(OMEGA PI)                     (P3)/(P1)
R2            0.02  OR LESS              DAHL       67 HBC  -  1.6-4.2 PI- P
R2            0.10  OR LESS (CL 90)      BALTAY     67 HBC +-                  2/67

R3   *  B MESON INTO (PI PI)/(PI OMEGA)                     (P4)/(P1)
R3            0.3   OR LESS              ADERHOLZ   64 HBC

R4   *  B MESON INTO (PI PHI) / (PI OMEGA)                   (P5)/(P1)
R4            0.015 OR LESS              DAHL       67 HBC     1.6-4.2 PI- P

R5   *  B MESON INTO (ETA PI) / (PI OMEGA)                   (P6)/(P1)
R5            0.25  OR LESS (CL 90)      BALTAY     67 HBC +-                  2/67

R6   *  B MESON INTO (K KBAR PI) / (PI OMEGA)                (P7)/(P1)

R6   *  B+- INTO ((K KBAR)+- PI0) / (PI OMEGA)
R6            0.08  OR LESS (CL 90)      BALTAY     67 HBC +-                  2/67

R6   *  B+- INTO (KS KS PI+-) / (PI OMEGA)
R6            0.02  OR LESS (CL 90)      BALTAY     67 HBC +-                  2/67

R6   *  B+- INTO (KS KL PI+-) / (PI OMEGA)
R6            0.06  OR LESS (CL 90)      BALTAY     67 HBC +-                  2/67

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                          REFERENCES FOR B MESON

ABOLINS  63 PRL 11 381          ABOLINS,LANDER,MEHLHOP,XUONG,YAGER // UCSD
ADERHOLZ 64 PL 10 240           AACHEN+BERLIN+BIRM+BONN+HAMBLR+IC-LOND+MPI
GOLDHABE 65 PRL 15 118          G GOLDHABER,S GOLDHABER,KADYK,SHEN /// LRL

ABC COLL 67  HEIDELBERG CONF.   //////////AACHEN+BERLIN+CERN COLLABORATION
BALTAY   67 PRL 18 93           +SEVERIENS+YEH+ZANELLO /////////// COL+BNL
CHUNG    67  UCRL-16881 REV     S.U.CHUNG,O.DAHL,J.KIRZ,D.H.MILLER /// LRL
DAHL     67  UCRL-16978         +HARDY+HESS+KIRZ+MILLER ////////////// LRL
FOSTER   67  HEIDELBERG CONF.   +GAVILLET,LABROSSE,MONTANET+// CERN+C.DE F

                  PAPERS NOT REFERRED TO IN DATA CARDS

BONDAR   63 PL 5 209            BONDAR,DODD+//AACHEN+BIRM+HAMB+IC-LOND+MPI
CARMONY  64 PRL 12 254          CARMONY,LANDER,RINDFLEISCH,XUONG,YAGER//UC   JP
SLATTERY 67 NC 50A 377          +KRAYBILL+FORMAN+FERBEL //////// YALE+ROCH

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f(1260)

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5  F  (1260,JPG=2++)  I=0

                  5  F   MASS (MEV)

M           1250.0     25.0              SELOVE     62 HBC
M           1260.0     35.0              VEILLET    63 HBC
M         5 1250.0                       GUIRAGOSS  63 HBC
M         5 1260.0                       BONDAR     63 HBC
M           1250.0                       LEE        64 HBC
M           1240.0     20.0              ACCENSI    66 HBC
M      1416 1267.0     10.0              JACOBS     66 HBC     2-3 PI-P,T CUT20 10/67
M           1275.0     25.0              WAHLIG     66 SPRK
M           1263.0      4.0              ARMENISE   67 DBC       5.1 PI+C       9/67
M    *      1255.      13.               BARLOW     67 HBC    (K01 K01 MODE)   11/66
M           1270.0     15.0              BIRD       67 SPRK    3.2 PI-P,PI+PI-N 10/67
M    *      1271.       9.               EISNER     67 HBC  4.2 PI-P (ALL T)    9/67
M           1264.       7.               EISNER     67 HBC  4.2 PI-P (T CUT 20) 9/67
M           1249.0     90.0              FOSTER     67 HBC +-  PBAR P AT REST   9/67
M           1267.      15.               LAMSA      67 HBC     8 PI-P          10/67
M           1262.0      7.0              POIRIER    67 HBC      8.0 PI- P      11/67
M    S      1276.      11.               RABIN      67 HBC      8.5 PI+ P       9/67
M    S       S-WAVE BREIT-WIGNER FIT
M           . . . . . . . . . .
M    AVG    1263.1988   2.7859   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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                  5  F   WIDTH (MEV)

W            100.0     25.0              SELOVE     62 HBC
W            200.0   OR LESS             VEILLET    63 HBC
W        85  160.0                       BONDAR     63 HBC
W            130.0     20.0              LEE        64 HBC
W            102.0     46.0              ACCENSI    66 HBC
W      1416   99.0     10.0              JACOBS     66 HBC     2-3 PI-P,T CUT20 10/67
W            100.                        WAHLIG     66 SPRK                    11/66
W            202.0     13.0              ARMENISE   67 DBC       5.1 PI+C       9/67
W    *        82.      34.               BARLOW     67 HBC    (K01 K01 MODE)   11/66
W            160.0     20.0              BIRD       67 SPRK    3.2 PI-P,PI+PI-N 10/67
W    *       219.      39.               EISNER     67 HBC  4.2 PI-P (ALL T)    9/67
W            173.      25.               EISNER     67 HBC  4.2 PI-P (T CUT 20) 9/67
W            173.0     50.0              FOSTER     67 HBC +-  PBAR P AT REST   9/67
W            113.      30.               LAMSA      67 HBC     8 PI-P          10/67
W            163.0     16.0              POIRIER    67 HBC      8.0 PI- P      11/67
W    S       155.      17.               RABIN      67 HBC      8.5 PI+ P       9/67
W    S       S-WAVE BREIT-WIGNER FIT
W           . . . . . . . . . .
W    AVG     140.8581  13.4809   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3)
                      (SEE IDEOGRAM)

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                 5  F  PARTIAL DECAY MODES

P1      F  INTO PI+ PI-                                      S 8S 8
P2      F  INTO 2PI+ 2PI-                                    S 8S 8S 8S 8
P3      F  INTO K KBAR                                       S12S12

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                 5  F   BRANCHING RATIOS

R1  *  F  INTO (4PI)/(2PI)                               (P2)/(P1)
R1          0.08      0.06           BCNCAR     63 HBC
R1          0.04  CR LESS            CHUNG      65 HBC

R2  *  F INTO (K KBAR)/(PI PI)                           (P3)/(P1)
R2  *     CETERMINATION CIFFICULT BECAUSE PRCXIMITY OF A2 WHICH HAS SAME
R2  *     NEUTRAL (K KBAR) MCDES
R2          0.09  CR LESS            BARMIN     65
R2          0.16  CR LESS            WANGLER    65 HBC
R2          0.06  CR LESS            BRANDT     66 HBC     CONF.LIMIT 0.95
R2          0.05 OR LESS             DEUTSCHMA  66 HBC
R2  F       0.023     0.006          FISCHER    66 SPRK
R2  F       RESULT GOT CHANGEC BY MCRE THAN 1 S.D.(SEE BEUSCH 67)           5/67
R2  B       PROBABLY SEEN            BARLOW     67 HBC     1.2 PBAR P--K1K1 11/66
R2  N       0.047     0.012 + SYST.  BEUSCH     67 SPRK    5,7,12 PI-P      9/67
R2  N       PEAK UNRESOLVEC FROM A2
R2  *       0.025 OR LESS            DAHL       67 HBC      1.6-4.2 PI- P

R   *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SCCOLOW, PRL 15,329(65)

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                         REFERENCES FCR F

SELCVE   62 PRL 9 272             SELOVE,HAGOPIAN,BRODY,BAKER,LEBCY // PENNA
BONCAR   63 PL 5 153 .            BCNCAR+//AACHEN+BIRM+BONN+CESY+IC-LONC+MPI
GUIRAGOS 63 PRL 11 85             Z.G.T. GUIRAGOSSIAN ////////////////// LRL
VEILLET  63 PRL 1C 29             VEILLET,HENNESSY,BINGHAM,ELCCH+//PAR+MILAN
LEE      64 PRL 12 342            LEE,RCE,SINCLAIR,VANDERVELCE //// MICHIGAN

BARMIN   65 SJNP 1 870            +COLGCLENKO+EROFEEV+KRESTNIKCV+/ ITEP MCSC
CHUNG    65 PRL 15 325            CHUNG,DAHL,HARDY,HESS,JACCBS,KIRZ //// LRL
GUIRAGOS 65 PRL 11 85             Z G T GUIRAGOSSIAN ////////////////// LRL
WANGLER  65 PR  137 B 414         T P WANGLER,A R ERWIN,W WALKER //WISCCNSIN

ACCENSI  66 PL 20 557             ACCENSI,ALLES-BCRELLI,FRENCH,FRISK+ //CERN
BEUSCH   66  PREPRINT             BEUSCH,FISCHER,ASTBURY,MICHELINI+/ETH+CERN
BRANCT   66  BERKELEY CONF.       BRANCT,COCCONI,CZYZEWSKI+ //CERN+CRAC+WARS
DEUTSCHM 66 PL 20 82              DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
FISCHER  66  PRIVATE COMM.        W E FISCHER(BASEC ON BEUSCH 66)/ ETH +CERN
JACOBS   66  UCRL-16877           L.D.JACCBS /////////////////////////// LRL
WAHLIG   66 PR  147  941          +SHIBATA,GORDON,FRISCH,MANNELLI //MIT+PISA  J

ARMENISE 67  HEIDELBERG CONF.     +GHIDINI,FORINO+//BARI+BCLCGN+FIRENZ+CRSAY
BARLCW   67 NC 50A 7C1            +LILLESTOL+MCNTANET+/CERN+CCF+IR+LIVERPOOL
BEUSCH   67 PL 25 B 357           +FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
BIRC     67  HEIDELBERG CCNF.     +WHITEHEAD,AULC+//AERE+RHEL+STHAMPT+LC.LON
DAHL     67  UCRL-16978           +HARDY+HESS+KIRZ+MILLER ////////////// LRL
EISNER   67  PR TO BE PUBL.       +JOHNSON+KLEIN+PETERS+SAHNI+YEN+ // PURCUE
FOSTER   67  HEIDELBERG CONF.     +GAVILLET,LABROSSE,MONTANET+ //  CERN+CDF
LAMSA    67  PREPRINT   ,         +CASCN+EISWAS+DERADO+GROVES+ /// NOTRECAME
POIRIER  67  PREPRINT             +BISWAS,CASON,DERADO,KENNEY+//NOTROAM+PENN
RABIN    67  THESIS               M. RABIN ///////////////////////// RUTGERS

                   PAPERS NOT REFERRED TO IN DATA CARDS

HAGCPIAN 63 PRL 1C 533            V HAGOPIAN,W SELCVE /////////////// PENNA
ADERHOLZ 64 PL 10 24C             AACHEN+BERLIN+BIRM+BONN+HAMBLR+IC-LONC+MPI  IJ
BRUYANT  64 PL 10 232             BRUYANT,GCLCBERG,HOLCER,FLELRY,HUC/CERN+PA  I
SODICKSC 64 PRL 12 485            SODICKSCN,WAHLIG,MANNELLI,FRISCH+ //// MIT  I
BARMIN   65 SJNP 1 23C            +COLGCLENKO,ELENSKY,EROFEEV+ / ITEP MCSCOW  JP
STRUGALS 67  JINR E1-31C0         STRUGALSKI+CHUVILC+IVANOVSKAJA+ //// CUBNA

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D(1285)

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         8  D MESON (1285,JPG= +) I=0

         CAHL 67 FAVCR JP=1+, BUT CC NOT EXCLUCE 2-,0-.

         8  C MESON  MASS (MEV)

M          1290.0      8.0         D.ANDLAU  65 HBC  1.2 PBAR P, 5-6 PFS
M          1290.    APPROX.        BARLOW    67 HBC     1.2 PBAR P, 4PFS  5/67
M          1283.0      5.0         DAHL      67 HBC     1.6-4.2 PI- P
M          . . . . . . . . .
M  AVG     1284.9663   4.2400   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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         8  C MESON WIDTH (MEV)

W          25.0      15.0          D.ANDLAU  65 HBC      1.2 PBAR P
W          35.0      1C.0          CAHL      67 HBC      1.6-4.2 PI- P
W          . . . . . . . . .
W  AVG     31.9231   6.3205   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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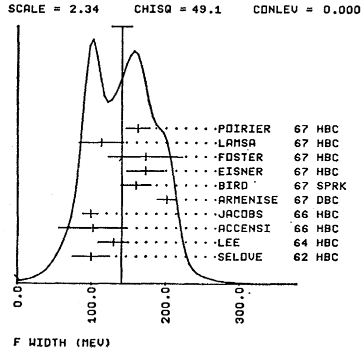


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         8  D MESCN PARTIAL DECAY MODES

P1        C MESON INTO K KBAR PI                          S11S11S 9
P2        C MESON INTO PI PI RHO                          S 9S 9U 9

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         8  C MESCN BRANCHING RATICS

R1  *     C MESON INTO (PI PI RHC) / (K KBAR PI)          NUM 2
R1  *                                                     CEN 1
R1  *       2.0    CR LESS          CAHL      67 HBC     C CHARGEC PI CNLY

R   *FOR 1+ NONET SU3 RATES SEE E.G. GCLCHABER, REVIEW BERKELEY CONF.1966

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                  REFERENCES FCR C MESCN

D.ANCLAU 65 PL 17 347         D.ANCLAL,ASTIER,BARLCW +//CCF+CERN+RAC+LIV
ROSENFEL 65 OXFORC CCNF 58    A H RCSENFELC /////////////////// LRL--RVUE
BARLCW   67 NC  50 A  701     +MONTANET,D-ANDLAU+/CERN+CCF+IDR+LIVERPOOL
DAHL     67  UCRL-16978       +HARDY+HESS+KIRZ+MILLER ////////////// LRL I JP
   SEE ALSC 65 PRL 14 1074    MILLER,CHUNG,CAHL,HESS,HARCY,KIRZ+//LRL+UC

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A2(1300)

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         12  A2 MESCN (130C,JPG=2+-)  I=1

         LEVRAT 66, CHIKCVANI 67 ANC MORRISCN 67  SUGGEST TWC
         CIFFERENT MESCNS NEAR 130C MEV.

         12  A2 MESON  MASS (MEV)

M         1320.0                        ADERHOLZ  64 HBC
M         1335.0      10.0              GCLCHABER 64 HBC  +-  3.7 PI+- P
M         1270.0                        CERACO    65 HBC
M     130 1310.0                        FCRINC    65 CBC  + C 4.5 PI+ D
M    1425 1290.0       5.0              LEFEBVRES 65 MMSP  -
M         1300.0                        SEICLITZ  65 DBC   -
M         1290.0      10.0              BARNES    66 HBC   -
M         1310.0      10.C              BENSCN    66 DBC
M   *     1280.0                        DEUTSCHMA 66 HBC  +   8.0 PI+ P
M   * 18C0 1310.0     1C.C    CCMP.BY   FERBEL    66      +-  PI+- P
M    1060 1286.        8.               LEVRAT    66 MMS  -    6-7 PI- P      2/67
M   C     1320.       10.               ARMENISE1 67 CBC    C 5.1 PI+ D       8/67
M   C     SUPERSEDEC BY ARMENISE2 BELOW
M         1312.0       7.0              ARMENISE2 67 DBC    C 5.1 PI+C        9/67
M     137 1285.       20.               BALTAY    67 HBC    C 8.5 PI+ P       7/67
M      80 1317.0       3.0              BARLOW    67 HBC  +-  1.2 PBAR P, KK  9/67
M      60 1333.0      13.0              BARLOW    67 HBC  +-  1.2 PBAR P, KK  9/67
M         1312.       10.               BARTSCH   67 HBC    C 8 PI+ P         8/67
M   N     1344.0       7.       6.      BEUSCH    67 SPRK   C 5-12 PI- P      7/67
M   N     K01 K01 MCDE. PEAK UNRESCLVED FROM F.
M     240 1300.0      15.0              BOCKMANN  67 HBC    C 5.0 PI+P        9/67
M     140 1300.0      15.0              BOCKMANN  67 HBC  +   5.0 PI+P        9/67
M   K     1330.0      20.0              BOCKMANN  67 HBC      5.0 PI+P  TC KK 9/67
M   A     1288.       14.               CASON     67 HBC  -  8 PI- P          5/67
M   A     ANALYSIS CCMPLICATED BY NEARBY PEAK (A1.5) AT 1190 MEV
M    4000 1307.       16.               CHIKOVANI 67 MMS  -  7 PI- P          8/67
M         1310.       20.               CHUNG     67 HBC  -  2.7-4.5 PI- P    8/67
M     130 1280.0      12.0              CONFORTC  67 HBC  +-  0. PBAR P IN KK 9/67
M   C     130C.     APPROX.             CONTE 1   67 HBC  - 11 PI- P          8/67
M   C     SUPERSEDEC BY CONTE2 BELCW
M         1282.0      10.0              CCNTE 2   67 HBC  - 11.0 PI- P       10/67
M   K     1317.2       4.0              DAHL      67 HBC  -  2.7-4.5 PI- P    8/67
M   K     1315.7      10.8              DAHL      67 HBC    C 2.7-4.5 PI- P   8/67
M         1269.        9.               DANYSZ    67 HBC  +-  3,3.6 PBAR P    7/67
M   *     1300.     PRELIM.             FRIEMAN   67 HBC  +- 5.7 PBAR P       7/67
M         1309.0                        HOOGLANC  67 HBC    C 3.0 K-P TO LAMB 9/67
M         1280.       12.               KEY       67 HBC  -  3 PI-P          11/67
M
M   K     VALUE FROM K K(BAR) MODE ONLY                                       9/67
M
M   *          EVIDENCE FOR TWC-PEAK STRUCTURE
M
M   *     LEVRAT+ 66 HAVE SLIGHT EVIDENCE FOR TWO-PEAK STRUCTURE.
M   *     WITH BASICALLY THE SAME SET-UP, CHIKCVANI+ 67 CONFIRM
M   *     THIS. COMBINING THEIR CATA WITH THE OLD DATA OF LEVRAT+
M   *     66, CHIKOVANI + 67 GET THE FOLLOWING RESULTS.
M
M   *     1274.       16.       FOR FIRST  PEAK  (TWO INDEP. PEAKS ASSUMED)   8/67
M   *     1320.       16.       FOR SECOND PEAK  (TWO INDEP. PEAKS ASSUMED)   8/67
M
M   *     1296.       16.       FOR FIT TO DIPOLE                             8/67
M         . . . . . . . . .
M  AVG    1304.7185   4.0364   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.2)
------ --------- --------- --(SEE IDEOGRAM)-- --------- --------- ---------
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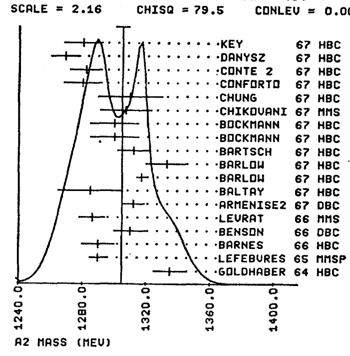

→ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.←

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                  12  A2 MESON  WIDTH (MEV)

W          100.0                        ADERHOLZ  64 HBC
W           90.0     10.0               GOLDHABER 64 HBC  +-  3.7 PI+- P
W          150.0                        DERADO    65 HBC
W      1425 99.0     15.0               LEFEBVRES 65 MMSP  -
W          140.0                        SEIDLITZ  65 DBC   -
W           70.0     10.0               BARNES    66 HBC   -
W   N      110.0     45.0               BENSON    66 DBC
W   N      SUPERSEDED BY BENSON 1 66
W          100.      15.                BENSON 1  66 DBC    C 3.65 PI+D      1/67
W   * 1800  80.0     10.0    COMP.BY    FERBEL    66      +-  PI+- P
W     1060  98.       5.                LEVRAT    66 MMS   - 6,7 PI- P       2/67
W   C      120.      20.                ARMENISE1 67 DBC    C 5.1 PI+ D      8/67
W   C      SUPERSEDED BY ARMENISE2 BELOW
W           90.0      8.0               ARMENISE2 67 DBC    0 5.1 PI+D       9/67
W      137 100.      25.                BALTAY    67 HBC    0 8.5 PI+ P      7/67
W       60  56.0     28.0               BARLOW    67 HBC  +-  1.2 PBAR P, KK 9/67
W       80  56.0     15.0               BARLOW    67 HBC  +-  1.2 PBAR P, KK 9/67
W           61.      25.                BARTSCH   67 HBC    C 8 PI+ P        8/67
W   N       88.      23.       22.      BEUSCH    67 SPRK   0 5-12 PI- P     7/67
W   N      K01 K01 MODE. PEAK UNRESOLVED FROM F.
W      240 100.0     11.0               BOCKMANN  67 HBC    C 5.0 PI+P       9/67
W      140 100.0     20.0               BOCKMANN  67 HBC  +   5.0 PI+F       9/67
W   K      100.0     20.0               BOCKMANN  67 HBC      5.0 PI+P  TO KK 9/67
W   A       84.      30.       20.      CASON     67 HBC   -  8 PI- P        5/67
W   A      ANALYSIS COMPLICATED BY NEARBY PEAK (A1.5) AT 1190 MEV
W     4000  90.      15.                CHIKOVANI 67 MMS   -  7 PI- P        8/67
W           80.      20.                CHUNG     67 HBC   -  2.7-4.5 PI- P  8/67
W      130  90.0                        CONFORTO  67 HBC  +-  0. PBAR P IN KK 9/67
W   D       80.   APPROX.               CONTE 1   67 HBC   - 11 PI- P        8/67
W   C      SUPERSEDED BY CONTE 2 BELOW
W   *      120.0  APPROX.               CONTE 2   67 HBC   - 11.0 PI- P     10/67
W   K       47.      18.                DAHL      67 HBC   -  2.7-4.5 PI- P  8/67
W   K       80.5     36.5               DAHL      67 HBC    C 2.7-4.5 PI- P  8/67
W           45.      22.                DANYSZ    67 HBC  +-  3,3.6 PBAR P   7/67
W   *       69.0                        HOOGLAND  67 HBC    C 3.0 K-P TO LAMB 9/67
W           91.      18.                KEY       67 HBC   -  3 PI-P        11/67
W
W   K      VALUE FROM K K(BAR) MODE ONLY                                     9/67
W
W   *                RESULTS FOR TWO-PEAK STRUCTURE BY CHICOVANI+ 67
W   *                   (CF. NOTE UNDER MASS LISTINGS ABOVE)
W
W   *       29.      10.    FOR FIRST  PEAK   (TWO INDEP. PEAKS ASSUMED)     8/67
W   *       35.      10.    FOR SECOND PEAK   (TWO INDEP. PEAKS ASSUMED)     8/67
W
W   *       30.       3.    FOR FIT TO DIPOLE                                8/67
W           . . . . . . . . . .
W   AVG     89.7620   3.4687   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
                 (SEE IDEOGRAM)

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                  12  A2 MESON PARTIAL DECAY MODES

P1       A2 MESON INTO RHO PI                                L 9S 8
P2       A2 MESON INTO KBAR K                                S10S12
P3       A2 MESON INTO ETA PI                                S14S 8
P4       A2 MESON INTO ETA PRIME PI                          L 2S 8
P5       A2 MESON INTO PI+ PI- PI0                           S 8S 8S 9

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                  12  A2 MESON  BRANCHING RATIOS

R1  *   A2 MESON  INTO (K KBAR) / (RHO PI)                   (P2)/(P1)
R1  *        0.06  OR LESS            LANDER    64 HBC  +
R1  A        0.02  OR LESS            ARMENTERO 65 HBC  -
R1  A        SUPERSEDED BY GAVILLET 67 BELOW
R1  M        0.03      0.02           DEUTSCHMA 66 HBC  +
R1  M        FOR NEW VALUE, SEE MORRISON 67 BELOW
R1  N        0.13      0.03           BEUSCH    67 SPRK   0 5,7,12 PI-+      9/67
R1  N        K01 K01 MODE. UNRESOLVED FROM F.
R1  *        0.15      0.05           BOCKMANN  67 HBC    C 5.0 PI+F       9/67
R1  *        0.05      0.05           BOCKMANN  67 HBC  +   5.0 PI+P       9/67
R1           0.054     0.022          CHUNG     67 HBC  -                  1/67
R1      130  0.042     0.016          GAVILLET  67 HBC  +-  0. PBAR P      9/67
R1  *        0.04      0.02           MORRISON  67 HBC  (SEE DEUTSCHM 66)  8/67
R1           . . . . . . . . . .
R1  AVG       .0462     .0129   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R1  FIT       .047      .013    VALUE FROM CONSTRAINED FIT

R2  *   A2 MESON INTO (ETA PI)/TOTAL                         (P3)/TOTAL
R2  X        0.03 OR LESS             DEUTSCHMA 66 HBC  +
R2  X        REPLACED BY MORRISON 2 67 BELOW
R2           0.084     0.023          MORRISON2 67 HBC  +   8 PI+ P       11/67
R2           . . . . . . . . . .
R2  FIT       .109      .021    VALUE FROM CONSTRAINED FIT

R3  *   A2 MESON INTO (ETA PI) / (RHO PI)                    (P3)/(P1)
R3           0.3       0.2            ADERHOLZ  65 HBC
R3           0.24      0.08           DUBOVIKOV 66 HBC  -                 11/66
R3  *    15  0.24      0.08           BOCKMANN  67 HBC  +   5.0 PI+P       9/67
R3           0.12      0.08           CHUNG     67 HBC  -                 12/66
R3           0.22      0.09           CONTE 1   67 HBC  -                  8/67
R3           0.16      0.10           KEY       67 HBC  -   3 PI-P        11/67
R3           . . . . . . . . . .
R3  AVG       .1506     .0422   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R3  FIT       .128      .028    VALUE FROM CONSTRAINED FIT
```
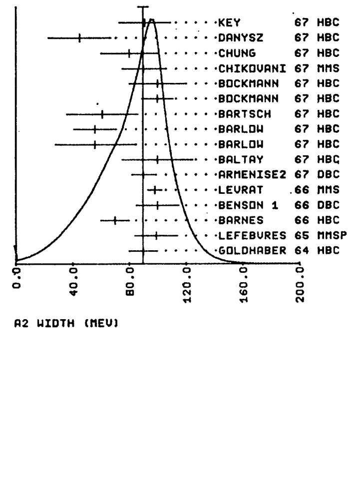

WEIGHTED AVERAGE = 89.76 ± 3.47
SCALE = 1.18   CHISQ = 21.0   CONLEV = 0.137



A2 WIDTH (MEV)

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R4  *   A2 MESON INTO (ETA PRIME PI) / TOTAL                 (P4)/TOTAL
R4           0.1   OR LESS            CHUNG      65 HBC  -
R4  *        0.015 OR LESS            DEUTSCHMA  66 HBC  +

R6  *   A2 MESON INTO (PI+ PI- PI0) / (RHO PI)               (P5)/(P1)
R6           0.17  OR LESS            BENSON     66 DBC    C

R   *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SOCOLOW, PRL 15,329(65)

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                   12 QUANTUM NUMBER DETERMINATIONS

Q1  *       IJP FOR NEUTRAL A2
Q1  *       I = 1                     ABOLINS    65
Q1  *       I = 1    JP = 2+          BENSON     66 HBC      3.65 PI+ D     11/67
Q1  *       I = 1    JP = 2+          ARMENISE2  67 DBC    C 5.1 PI+D        9/67
Q1  *       I = 1    JP = 2+          BALTAY     67
Q1  *       I = 1    JP = 2+          BARTSCH    67
Q1  *                JP = 2+          MARTIN     67 SPRK     7.0 PI-P MM     9/67

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REFERENCES FOR A2


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ADERHOLZ 64 PL 10 248               AACHEN+BERLIN+BIRM+BONN+HAMB+IC-LONDON+MPI
GOLDHABE 64 DUBNA CONF  1 480 G GOLDHABER,S GOLDHABER,OHALLORAN,SHEN/LRL
LANDER   64 PRL 13 346              +ABOLINS,CARMONY,HENDRIKS,XUONG+/ LA JOLLA

ABOLINS  65 ATHENS(OHIO)CONF.  +CARMONY,LANDER,XUONG,YAGER ///// LA JOLLA I=1
ARMENTER 65 PL 17 344               ARMENTEROS,EDWARDS,JACOBSEN +  //CERN+CDEF
CHUNG    65 PRL  15  325            +DAHL,HARDY,HESS,JACOBS,KIRZ,MILLER // LRL
DERADO   65 PRL 14 872              DERADO,KENNEY,POIRIER,SHEPHARD//NOTRE DAME
FORINO   65 PL 19 68                +GESSAROLI+LENDINARA+/BOL+BARI+FIR+ORS+SAC
LEFEBVRE 65 PL 19 434               CERN MISSING MASS SPECTROMETER GROUP /CERN
SEIDLITZ 65 PRL 15 217              L SEIDLITZ,O I DAHL,D H MILLER /////// LRL

BARNES   66 PRL 16 41               BARNES,FOWLER,LAI,ORENSTEIN + /// BNL+CCNY
BENSON   66 PRL 16 1177             G BENSON,LOVELL,MARQUIT,ROES + // MICHIGAN
BENSON 1 66  MICH COO-1112-4        G.C.BENSON /////////////////////// MICHIGAN
DEUTSCHM 66 PL 20 82                DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
DUBOVIKO 66 PL 23 716+PRIV.C.  DUBOVIKOV,GRIGORIEV,VLADIMIRSKY +  // ITEP
EHRLICH  66 PR 152 1194             R. EHRLICH,W.SELOVE,H.YUTA // PENNSYLVANIA
FERBEL   66 PL 21 111               FERBEL                       // ROCHESTER
LEVRAT   66 PL  22  714             CERN MISSING MASS SPECTROMETER GROUP /CERN

ARMENI 1 67 PL 25B 53               ARMENISE,FORINO,+ ///// BARI+BOL+FIR+ORSAY
ARMENI 2 67  HEIDELBERG CONF.  ARMENISE,FORINO,+ ///// BARI+BOL+FIR+ORSAY
BALTAY   67 PL 25B 160              +KIRSCH+KUNG+YEH+RABIN / COLUM+BNL+RUTGERS
BARLOW   67 NC 50A 701              +LILLESTOL+MONTANET+/CERN+CDF+IR+LIVERPOOL
BARTSCH  67 PL 25B 48               +DEUTSCHMANN+GROTE+COCCONI+/AACH+BERL+CERN
BEUSCH   67 PL 25 B 357             +FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
BOCKMANN 67  HEIDELBERG CONF.  +KOBE,ROST,POLS+//BONN+DURH+NIJM+EPP+TURIN
CASON    67 PRL 18 880              +LAMSA,BISWAS,DERADO,GROVES,+ // NOTREDAME
CHIKOVAN 67 PL 25B 44               CERN MISSING MASS SPECTROMETER GROUP//CERN
CHUNG    67 PRL 16 100              +DAHL,HARDY,HESS,KIRZ,MILLER ///////// LRL
    ALSO 66 UCRL-16832              RICHARD I HESS--THESIS,BERKELEY     // LRL
CHUNG    67  UCRL-16881 REV         S.U.CHUNG,O.DAHL,J.KIRZ,D.H.MILLER /// LRL
COHN     67 NP 81 57                +MCCULLOCH+BUGG+CONDO //// ORNL+UNIV.TENN.
CONFORTO 67  PREPRINT TO NP         +MARECHAL,MONTANET+//CERN+CF+IPN+LIVERPOOL
CONTE 1  67 NC  51 A  175           +TOMASINI,CORDS+//GENOVA+HAM+MILANO+SACLAY
CONTE 2  67  HEIDELBERG CONF.  +TOMASINI,CORDS+//GENOVA+HAM+MILANO+SACLAY
DAHL     67  UCRL-16978             +HARDY+HESS+KIRZ+MILLER ////////////// LRL
DANYSZ   67 NC 51 A 801             DANYSZ+FRENCH+SIMAK ///////////////// CERN
FRIDMAN  67  PREPRINT               +MAURER+MICHALON+OUDET+SCHIBY+/HEID+STRASB
GAVILLET 67  HEIDELBERG CONF   +VILLEMOES,FOSTER,MONTANET,BLOCH+/CERN+CDF
HOOGLAND 67  HEIDELBERG CONF.  +KLUYVER,TENNER              // ZEEMAN LAB
KEY      67  PREPRINT               +PRENTICE+COOPER+MANNER+WALKER+/TO+ANL+WIS
MARTIN   67  HEIDELBERG CONF.  CERN MISSING MASS SPECTROMETER GROUP//CERN
MORRISON 67 PL 25 B 238             D.R.O.MORRISON ///////////////////////CERN
MORRISO2 67  PRIV.COMM.             D.R.O.MORRISON ///////////////////////CERN
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PAPERS NOT REFERRED TO IN DATA CARDS


```
LANDER   64 PRL 13 346 A            LANDER,ABOLINS,CARMONY,HENDRICKS +/// UCSD   JP
ADERHOLZ 65 PR 138 B 697            AACHEN+BERLIN+BIRM+BONN+HAMB+LOND+MUENCHEN
ALITTI   65 PL 15 69                ALITTI,BATON,DELER,CRUSSARD+/ SACLAY+ECLOG   JP
GOLDHABE 66 BERKELEY CONF.          G. GOLDHABER, MESON REVIEW ////////////LRL
LAMSA    67  PREPRINT               +CASON+BISWAS+DERADO+GROVES+ /// NOTREDAME
SLATTERY 67 NC 50A 377              +KRAYBILL+FORMAN+FERBEL //////// YALE+ROCH    JP
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A2$_{I=2}$(1320)

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        A2,2 (1320) I=2 OR GREATER

        SEEN AS A BUMP IN RHO- PI- MASS SPECTRUM.
        EVIDENCE NOT COMPELLING. OMITTED FROM TABLE.

        90 MASS (MEV)

M       34 1320.     25.          VANDERHAG 67 DBC  -- 5 PI-D          5/67

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        90 WIDTH (MEV)

W       34  150.   APPROX.        VANDERHAG 67 DBC  -- 5 PI-D          5/67

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        90 CROSS SECTION (MICROBARNS)

CS      34  15.      5.           VANDERHAG 67 DBC  -- 5 PI-D          5/67

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REFERENCES FOR A2,2


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VANDERHA 67 PL 24B 493          VANDERHAGEN+HUC+FLEURY+ /EP+IPN+BARI+ECLOG
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E(1420)

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        6  E MESON  (1420,JPG=A +)  I=0

        BAILLON 67 FAVOR JP=0-, DAHL 67 FAVOR 1+ BUT DO NOT
        EXCLUDE 2-, 0-.

        6 E MESON MASS (MEV)

M          1425.      7.          BAILLON   67 HBC    0. PBAR P        11/66
M          1420.0    20.0         DAHL      67 HBC    1.6-4.2 PI- P
M          1423.     10.          FRENCH    67 HBC    3-4 PBAR P        6/67
M          . . . . . . . . . .
M   AVG    1424.0124  5.5125   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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→ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    6 E MESON WIDTH (MEV)

W          80.       10.              BAILLON   67 HBC    0. PBAR P        11/66
W          60.0      20.0             DAHL      67 HBC     1.6-4.2 PI- P
W          45.       20.              FRENCH    67 HBC     3-4 PBAR P       6/67
W          . . . . . . . . . .
W   AVG    70.8333   9.6645   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
                    (SEE IDEOGRAM)

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                    6 E MESON PARTIAL DECAY MODES

P1          E INTO K K*(890)                             S10U18
P2          E INTO K KBAR PI                             S12S12S 8
P3          E MESON INTO PI PI RHO                       S 9S 9U 9
P4          E INTO PI(1003) PI                           U16S 8
P5          E INTO ETA PI PI                             S14S 8S 8

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                    6   E MESON BRANCHING RATIOS

R1  *       E INTO K K*(890)/((K K*)+(PI(1003) PI))      NUM 1
R1  *                                                    DEN 1   4
R1             .50       .10          BAILLON   67 HBC                     11/66

R2  *       E MESON INTO (PI PI RHO) / (K KBAR PI)       NUM   3
R2  *                                                    DEN  2
R2  *         2.0   OR LESS           DAHL      67 HBC    C CHARGED PI ONLY

R3  *       E INTO(ETA PI PI)/(K KBAR PI)                NUM     5
R3  *                                                    DEN  2
R3            7.0   OR LESS           FOSTER    67 HBC      0. PBAR P      10/67

R    *FOR 1+ NONET SU3 RATES SEE E.G. GOLDHABER, REVIEW BERKELEY CONF.1966

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                              REFERENCES FOR E MESON
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ARMENTER 64 DUBNA CONF 1 467  ARMENTEROS,EDWARDS,JACOBSEN,ASTIER+ //CERN
BAILLON  67 NC 50A  393       +EDWARDS+D.ANDLAU+ASTIER+ //// CERN+CDF+IR
BARASH   67 PR 156  1399      BARASH,KIRSCH,MILLER,TAN /////////COLUMBIA
DAHL     67  UCRL-16978       +HARDY+HESS+KIRZ+MILLER ////////////// LRL I JP
  SEE ALSO 65 PRL 14 1074     MILLER,CHUNG,DAHL,HESS,HARDY,KIRZ+ /LRL+UC
FOSTER   67  HEIDELBERG CONF. +GAVILLET,LABROSSE, MONTANET+  // CERN+CDF
FRENCH   67  CERN/TC/PH.66-31 +KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
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$K_S K_S$ (1440) / $\rho\rho$ (1410)

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  6  KSKS(1440) AND RHORHO(1410) (JPG=V +) I GTE 0

             EVIDENCE NOT YET COMPELLING, OMITTED FROM TABLE
             IF RHOO RHOO AND KS KS ARE MODES OF THE SAME RESONANCE
             THEN I=0.

             29  KSKS AND RHORHO MASS  (MEV)

M   -------RHOO RHOO MODE-------
M          1410.0                     BETTINI   66 DBC   C  0. PBARP TO 5PR

M   -------KS KS MODE ----------
M   B'     POSSIBLY SEEN              ABRAMS    67 HBC    4.25 K- P        5/67
M   B      THE AUTHORS ASSOCIATE THE PEAK WITH THE F PRIME, BUT BACKGROUND
M   B      ESTIMATION IS DIFFICULT
M          1412.       23.            BARLOW    67 HBC    1.2 PBAR P       5/67
M          1439.0      5.0     6.0    BEUSCH    67 SPRK   5,7,12 PI-P      9/67
M          . . . . . . . . . .
M   AVG    1437.5396   5.3492   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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             29  KSKS AND RHORHO WIDTH (MEV)

W   -------RHOO RHOO MODE-------
W            90.0                     BETTINI   66 DBC   C 0. PBAR P TO 5PR

W   -------KS KS MODE ----------
W           100.       70.            BARLOW    67 HBC    1.2 PBAR P       5/67
W            43.0      17.0    18.0   BEUSCH    67 SPRK   5,7,12 PI-P      9/67
W          . . . . . . . . . .
W   AVG      46.3529  16.9775   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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                 REFERENCES FOR KSKS(1440) AND RHO RHO(1410)
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BETTINI  66 NC 42A 695        +CRESTI,LIMENTANI,LORIA,PERUZZO+//PAD+PISA
ABRAMS   67 PRL 18 620        +KEHOE,GLASSER,SECHI-ZORN,WOLSKY /MARYLAND
BARLOW   67 NC  50 A  701     +MONTANET,D-ANDLAU+/CERN+CDF+IDR+LIVERPOOL
BEUSCH   67 PL 25 B 357       +FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
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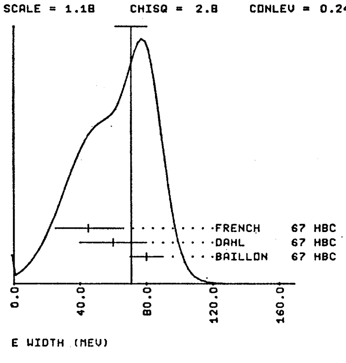
WEIGHTED AVERAGE = 70.83 ± 9.66
SCALE = 1.18   CHISQ = 2.8   CONLEV = 0.246



f′(1515)

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             13  F PRIME (1515,JPG=2++)  I=0

             13  F PRIME(1515) MASS (MEV)

M        14 1480.0                     CRENNELL  66 HBC      6.0 PI- P
M   B     5 1460.       10.            ABRAMS    67 HBC    4.25 K- P        5/67
M   B   BACKGROUND ESTIMATION DIFFICULT.                                    5/67
M          1515.0 .     7.0            AMMAR     67 HBC     5.5 K-P         9/67
M        70 1513.0      7.0            BARNES    67 HBC    4.6, 5. K- P    10/67
M          . . . . . . . . . .
M   AVG    1514.0000   4.9497   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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             13  F PRIME(1515) WIDTH (MEV)

W   B    5   53.       18.             ABRAMS    67 HBC    4.25 K- P        5/67
W   B   BACKGROUND ESTIMATION DIFFICULT.                                    5/67
W           35.0      25.0             AMMAR     67 HBC     5.5 K-P         9/67
W       70  87.0      15.0             BARNES    67 HBC    4.6, 5. K- P    10/67
W          . . . . . . . . . .
W   AVG     73.2353  22.9412   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.8)

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             13  F PRIME PARTIAL DECAY MODES

P1          F PRIME INTO PI+ PI-                          S08S08
P2          F PRIME INTO K KBAR                           S12S12
P3          F PRIME INTO K K*(890)                        S10U18
P4          F PRIME INTO ETA ETA                          S14S14
P5          F PRIME INTO PI PI ETA                        S 8S 8S14
P6          F PRIME INTO PI K KBAR                        S 8S12S12

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             13  F PRIME BRANCHING RATIOS

R1  *       F PRIME INTO (PI+ PI-)/(K KBAR)                  (P1)/(P2)
R1            0.2  OR LESS           AMMAR     67 HBC     5.5 K-P ,CL=.67  9/67
R1            0.18  OR LESS          BARNES    67 HBC    4.6, 5.0 K- P    10/67
R1  N          .03  ESTIMATE FROM SU3 GLASHOW  65  SU3

R2  *       F PRIME INTO (K KBAR) / TOTAL                    (P2)/TOTAL
R2  X         0.64      0.31         GOLDBERG  66, WITHDRAWN
R2  X         BARNES 66 POINT OUT THAT F PRIME UNRESOLVABLE FROM E MESON

R3  *       F PRIME INTO (ETA ETA)/(K KBAR)                  (P4)/(P2)
R3            0.50  OR LESS          BARNES    67 HBC    4.6, 5.0 K- P    10/67

R4  *       F PRIME INTO (PI PI ETA)/(K KBAR)                (P5)/(P2)
R4            0.3   OR LESS          AMMAR     67 HBC     CL=0.67         10/67
R4            0.25      0.13         BARNES    67 HBC    4.6, 5.0 K- P    10/67

R5  *       F PRIME INTO (PI K KBAR + K K*(890))/(K KBAR) (P3+P6)/(P2)
R5            0.4   OR LESS          AMMAR     67 HBC     CL=0.67         10/67
R5            0.14  OR LESS          BARNES    67 HBC    4.6, 5.0 K- P    10/67
R5  B    OR AS 0.14     0.14         BARNES    67 HBC    4.6, 5.0 K- P    10/67

R    *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SOCOLOW, PRL 15,329(65)

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                              REFERENCES FOR F PRIME
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GLASHOW  65 PRL 15 329        S L GLASHOW, R H SOCOLOW     //SU3 BERKELEY
BARNES   65 PRL 15 322        REPLACED BY REFERENCE BELOW
BARNES   66  BERKELEY CONF.   +CORNAN,GUIDONI,KALBFLEISCH,LONDON/BNL,SYR I=0
CRENNELL 66 PRL  16  1025     + KALBFLEISCH,LAI,SCARR,SCHUMANN +  // BNL I
GOLDBERG 66  SUBMITTED TO NC  + LEITNER,MUSTO,O RAIFEARTAIGH  //SYRACUSE
    ALSO 66  BERKELEY CONF    +KALBFLEISCH,LAI,SCARR,SCHUMANN+////// BNL I=0
    ALSO 67  HEIDELBERG CONF. LEITNER+                       // BNL+SYRACUSE
ABRAMS   67 PRL 18 620        +KEHOE,GLASSER,SECHI-ZORN,WOLSKY /MARYLAND
AMMAR    67 PRL  19  1071     +DAVIS,HWANG,DAGAN,DERRICK +    // NWU+ANL   JP
BARNES   67 PRL  19  964      +CORNAN,GOLDBERG,LEITNER + // BNL+SYRACUSE IOJP
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η(1600) → 4π

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             30  ETA (1600,JPG=  +) I = 0

             THIS ENTRY CONTAINS 4PI PEAKS.
        EVIDENCE NOT COMPELLING, OMITTED FROM TABLE

             30  ETA (1600)  MASS (MEV)

M        23 1610.0      40.            KERNAN    65 HBC    0 2.7 PBAR P
M           1597.0      13.0           CLAYTON   67 HBC    0 2.5 PBAR P     10/67
M          . . . . . . . . . .
M   AVG     1598.2419  12.3634   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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             30  ETA (1600)  WIDTH (MEV)

W            155.      85.             KERNAN    65 HBC    0 2.7 PBAR P
W             88.0     26.0            CLAYTON   67 HBC    0 2.5 PBAR P     10/67
W          . . . . . . . . . .
W   AVG       93.7324  24.8629   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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             30  ETA (1600)  PARTIAL DECAY MODES

P1          ETA (1600) INTO 4PI                           S 8S 8S 8S 8

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                              REFERENCES FOR ETA(1600)
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KERNAN   65 PRL 15 803        +LYON+CRAWLEY ////////////////////// IOWA
CLAYTON  67  HEIDELBERG CONF. +MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

$\pi_A(1640) \rightarrow 3\pi, 5\pi$

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            34  PI (164C, JPG=  -)  I = 1

            THIS ENTRY CONTAINS G=-1 PEAKS ANC THE R1 PEAK

            FOR COMPILATION BY T. FEREEL, SEE REVIEW ON MESCNS,
            PROC. 1966 BERKELEY CONFERENCE, P. 132

            34  PI (164C) MASS  (MEV)

M   C   30 1600.0                      FORINO    65 DBC  C  4.5 PI+ C
M   C 17C0 EVENTS,COMPILED BY FERBEL.  ABC COLL. 66  HBC +   8.0 PI+ P
M   C 4CC0 EVENTS,COMPILED BY FERBEL.  BALTAY    66  HBC +   8.4 PI+ P
M   C 2CC0 EVENTS,COMPILED BY FERBEL.  SLATTERY  67  HBC +   7.0 PI+ P
M   C  110 1640.     2C.               FERBEL    66 RVUE +   7-8 PI P        11/66
M       20 1630.0    3C.0              VETLITSKY 66 HBC  -   4.7 PI- P
M          1662.0    16.0              ABC COLL. 67 HBC  +   8.0 PI+ P       10/67
M   *      1700.0    16.0              ABC COLL. 67 HBC  +   8.0 PI+ P,PI+F  10/67
M   *      1654.0    19.0              ARMENISE  67 DBC    C 5.1 PI+C         9/67
M          1665.0    10.0              CONTE     67 HBC  - 11.0 PI- P,PI-F   10/67
M   C      1689.     10.               DANYSZ    67 HBC    0 3,3.6 PBAR P     7/67
M   C   OBSERVED IN (OMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE
M   C   NOTE THAT THE WIDTH OF THIS PEAK IS SMALL
M   R      1630.     15.               DUBAL     67 MMS  -   7-12 PI- P       7/67
M   R   R1 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.
M   R   NOTE THAT THE R1 HAS SMALLER WIDTH THAN THE OTHER ENTRIES.
M          1610.     19.               LAMSA     67 HBC  -   8.0 PI-P, PI-F  11/67
M          . . . . . . . . . .
M   AVG    1653.5896  11.8236   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)
                    (SEE IDEOGRAM)

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            34  PI (164C) WIDTH  (MEV)

W   C  110  100.     2C.               FERBEL    66 RVUE +   7-8 PI F        11/66
W   R        21.   CR LESS             LEVRAT    66 MMS  -   7-12 PI- P       7/67
W   R   R1 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.
W       20  100.                       VETLITSKY 66 HBC  -
W           120.0    45.0              ABC COLL. 67 HBC  +   8.0 PI+ P       10/67
W   *       170.0    50.0              ABC COLL. 67 HBC  +   8.0 PI+ P,PI+F  10/67
W   *       176.0    28.0              ARMENISE  67 DBC    C 5.1 PI+C         9/67
W           120.0  APPROX.             CONTE     67 HBC  - 11.0 PI- P,PI-F   10/67
W   C        38.     18.               DANYSZ    67 HBC    C 3,3.6 PBAR P     7/67
W   C   OBSERVED IN (OMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE
W           100.     50.      30.      LAMSA     67 HBC  -   8.0 PI-P  PI-F  11/67
W           . . . . . . . . . .
W   AVG     108.8276  29.8964   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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            34  PI (164C) PARTIAL DECAY MODES

P1          PI(164C) INTO 3 PI                        S 9S 9S 9
P2          PI(164C) INTO RHO PI                      S 9U 9
P3          PI(164C) INTO ETA PI                      S 9S14
P4          PI(164C) INTO 5 PI
P5          PI(164C) INTO K K*(890)                   S11U18
P6          PI(1640) INTO K KBAR PI                   S11S11S 9
P7          PI(164C) INTO K KBAR                      S11S11
P8          PI(1640) INTO F PI                        L 5S 9

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            34  PI (164C)  BRANCHING RATIOS

R1  *       PI(164C) INTO (K KBAR) / (3 PI)            NUM      7
R1  *                                                  CEN 1
R1              .40  CR LESS (ESTIMATED FROM DATA OF DEUTSCHMANN 66)        11/66

R2  *       PI(164C) INTO (RHO PI) / (3 PI)            NUM  2
R2  *                                                  CEN 1
R2            0.40  CR LESS          FERBEL    66 HBC                      11/66
R2  *               SEEN             ARMENISE  67        C 5.1 PI+ D       10/67

R3  *       PI(164C) INTO (F PI) / (3 PI)              NUM      8
R3  *                                                  CEN 1
R3            INDICATION SEEN        LUBATTI   66 HLBC                     11/66
R3                  SEEN             ABC COLL. 67 HBC  +   8.0 PI+ P       10/67
R3            APPEARS DOMINANT       CONTE     67 HBC  - 11.0 PI- P        10/67

R4  *       R1 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS
R4  *          0.37 /   0.59 /   0.04  FOCACCI   66 MMS  -

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REFERENCES FOR PI(1640)


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FORINO    65 PL 19 68            +GESSAROLI+LENDINARA+/BOL+BARI+FIR+ORS+SAC
ABC COLL 66 COMM.TO T. FERBEL FOR AUTHORS SEE PL 19 608(65)AACHEN,BERLIN,CERN
BALTAY C 66 COMM.TO T. FERBEL +YEH,FRANZINI,KUNG,PLANO,RAVIN//COL.RUTGER
DEUTSCHM 66 PL 20 82           DEUTSCHMANN,STEINBERG + / AACH+BERLIN+CERN
   ALSO CERN/PH.67-4           D.R.O.MORRISON ////////////////////////// CERN
FERBEL    66  BERKELEY CONF.   SEE G. GOLDHABER, REVIEW ON MESONS /// LRL
   ALSO PRIVATE COMM. FROM T. FERBEL
FOCACCI   66 PL   17  690      CERN MISSING MASS SPECTROMETER GROUP//CERN
LEVRAT    66 PL   22  714      CERN MISSING MASS SPECTROMETER GROUP//CERN
   ALSO SEGUINOT+ 66,  PL 19 712
LUBATTI   66  THESIS BERKELEY  H.J.LUBATTI ////////////////////////// LRL 1-2-
VETLITSK 66 PL   21   579      VETLITSKY,GUSZAVIN,KLIGER,ZOLGANOV+ //ITEP
ABC COLL 67  HEIDELBERG CONF. //////////AACHEN+BERLIN+CERN COLLABORATION
ARMENISE 67  HEIDELBERG CONF. +GHIDINI,FORINO+//BARI+BOLOGN+FIRENZ+ORSAY
CONTE     67  HEIDELBERG CONF. +TOMASINI+COROS+ //// GENOVA+HAMB+MIL+SACL
DANYSZ    67 NC 51 A 601       DANYSZ+FRENCH+SIMAK ////////////////// CERN
DUBAL     67 NP TO BE PUBL.    CERN MISSING MASS SPECTROMETER GROUP//CERN
LAMSA     67  PREPRINT         +CASON+BISWAS+DERADO+GROVES+ /// NOTREDAME
SLATTERY 67 NC 50A 377         +H.KRAYBILL, B.FORMAN, T.FERBEL//ROCH.YALE
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$\rho(1650)$

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            15  RHO (1650, JPG=  +) I=1

            ALSO KNOWN AS G MESON. (G=+1)
            FOR POSSIBLE 4 PI MODES SEE ETA(16CC) AND RHO(1700)

    *       FOR COMPILATION,SEE GOLDHABER,MESON REVIEW,
    *       PROC. 1966 BERKELEY CONFERENCE

            15  RHO (1650)  MASS (MEV)

M          1700.0    10C.0               BELLINI   65 HLBC    C
M          1620.0     20.0               DEUTSCHMA 65 HBC  +  8.C PI+ P
M          1640.0                        FORINO    65 DBC     C
M          1670.0     30.0               GOLDBERG  65 HBC     C
M       70 1700.                         CRENNELL  67 HBC     C 6.0 PI-P        3/67
M       50 1630.                         CRENNELL  67 HBC   -  6.0 PI-P         3/67
M   C      MOST OF DATA ABOVE COMPILED BY GOLDHABER
M   C  300 1650.0             COMP. BY GOLDHABER 66 RVUE  C 5-8 PI P, PI C
M   C   50 1650.0             COMP. BY GOLDHABER 66 RVUE +-  5-8 PI F, PI C
M          1691.0     31.0               ARMENISE  67 DBC     C 5.1 PI+C        9/67
M   R      1630.      15.                DUBAL     67 MMS   -  7-12 PI- P       7/67
M   R      R1 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.
M   R      NOTE THAT THE R1 HAS MUCH SMALLER WIDTH THAN THE OTHER ENTRIES.
M          1680.0     20.0               POIRIER   67 HBC     C 8.0 PI- P      11/67
M          . . . . . . . . . .
M   AVG    1659.6372  16.7549   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
                    (SEE IDEOGRAM)

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            15  RHO (1650)  WIDTH (MEV)

W   A   13  80.0      40.0               DEUTSCHMA 65 HBC  +
W   A       SUPERSEDED BY ABC COLL.67 BELOW
W           40.0                         FORINO    65 DBC     C.
W           180.0     40.0               GOLDBERG  65 HBC     C
W   C  350  150.0     50.0   COMP. BY GOLDHABER 66 RVUE +-C 5-8 PI F, PI C
W   R        21.    CR LESS              LEVRAT    66 MMS   -  7-12 PI- P       7/67
W   R       R1 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.
W       70  200.                         CRENNELL  67 HBC     C 6.0 PI-P        3/67
W       5C  100.                         CRENNELL  67 HBC   -  6.0 PI-F         3/67
W           115.0     4C.0               ABC COLL. 67 HBC  +   8.0 PI+ P       10/67
W           184.0     39.0               ARMENISE  67 DBC     C 5.1 PI+C        9/67
W           226.0     68.0      46.0     POIRIER   67 HBC     C 8.0 PI- P      11/67
W           . . . . . . . . . .
W   AVG     169.2396  21.4086   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
                    (SEE IDEOGRAM)

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            15  RHO (1650)     PARTIAL DECAY MODES

P1          RHO (165C) INTO PI PI                       S 8S 8
P2          RHO (1650) INTO PI PI PI PI                 S 8S 8S 8S 8
P3          RHO (165C) INTO PI PI RHO                   S 8S 8U 9
P4          RHO (165C) INTO RHO RHO                     L 9U 9
P5          RHO (1650) INTO K KBAR                      S11S11
P6          RHO (165C) INTO OMEGA PI                    L 1S 8

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            15  RHO (1650)  BRANCHING RATIOS

R1  *       R1 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS
R1             0.37 /   C.59 /   0.04  FOCACCI   66 MMS  -

R3  *       RHO(1650) INTO (K KBAR) / (2 PI)               NUM     5
R3  *                                                      CEN 1
R3             INDICATION SEEN        EHRLICH   66 HBC  +-C 7.9 PI- P          3/67
R3             PROBABLY SEEN          ABRAMS    67 HBC    C 4.25 K- P          6/67
R3             0.10  CR LESS          CRENNEL   67 HBC                         4/67

R4  *       RHO(1650) INTO (OMEGA PI) / TOTAL              NUM      6
R4  *                                                      CEN 1234
R4             INDICATION SEEN        GOLDHABER 65 RVUE +-  3-4 PI+- P         7/67

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REFERENCES FOR RHO(1650)


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BELLINI  65 NC 40 A 946        BELLINI,DI CORATO,DUIMIO,FIORINI //MILANO
DEUTSCHM 65 PL 18 351          DEUTSCHMANN,SCHULTE + //AACHEN+BERLIN+CERN
FORINO   65 PL 19 65           FORINO,GESSAROLI +  //BOLOGNA+ORSAY+SACLAY
GOLDBERG 65 PL 17 354          GOLDBERG+/CERN+PARIS+ORSAY+MILANO+CEA-SACL
GOLDHABE 65 UCRL-16295         S. GOLDHABER ////////////////////////// LRL
    (SEE ALSO GOLDHABER 66)
EHRLICH  66 PR 152 1194        R. EHRLICH,W.SELOVE,H.YUTA // PENNSYLVANIA
FOCACCI  66 PL   17  89C       CERN MISSING MASS SPECTROMETER GROUP//CERN
GOLDHABE 66 BERKELEY CONF.     G.GOLDHABER, MESON REVIEW, P.101 ///// LRL
LEVRAT   66 PL   22  714       CERN MISSING MASS SPECTROMETER GROUP//CERN
   ALSO SEGUINOT+ 66,  PL 19 712
ABC COLL 67  HEIDELBERG CONF. //////////AACHEN+BERLIN+CERN COLLABORATION
ABRAMS   67 PRL 18 620         +KEHOE+GLASSER+SECHI-ZORN+WOLSKY/ MARYLAND
ARMENISE 67  HEIDELBERG CONF. +GHIDINI,FORINO+//BARI+BOLOGN+FIRENZ+ORSAY
CRENNELL 67 PRL 18 323         +HOUGH,KALBFLEISCH,LAI,BACHMAN+// BNL,CCNY I  P
    CRENNELL+SUGGEST JP=3- FROM THE PI PI SCATTERING ANGLE DISTRIBUTION
DUBAL    67 NP TO BE PUBL.     CERN MISSING MASS SPECTROMETER GROUP//CERN
POIRIER  67  PREPRINT          +BISWAS,CASON,DERADO,KENNEY+//NOTRDAM+PENN

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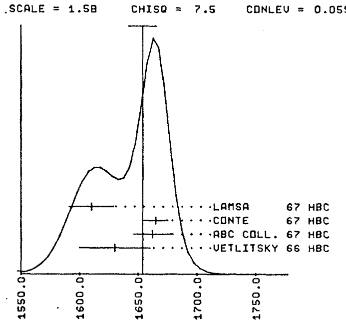
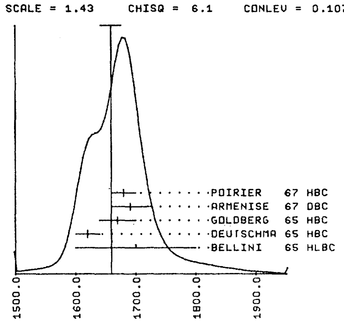
WEIGHTED AVERAGE = 1653.6 ± 11.8
SCALE = 1.58   CHISQ = 7.5   CONLEV = 0.059



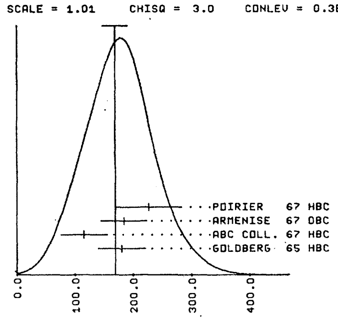
PI(1640) MASS (MEV)

WEIGHTED AVERAGE = 1659.6 ± 16.8
SCALE = 1.43   CHISQ = 6.1   CONLEV = 0.107



RHO (1650) MASS (MEV)

WEIGHTED AVERAGE = 169.2 ± 21.4
SCALE = 1.01   CHISQ = 3.0   CONLEV = 0.385



RHO (1650) WIDTH (MEV)

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

ρ, I≥1 (1715) → 4π, K*K̄

```
         92  RHO(1700,JPG=  +) I = 1 OR 2

    *       THIS ENTRY CONTAINS 4PI, RHO 2PI, 2RHO AND K*KBAR PEAKS, AND THE
    *       R2. IF (2RHO 0) MODE IS TRUE, AN I=C RESONANCE EXISTS AS WELL.

    *       SEE SKETCH ON MESON TABLE.

                 92  MASS (MEV)

M           1680.0   APPROX.          CONTE     66 HBC   -  11 PI- P       10/67
M           1720.0                    BALLAM    67 HBC   - 16 PI+-P,(4PI P) 10/67
M           1715.0      7.0           CLAYTON   67 HBC    CSEE NOTE R BELOW 10/67
M        80 1717.       7.            DANYSZ    67 HBC    CSEE NOTE R BELOW  5/67
M   R    SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND
M   M       1700.      15.            DUBAL     67 MMS   -  7-12 PI- P       7/67
M   M    R2 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.
M   K       1700.                     FRENCH    67 HBC    C 3,3.6 PBAR P     7/67
M   K    OBSERVED IN NEUTRAL(K* KBAR) MODE  (G-PARITY UNKNOWN)
M           . . . . . . . . . . .
M   AVG     1716.0000   4.9497   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                 92  WIDTH (MEV)

W            160.0   APPROX.          CONTE     66 HBC   -  11 PI- P       10/67
W   M         30.    CR LESS          LEVRAT    66 MMS   -  7-12 PI- P      7/67
W   M    R2 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.
W             58.0     14.0           CLAYTON   67 HBC    CSEE NOTE R BELOW 10/67
W        80   40.      12.            DANYSZ    67 HBC    CSEE NOTE R BELOW  5/67
W   R    SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND
W           . . . . . . . . . .
W   AVG       47.6235   9.1111   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                 92  RHO(1700) BRANCHING RATIOS

R1  *       R2 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS
R1            0.42 /  0.56 /   0.01  FOCACCI   66 MMS

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REFERENCES FOR RHO(1700)


```
CONTE    66 PL 22 702          +TOMASINI+DITTMANN+/GENOVA+HAMB+MIL+SACLAY
FOCACCI  66 PL   17  890       CERN MISSING MASS SPECTROMETER GROUP//CERN
LEVRAT   66 PL  22  714        CERN MISSING MASS SPECTROMETER GROUP//CERN
  ALSO SEGLINOT+ 66,  PL 19 712
BALLAM   67  HEIDELBERG CONF. +BRODY,CHADWICK,FRIES,GUIRAGOSSIAN+// SLAC
CLAYTON  67  HEIDELBERG CONF. +MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
DANYSZ   67 PL 24B 309         +FRENCH+KINSON+SIMAK+ ///// CERN+LIVERPOOL
DUBAL    67 NP TO BE PUBL.     +FOCACCI+KIENZLE+LECHANOINE+LEVRAT+ / CERN
FRENCH   67  CERN/TC/PH.66-31 +KINSON+MCDONALD+RICCIFORD+ //// CERN+BIRM
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R3(1750)

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         93  R3(1750) I=1,2

      NOT YET A FIRMLY ESTABLISHED RESONANCE - OMITTED FROM TABLE

                 93  R3(1750) MASS(MEV)

M           1748.      16.            DUBAL     67 MMS   -  7-12 PI- P       7/67
M   F       1740.                     FRENCH    67 HBC  (KC K+-) 3-4 PBAR P  7/67
M   F       SEE FIG. 9

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                 93  R3(1750) WIDTH (MEV)

W             38.    CR LESS          LEVRAT    66 MMS   -  7-12 PI- P       7/67

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                 93  R3 BRANCHING RATIOS

R3  *       R3 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS
R3  C         0.14 /   0.80 /   0.05  FOCACCI   66 MMS   -
R3  C    FRACTION INTO ONE CHARGED PROB.LARGER THAN GIVEN ABOVE. CF.DUBAL+67

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REFERENCES FOR R3(1750)


```
FOCACCI  66 PL   17  890       CERN MISSING MASS SPECTROMETER GROUP//CERN
LEVRAT   66 PL  22  714        CERN MISSING MASS SPECTROMETER GROUP//CERN
  ALSO SEGLINOT+ 66,  PL 19 712
DUBAL    67 NP TO BE PUBL.     CERN MISSING MASS SPECTROMETER GROUP//CERN
FRENCH   67  CERN/TC/PH.66-31 +KINSON+MCDONALD+RICCIFORD+ //// CERN+BIRM
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ηA, I≥0 (1830) → 4π, K*K̄

```
         ETA(1830) G=+1  (JPG=A +)  I = C  CR GREATER

    *            MAY BE NEUTRAL COMPONENT CF R4(1830)  (I=1 CR 2)

    *            SEE SKETCH ON MESON TABLE

                 94 MASS (MEV)

M           1822.0     12.0           CLAYTON   67 HBC    CSEE NOTE R BELOW 10/67
M       110 1832.       6.            DANYSZ    67 HBC    CSEE NOTE R BELOW  5/67
M   R    SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND
M           1820.      12.            FRENCH    67 HBC    CSEE NOTE K BELOW  7/67
M   K    SEEN IN 3.-3.6 PBAR P TC (KS KO PIO...). G PARITY UNKNOWN
M           . . . . . . . . . .
M   AVG     1828.3333   4.8990   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                 94 WIDTH (MEV)

W             60.0     34.0           CLAYTON   67 HBC    CSEE NOTE R BELOW 10/67
W       110   42.      11.            DANYSZ    67 HBC    CSEE NOTE R BELOW  5/67
W   R    SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND
W             50.      23.            FRENCH    67 HBC    CSEE NOTE K BELOW  7/67
W   K    SEEN IN 3.-3.6 PBAR P TC (KS KO PIO...). G PARITY UNKNOWN
W           . . . . . . . . . .
W   AVG       44.7853   9.5260   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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REFERENCES FOR ETA(1830)


```
CLAYTON  67  HEIDELBERG CONF. +MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
DANYSZ   67 PL 24B 309         +FRENCH+KINSON+SIMAK+ ///// CERN+LIVERPOOL
FRENCH   67  CERN/TC/PH.66-31 +KINSON+MCDONALD+RICCIFORD+ //// CERN+BIRM
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φA, I≥0 (1830)

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         PHI(1830) G=-1  (JPG=A,-)  I = C  CR GREATER

    *            MAY BE NEUTRAL COMPONENT CF R4(1830)  (I=1 CR 2)
    *            I=1 IF (OMEGA RHO) MODE EXISTS.

    *            SEE SKETCH ON MESON TABLE

                 95  MASS (MEV)

M   C       1848.      11.            DANYSZ    67 HBC    C 3,3.6 PBAR P     7/67
M   C    OBSERVED IN (OMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE
M   K       1820.      12.            FRENCH    67 HBC    C 3,3.6 PBAR P     7/67
M   K    OBSERVED IN (KS KO PIO...) MODE  (G-PARITY UNKNOWN)

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                 95  WIDTH (MEV)

W   C         67.      27.            DANYSZ    67 HBC    C 3,3.6 PBAR P     7/67
W   C    OBSERVED IN (OMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE
W   K         50.      20.            FRENCH    67 HBC    C 3-4 PBAR P       7/67
W   K    OBSERVED IN (KS KO PIO...) MODE (G PARITY UNKNOWN)

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REFERENCES FOR PHI(1830)


```
DANYSZ   67 NC 51A 801         DANYSZ+FRENCH+SIMAK ///////////////// CERN
FRENCH   67  CERN/TC/PH.66-31 +KINSON+MCDONALD+RICCIFORD+ //// CERN+BIRM
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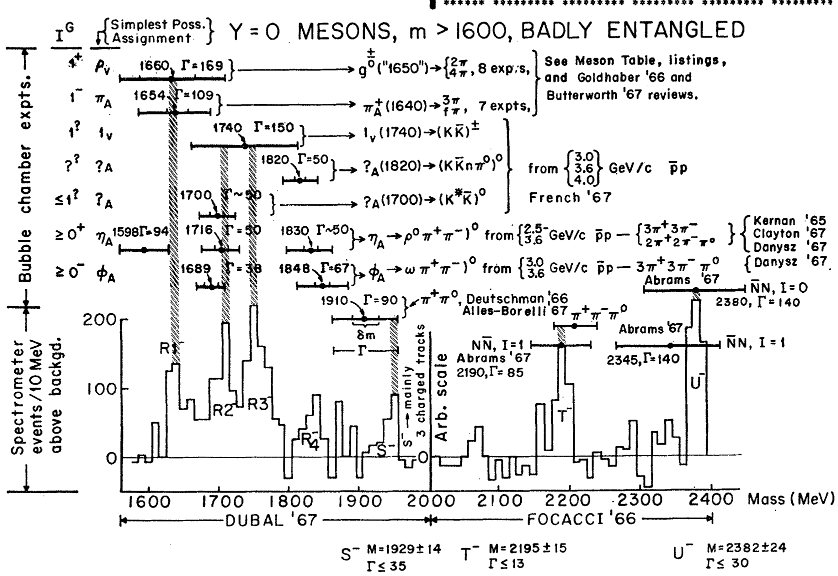

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

R4(1830)

```
98 R4(1830) I=1,2

*  NOT YET A FIRMLY ESTABLISHEC RESONANCE.
*  MAY BE CHARGEC COUNTERPART CF ETA(183C) ANC/OR PHI(1830).

*                 SEE SKETCH CN MESCN TABLE

                  98 R4(1830) MASS(MEV)

M        1830.     15.             DUBAL     67 MMS   -  7-12 PI- P       7/67
------ --------- --------- --------- --------- --------- --------- ---------

                  98 R4(1830) WICTH (MEV)

W  *  CBSERVED WIDTH SIMILAR TC EXPERIMENTAL RESOLUTICN (30 MEV).
****** ********* ********* ********* ********* ********* ********* *********

                        REFERENCES FOR R4(183C)

DUBAL    67 NP TO BE PUBL.    CERN MISSING MASS SPECTRCMETER GROUP//CERN

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S(1930)

```
31 S(1930, JP=  , I GTE 1) 3 CHARGEC CECAY TRACKS

                31  S (1930)  MASS (MEV)

M   A   15 1910.0     20.0           DEUTSCHMA 65 HBC  +
M   A  SUPERSEDED BY ABC COLL.67 BELOW
M          1929.0     14.0           CHIKOVANI 66 MMSP  -
M          1900.0     45.0           ABC COLL. 67 HBC  +   8.0 PI+ P        1C/67
M          . . . . . . . . . .
M   AVG    1926.4408  13.3680   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

M   *  PROBABLY THESE TWO ARE NCT THE SAME RESCNANCE SINCE (A) MMS HAS LESS
M   *  THAN 2C PERCENT OF DECAYS WITH 1 CHARGEC TRACK, WHEREAS HBC SEES DE-
M   *  CAY INTO (PI+ PIO), (B) THE WICTHS ARE INCCMPATIBLE.
------ --------- --------- --------- --------- --------- --------- ---------

                31  S (1930) WICTH (MEV)

W   A   15   90.0     40.0           DEUTSCHMA 65 HBC  +
W   A  SUPERSEDED BY ABC COLL.67 BELOW
W           35.0   CR LESS           CHIKOVANI 66 MMSP  -
W          220.0     10.0            ABC COLL. 67 HBC  +   8.0 PI+ P        1C/67
------ --------- --------- --------- --------- --------- --------- ---------

                31 D(SIGMA)/D(T) ( MICROBARNS/(GEV/C)**2 )

CS          35.0     12.0            FOCACCI   66 MMS  .22 LTE T LTE .36
****** ********* ********* ********* ********* ********* ********* *********

                        REFERENCES FOR S(193C)

DEUTSCHM 65 PL 18 351          +SCHULTE+STEINBERG+ ///// AACH+BERLIN+CERN G=+
CHIKCVAN 66 PL  22  233        CERN MISSING MASS SPECTRCMETER GROUP//CERN
FOCACCI  66 PRL  17  89C       CERN MISSING MASS SPECTRCMETER GROUP//CERN
ABC COLL 67  HEIDELBERG CCNF.  //////////AACHEN+BERLIN+CERN COLLABCRATION
MORRISCN 67  CERN/PH.67-4      C.R.O.MCRRISCN ///////////////////////CERN G=+

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T(2195)

```
32 T(2200, JP=  , I GTE 1) 3 CHARGEC CECAY TRACKS

                32 T(2200)  MASS (MEV)

M          2195.0     15.0           CHIKOVANI 66 MMSP  -
M   B      2190.       5.            ABRAMS.   67 CNTR    S CHANNEL NBAR N  7/67
M   B   SEEN AS BUMP IN I=1 STATE. WICTH MUCH LARGER THAN IN THE MMSP EXPT.
M          2207.      13.            ALLES-BCR 67 HBC    C 5.7 PBAR P      12/66
M   A   ALLES-BORELLI 67 SEE NEUTRAL MODE CNLY (PI+PI-PIC)
M          2160.0      9.C           CLAYTON   67 HBC  +- 2.5PBAR,A2+OMEGA 1C/67
M          . . . . . . . . . .
M   AVG    2179.0579\ 15.0111   AVERAGE (ERROR INCLUDES SCALE FACTCR = 2.3)
------ --------- --------- --------- --------- --------- --------- ---------

                32 T(22C0) WICTH (MEV)

W           13.0   CR LESS           CHIKOVANI 66 MMSP  -
W   B       85.                      ABRAMS    67 CNTR    S CHANNEL NBAR N  7/67
W   B   SEEN AS BUMP IN I=1 STATE. WICTH MUCH LARGER THAN IN THE MMSP EXPT.
W           62.      52.             ALLES-BCR 67 HBC    C 5.7 PBAR P      12/66
W           66.0     26.C            CLAYTON   67 HBC  +- 2.5PBAR,A2+OMEGA 1C/67
W          . . . . . . . . . .
W   AVG     65.2000  23.2551    AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
------ --------- --------- --------- --------- --------- --------- ---------

                32 C(SIGMA)/D(T) ( MICROBARNS/(GEV/C)**2 )

CS          29.0     1C.C            FCCACCI   66 MMS  .22 LTE T LTE .36
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                32 SIGMA (MB) FCR FORMATICN BY NUCLECN ANTINUCLEON

CS           6.                      ABRAMS    67 CNTR                      7/67
****** ********* ********* ********* ********* ********* ********* *********

                        REFERENCES FOR T(220C)

CHIKCVAN 66 PL  22  233        CERN MISSING MASS SPECTRCMETER GROUP//CERN
FOCACCI  66 PRL  17  890       CERN MISSING MASS SPECTRCMETER GROUP//CERN
ABRAMS   67 PRL 18 12C9        +COOL+GIACOMELLI+KYCIA+LECNTIC+LI+ /// BNL
ALLES-BC 67 NC 50 A 776        ALLES-BCRELLI,FRENCH,FRISK,+ /// CERN+BONN G=-
CLAYTON  67  HEIDELBERG CONF.  +MASON,MUIRHEAD,FILIPPAS+// LIVPCOL+AJHENS
MORRISCN 67  CERN/PH.67-4      C.R.O.MCRRISCN ///////////////////////CERN G=+

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$N\bar{N}_{I=0}$(2380)

```
N NBAR (2380) (I=0)

                EVICENCE FCR RESONANT STATE NOT YET CCMPELLING.
                CMITTED FROM TABLE.

                99 MASS

M        2380.     10.             ABRAMS    67 CNTR    S CHANNEL NBAR N  7/67
------ --------- --------- --------- --------- --------- --------- ---------

                99 WIDTH
W        140.                      ABRAMS    67 CNTR    S CHANNEL NBAR N  7/67
------ --------- --------- --------- --------- --------- --------- ---------

                99 SIGMA (MB) FCR FCRMATICN BY NUCLECN ANTINUCLEON

CS  *      2.                      ABRAMS    67 CNTR                      7/67
****** ********* ********* ********* ********* ********* ********* *********

                        REFERENCES FOR N NBAR (238C)

ABRAMS   67 PRL 18 1209        +COCL+GIACOMELLI+KYCIA+LECNTIC+LI+ /// BNL

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U(2380)

```
33 U(2380, JP=  , I GTE 1) 1,3,5  CHARGED TRACKS

                33 U(2380)  MASS (MEV)

M          2382.0     24.0           CHIKOVANI 66 MMSP  -
M   B      2345.      1C.            ABRAMS    67 CNTR    S CHANNEL NBAR N  7/67
M.  B   SEEN AS BUMP IN I=1 STATE. WICTH MUCH LARGER THAN IN THE MMSP EXPT.
M          2324.0                    CLAYTON   67 HBC  +- 2.5PBAR,A2+OMEGA 1C/67
------ --------- --------- --------- --------- --------- --------- ---------

                33 U(2380) WICTH (MEV)

W           30.0   OR LESS           CHIKCVANI 66 MMSP  -
W   B      140.                      ABRAMS    67 CNTR    S CHANNEL PBAR N  7/67
W   B   SEEN AS BUMP IN I=1 STATE. WICTH MUCH LARGER THAN IN THE MMSP EXPT.
W           18.0     24.0            CLAYTON   67 HBC  +- 2.5PBAR,A2+OMEGA 10/67
------ --------- --------- --------- --------- --------- --------- ---------

                33 D(SIGMA)/D(T) ( MICROBARNS/(GEV/C)**2 )

CS          42.0     14.0            FCCACCI   66 MMS  .28 LTE T LTE .36
------ --------- --------- --------- --------- --------- --------- ---------

                33 SIGMA (MB) FCR FCRMATICN BY NUCLECN ANTINUCLEON

CS  *       3.                       ABRAMS    67 CNTR                      7/67
------ --------- --------- --------- --------- --------- --------- ---------

                33  U MESON BRANCHING RATICS

R1  *     U- MESCN FRACTION INTO ONE / THREE / FIVE OR MCRE CHARGEC TRACKS
R1           0.30 /   C.45 /   0.25  FCCACCI   66 MMS  -
****** ********* ********* ********* ********* ********* ********* *********

                        REFERENCES FCR U(238C)

CHIKCVAN 66 PL  22  233        CERN MISSING MASS SPECTRCMETER GROUP//CERN
FOCACCI  66 PRL  17  89C       CERN MISSING MASS SPECTRCMETER GROUP//CERN
ABRAMS   67 PRL 18 1209        +COOL+GIACOMELLI+KYCIA+LECNTIC+LI+ /// BNL
CLAYTON  67  HEIDELBERG CONF.  +MASON,MUIRHEAD,FILIPPAS+// LIVPCOL+ATHENS
MORRISCN 67  CERN/PH.67-4      C.R.O.MCRRISCN ///////////////////////CERN G=+

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$K^{\pm}$

```
1C  CHARGED K   (494, JP=C- )   I=1/2
SEE LISTINGS CF STABLE PARTICLES

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K^{0}

```
11  NEUTRAL K   (498,JP=0- )   I=1/2
SEE LISTINGS OF STABLE PARTICLES

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K(725)

```
17  KAPPA (725,JP=  )   I=1/2

EVICENCE NOT COMPELLING. CMITTED FRCM TABLE.
FOR A COMPILATICN, SEE APPENDIX A CF JAN 67 EDITION
(RMP 39, 1) OF THIS DATA SUMMARY.

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K^{*}(892)

```
18  K*  (89C,JP =1- )  I=1/2

                18  K* (890) MASS (MEV)

M          898.0     5.0          CHADWICK  63 HBC  +
M          891.0     3.0          FERRO-LUZ 65 HBC  +
M          895.      3.           BCMSE     67 HBC  +  2.3 K+P              7/67
M          891.      2.           DE BAERE  67 HBC  +  3.5 K+P (KO PI+)     7/67
M          892.5     2.5          DE BAERE  67 HBC  +  3.5 K+P (K+ PIC)     7/67
M          892.      4.           GCSHAW    67 HBC  +  3.5 K+ P             7/67
M          898.      4.           SALLSTRCM 67 HBC  +  3. K+ P (KO PI+)     7/67
M          883.      5.           SALLSTRCM 67 HBC  +  3. K+ P (K+ PIC)     7/67
M          890.      2.           BARLOW    67 HBC  +-  1.2 PBAR P         11/66
M          889.      3.           BARLOW    67 HBC  +-  1.2 PBAR P         11/66
M          896.0     5.0          CCNFCRTC  67 HBC  +-  0. PBAR P           9/67
M     3870 891.0     1.C          WCJCICKI1 64 HBC  -
M          895.0     3.C          GELSEMA   65 HBC  -
M          896.0     3.0          ABCLV CCL 67 HBC     10.1 K- P           10/67
M          891.      4.           FICENEC   67 HBC  -  1.3 K-P (K-PIC)      9/67
M          887.      3.           FICENEC   67 HBC  -  1.3 K-P (KOPI-)      9/67
M          896.0     4.0          SCHWEINGR 67 HBC  -  4.1 K-P              9/67
M          892.0     2.0          SCHWEINGR 67 HBC  -  5.5 K-P              9/67
M          . . . . . . . . . . .
M   AVG    891.6754   .6041   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
                  (SEE IDEOGRAM)

M      2C0 880.0                  ALEXANDER 62 HBC  + C
M          895.0     2.0          FERRCLUZZ 65 HBC  + C
M          895.0                  WANGLER   65 HBC  + C 3.0 PI- P
M          894.      5.           FRENCH    67 HBC  +-C 3-4 PBAR P          6/67
M          . . . . . . . . . . .
M   AVG    894.8621  1.8570   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
```

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

```
M       70  897.0      10.0              COLLEY     62 HBC    C
M      2C0  892.0       2.0              KRAEMER    63 HBC    C
M      150  885.0                        SMITH      63 HBC    C
M           889.5       2.5              ACELMAN    65 HBC
M      160  891.        5.               CRENNELL   66 HBC    C 6.0 PI-P
M           899.        4.               BARLOW     67 HBC    C 1.2 PBAR P      11/66
M           897.        4.               BARLOW     67 HBC    C 1.2 PBAR P      11/66
M           889.0       5.C              CONFORTC   67 HBC    C 0. PBAR P        9/67
M           894.7       1.3              DAUBER     67 HBC    C  2.0 K- P       12/66
M           895.        2.               FICENEC    67 HBC    C 1.3 K-P (K-PI+)  9/67
M           892.0       4.0              GEORGE     67 HBC    C 5.0 K+ P        11/67
M           896.0       4.0              SCHWEINGR  67 HBC    C 4.1 K-P          9/67
M           903.0       4.0              SCHWEINGR  67 HBC    C 5.5 K-P          9/67
M            . . . . . . . . . .
M    AVG    894.131C    .9136   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
                  (SEE IDEOGRAM)

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                  18  K*(0) - K*(+) MASS DIFF. (MEV)

D             6.3       4.1              BARASH     67 HBC      0 PBAR P         8/67

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                  18  K* (890) WIDTH (MEV)

W            46.0       8.0              CHADWICK   63 HBC   +
W            47.0       4.0              FERRO-LUZ  65 HBC   +
W            50.        5.               BOMSE      67 HBC   +  2.3 K+P           7/67
W            56.        4.5              DE BAERE   67 HBC   +  3.5 K+P (KC PI+)  7/67
W            53.        8.               DE BAERE   67 HBC   +  3.5 K+P (K+ PIC)  7/67
W            27.       12.         9.    GOSHAW     67 HBC   +  3.5 K+ P          7/67
W            66.       10.               SALLSTROM  67 HBC   +  3. K+ P (KC PI+)  7/67
W            47.       10.               SALLSTROM  67 HBC   +  3. K+ P (K+ PIC)  7/67
W     3870   46.0       3.0              WOJCICKI1  64 HBC   -
W            50.0      15.0              GELSEMA    65 HBC  .-
W            45.0       7.0              ABCLV CCL  67 HBC      10.1 K- P        10/67
W            58.       16.               FICENEC    67 HBC   -  1.3 K-P (K-PIC)   9/67
W            44.       13.               FICENEC    67 HBC   -  1.3 K-P (KOPI-)   9/67
W            41.0       8.0              SCHWEINGR  67 HBC   -  4.1 K-P           9/67
W            47.0       4.0              SCHWEINGR  67 HBC   -  5.5 K-P           9/67
W            44.        7.               BARLOW     67 HBC   +- .1.2 PBAR P      11/66
W            43.        9.               BARLOW     67 HBC   +- 1.2 PBAR P       11/66
W            53.        7.               BARLOW     67 HBC   +-  1.2 PBAR P      11/66
W            43.                         CONFORTO   67 HBC   +-  0. PBAR P        9/67
W      2C0   60.0       5.0              ALEXANDER  62 HBC   + C
W            51.8       3.5              FERROLUZZ  65 HBC   + C
W            40.0                        WANGLER    65 HBC   + C 3.0 PI- P
W            60.       10.               FRENCH     67 HBC   +-C 3-4 PBAR P       6/67
W       70   60.0      10.0              COLLEY     62 HBC     C
W      2C0.  50.0       5.0              KRAEMER    63 HBC     C
W      15C   50.0                        SMITH      63 HBC     C
W            51.0       3.0              ADELMAN    65 HBC
W      160   49.        6.               CRENNELL   66 HBC     C 6.0 PI-P
W            53.       13.               BARLOW     67 HBC     C 1.2 PBAR P      11/66
W            34.        8.               BARLOW     67 HBC     C 1.2 PBAR P      11/66
W            43.                         CONFORTO   67 HBC     C 0. PBAR P        9/67
W            44.        4.               DAUBER     67 HBC     0  2.0 K- P       12/66
W            52.       12.               FICENEC    67 HBC     0 1.3 K-P (K-PI+)  9/67
W            51.0      11.0              SCHWEINGR  67 HBC     C 5.5 K-P          9/67
W            53.0      11.0              SCHWEINGR  67 HBC     C 4.1 K-P          9/67
W            . . . . . . . . . .
W    AVG     49.2129    1.0441  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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                  18  K* (890) PARTIAL DECAY MODES

P1     K* INTO K PI                                         S1CS 8
P2     K*(890) INTO (K PI PI)                               S10S 8S 8

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                  18  K* (890) BRANCHING RATIOS

R1  *  K*(890) INTO (K PI PI)/(K PI)                     (P2)/(P1)
R1        0    0.002 OR LESS            WOJCICKI2 64 HBC   -

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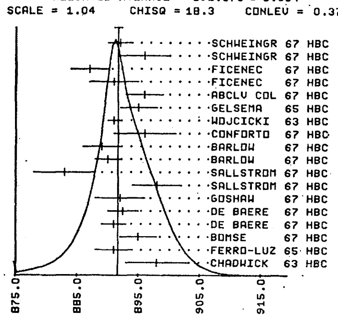
REFERENCES FOR K*


```
ALSTON    61 PRL 6 30C            ALSTON,ALVAREZ,EBERHARD,GOOD,GRAZIANO+/LRL
ALEXANDE  62 PRL 8 447            ALEXANDER,KALBFLEISCH,MILLER,G SMITH //LRL
COLLEY    62 CERN CONF 315        D COLLEY,N GELFAND + //// COLUMBIA+RUTGERS

CHADWICK  63 PL 6 309             CHADWICK,CRENNELL,DAVIES,BETTINI+/OXF+PADU
GOLDHABE  63 ATHENS CONF 92       SULAMITH GOLDHABER /////////////////// LRL
KRAEMER   63 ATHENS CONF 130      R KRAEMER L MADANSKY + ////  JOHNS HOPKINS
SMITH     63 PRL 1C 138           SMITH,SCHWARTZ,MILLER,KALBFLEISCH,HUF+/LRL

WOJCICK1  64 PR 135 B 484         STANLEY G WOJCICKI /////////////////// LRL
WOJCICK2  64 PR 135 B 495         S WOJCICKI,M ALSTON,G KALBFLEISCH //// LRL

ADELMAN   65 ATHENS 527           STUART LEE ADELMAN            // CAVENDISH
FERROLUZ  65 NC 36 11C1           FERRO-LUZZI,GEORGE,HENRI,JONGEJANS // CERN
FERROLUZ  65 NC 39 417            FERRO-LUZZI,GEORGE,GOLDSCHMIDT-CLER+//CERN
GELSEMA   65  THESIS              E.S.GELSEMA (SEE ALSO PL 1C 341) / AMSTERD
WANGLER   65 PR 137 B 414         WANGLER,ERWIN,WALKER /////////// WISCONSIN

CRENNELL  66  BERKELEY CONF       +KALBFLEISCH,LAI,SCARR,SCHUMANN+////// BNL
```


WEIGHTED AVERAGE = 891.675 ± 0.604
SCALE = 1.04   CHISQ = 18.3   CONLEV = 0.371



CHARGED K*(890) MASS (MEV)


```
ABCLV CC 67  HEIDELBERG CONF.  AACHEN+BERLIN+CERN+LONDON IC+VIENNA COLLAB
BARASH   67 PR  156  1399      BARASH,KIRSCH,MILLER,TAN /////////COLUMBIA
BARLOW   67 NC  50 A  701      +MONTANET,D-ANDLAU+/CERN+CDF+IDR+LIVERPOOL
BOMSE    67 PR 158 1298        +BORENSTEIN+COLE+GILLESPIE+ / JOHN HOPKINS
CONFORTC 67  PREPRINT TO NP    +MARECHAL,MONTANET+//CERN+CF+IPN+LIVERPOOL
DAUBER   67 PR 153 1403        +SCHLEIN,SLATER,TICHO //////////////// UCLA
DE BAERE 67 NC 51 A 401        +GOLDSCHMIDT-CLERMONT,HENRI+ /// BRUX+CERN
FICENEC  67  PREPRINT          +HULSIZER+SWANSON+TROWER ////////// URBANA
FRENCH   67  CERN/TC/PH.66-31  +KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
GEORGE   67 NC 49A 9           +GOLDSCHMIDT-CLERMONT+HENRI+ /// CERN+BRUX
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG ////////////// WISC
SALLSTRC 67 NC 49A 348         SALLSTROM+OTTER+EKSPONG //////// STOCKHOLM
SCHWEING 67  SUBMITTED TO PR   SCHWEINGRUBER,DERRICK,FIELDS,AMMAR+/ANL+NW
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$K_V(1080)$

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19  KV (108C)

                    VERY TENTATIVE EVIDENCE HAS BEEN FOUND BY
DEBAERE 67 NC 49A 374        +DEBAISIEUX+FAST+FILIPPAS+ ///// CERN+BRUX
                    OMITTED FROM TABLE.

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```

$K_{3/2}(1175)$

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24 KA 3/2 (1175,JP=  ) I = 3/2

                    EVIDENCE NOT YET COMPELLING, OMITTED FROM TABLE.
    *               FOR COMPILATIONS + NEG. EVIDENCE, SEE ROSENFELD, OXFORD
    *               1965 SUPPL., P 17.
    *         BARNHAM 67 AND GOSHAW 67 SEE DOUBLY CHARGED (K++PI+) MODE

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                    24 KA 3/2 (1175) MASS (MEV)

M    *   23 1175.0                     WANGLER   64 HBC
M    *   15 1160.0      10.0           MILLER    65 HBC
M    *      1180.0                     GOSHAW    67 HBC  ++  3.5 K+ P       11/67
M    B      1200.0                     BARNHAM   67 HBC  ++  10.0 K+P       11/67
M    B   SEEN IN (KO PI+ PI+) FROM SIX-BODY FINAL STATE WITH P PI- PIO      11/67

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                    24 KA 3/2 (1175) WIDTH (MEV)

W    *   23    25.0  OR LESS           WANGLER   64 HBC
W    *   15    35.0     10.0           MILLER    65 HBC
W    *         50.0  APPROX.           GOSHAW    67 HBC

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REFERENCES FOR KA3/2(1175)


```
WANGLER   64 PL 9 71            T P WANGLER,A R ERWIN,W D WALKER //WISCONS
MILLER    65 PL 15 74           MILLER,KOVACS,MCILWAIN,PALFREY +/// PURDUE
ROSENFEL  65 OXFORD CONF 56     A H ROSENFELD /////////////////// LRL--RVUE
BARNHAM   67  HEIDELBERG CONF   +BEANEY,HUGHES,BOWLER+ // BIRM+GLASGOW+OXF
GOSHAW    67  PREPRINT          +ERWIN+WALKER+WEINBERG ////////////// WISC
    ALSO  66 PRL  16  1069      BISHOP,GOSHAW,ERWIN,THOMPSON,WALKER+//WISC
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$K_{3/2}(1270)$

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25  KA3/2(1265,JP=     )  I=3/2

                    EVIDENCE NOT YET COMPELLING, OMITTED FROM TABLE
    *               FOR COMPILATIONS + NEG. EVIDENCE, SEE ROSENFELD, OXFORD
    *               1965 SUPPL., AND G. GOLDHABER, BERKELEY CONF. 1966.

                    KA3/2 (1265)  MASS (MEV)

M          1265.     10.               FRENCH    67 HBC  I=3/2  3-4 PBAR P    6/67

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                    KA3/2 (1265) WIDTH (MEV)

W           50.      20.               FRENCH    67 HBC  I=3/2  3-4 PBAR P    6/67

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                    KA3/2 (1265) PARTIAL DECAY MODES

P1          KA(127C) INTO K PI                                 S11S 9
P2          KA(127C) INTO K*(89C) PI                           L18S 9
P3          KA(127C) INTO K RHO                                S11U 9

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REFERENCES FOR K*3/2 (1265)


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ROSENFEL 65 OXFORD CONF 58     A H ROSENFELD /////////////////// LRL--RVUE
GOLDHABE 66  BERKELEY CONF     G.GOLDHABER,SAMIOS,ASTIER,SHEN,LAI.MESON REVIEW
FRENCH   67  CERN/TC/PH.66-31  +KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
SEE ALSO 64 PL 12 65           BOCK,FRENCH,KINSON,BADIER+//CERN+PAR+ LOND
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```
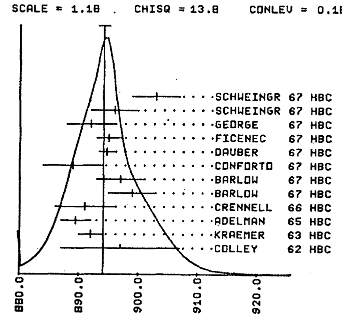

WEIGHTED AVERAGE = 894.131 ± 0.914
SCALE = 1.18 . CHISQ = 13.8   CONLEV = 0.182

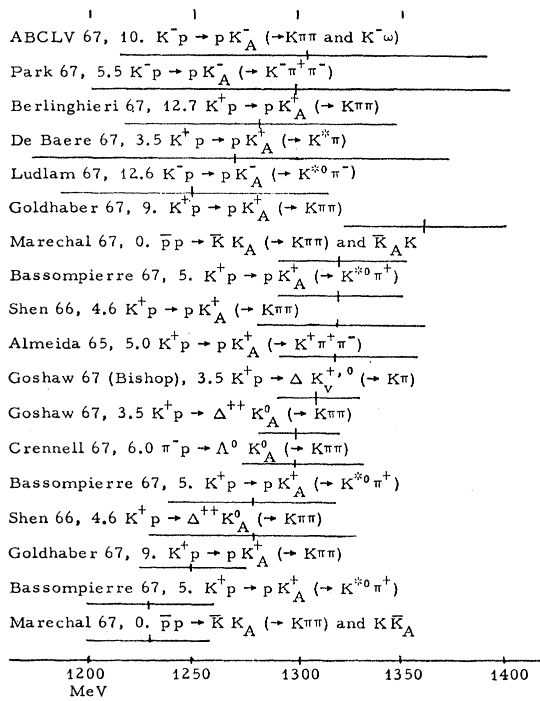


NEUTRAL K*(890) MASS (MEV)

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

```
THERE EXIST MANY PAPERS REPCRTING A BRCAD I=1/2 (K PI PI) ENHANCEMENT
IN THE MASS REGICN 1.2-1.5 GEV.  THE BUMP NEAR 1.4 GEV IS USUALLY
ASSCCIATED WITH THE WELL-ESTABLISHEC KV(1420), WHICH IS CLEARLY SEEN
IN (K PI) DECAY.  THE 1.2-1.4 GEV ENHANCEMENT IS PRCBABLY CUE TC SOME
COMBINATION OF CECK EFFECT ANC CNE, TWC, CR THREE REAL RESONANCES.
FOR CONVENIENCE CF PRESENTATICN, WE HAVE GRCUPEC THE CATA UNDER THE NAMES
OF THREE PARTICLES ANC ONE PSEUCO-PARTICLE, RESPECTIVELY KA(123C),
KA(1280), KA(132C), AND KA(12CC-135C).  UNCER THE LAST CATEGORY WE
HAVE LISTED ALL EXPERIMENTS THAT REPORT A BROAC PEAK, WITH A WICTH
GREATER THAN 10C MEV.  THE FOLLCWING FIGURE SHCWS THE MASSES ANC
WICTHS CF REPCRTEC PEAKS.
     NOTE THAT MARECHAL 67 SEES (K PI PI) PEAKS AT 123C AND 132C MEV
IN-ANTIPROTON ANNIHILATICN AT REST, AND CRENNELL 67 SEES A (K PI PI) PEAK
AT 130C MEV FCR PI- K INTC LAMBCA K PI PI.  NEITHER CF THESE PRCCESSES
ALLCWS A TRACITICNAL CECK EFFECT.
```

Reported Masses and Widths of
Kππ Resonances, 1230-1360 MeV



K_A (1200-1350) KA(12CC-135C) I=1/2

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                                SEE NOTE ABCVE

                      28  KA(1200-135C) MASS  (MEV)

M          1304.C      8.0             ABCLV CCL 67 HBC      10.0 K- P           1C/67
M          1270.                       BARNHAM   67 HBC  +  10. K+P(K PI PI) 11/67
M    B     1330.                       BARNHAM   67 HBC   C  1C.C K+ P           11/67
M    B   SEEN IN (KO PI+ PI-) FRCM SIX-BCDY FINAL STATE WITH P PI+ PIO           11/67
M       2CO 1280.      20.             BERLINGHI 67 HBC  +    12.7 K+ P            7/67
M    BERLINGHIERI VALUE IS FROM (K* PI) MODE. THE (K RHC) MASS PEAKS AT 132C,
M    AN EFFECT THAT THEY ATTRIBUTE TC KINEMATICS NEAR (K RHC) THRESHCLD.
M          1270.     APPROX.           CE BAERE  67 HBC  +  3.5 K+ P              7/67
M          1250.0     3C.C             LUDLAM    67 HBC     12.6 K-P              9/67
M          1300.0                      PARK      67 HBC      5.5 K- P            10/67
M          . . . . . . . . . .
M    AVG   1297.7617  1C.1088   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.4)
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                      28  KA(1200-135C) WIDTH (MEV)

W            176.0     33.C            ABCLV CCL 67 HBC      10.0 K- P           1C/67
W            170.                      BARNHAM   67 HBC  +  10. K+P(K PI PI) 11/67
W       2CO  130.      15.             BERLINGHI 67 HBC  +    12.7 K+ P            7/67
W            200.    APPROX.           DE BAERE  67 HBC  +  3.5 K+ P              7/67
W            130.0     2C.0            LUDLAM    67 HBC     12.6 K-P              9/67
W            200.0                     PARK      67 HBC      5.5 K- P            10/67
W.           . . . . . . . . . .
W    AVG.    135.6C58  11.2775  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
------ --------- --------- --------- --------- --------- --------- ---------

                      28  KA(1200-135C) PARTIAL CECAY MOCES

P1   *      KA(1200-1350) INTO K*(89C) PI                     L18SC8
P2   *      KA(120C-1350) INTC K RHO                          S11LC9
P3   *      KA(120C-1350) INTC K PI                           S11S08
P4   *      KA(1200-1350) INTC K ETA                          S11S14
P5   *      KA(1200-1350) INTO K OMEGA                        S11UC1
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                      28  KA(1200-135C) BRANCHING RATIOS

R1          KA(1200-1350) INTO K*(89C) PI AND K RHO (OVERLAPPING BANCS)
R1     2CO    1.0                       BERLINGHI 67 HBC  +                     7/67

R2          KA(1200-1350) INTC (K PI) / TOTAL
R2            0.02  CR LESS             BERLINGHI 67 HEC  +   12.7 K+ P        11/67

R3          KA(1200-1350) INTO (K ETA) / TOTAL
R3            0.02  CR LESS             BERLINGHI 67 HBC  +   12.7 K+ P        11/67

R4          KA(1200-1350) INTO (K CMEGA) / TOTAL
R4            INDICATION SEEN           ABCLV CC  67 HBC  -   1C   K- P        11/67
R4            0.02  CR LESS             BERLINGHI 67 HBC  +   12.7 K+ P        11/67

R5          KA(120C-1350) INTO (K RHC) / (K*(89C) PI)
R5            0.91      0.25            BERLINGHI 67 HBC  +   12.7 K+ P        11/67
R5   C        0.17      C.10     0.C7   CHIEN     67 HBC  +   7.3 K+ P         11/67
R5   C   INTERFERING BANCS TAKEN INTC ACCOUNT. NCT CORR.FCR PHASE SP. RATIC.

R6          KA(120C-1350) INTO (K PI) / (K*(89C) PI)
R6            0.21  CR LESS             DE BAERE  67 HBC                        11/66
****** ********* ********* ********* ********* ********* ********* *********
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REFERENCES FCR KA (1200-135C)


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ABCLV CC 67  HEIDELBERG CCNF. AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
SEE ALSC 66 PL 22 357         BARTSCH,CEUTSCHMANN,MORRISCN+ // ABCL(IC)V
BARNHAM  67  HEIDELBERG CCNF  +BEANEY,HUGHES,BCWLER+ // BIRM+GLASGCW+CXF
BERLINGH 67 PRL 18 1C67       BERLINGHIERI+FARBER+FERBEL+FCRMAN+ // RCCH IJP
CHIEN    67  PREPRINT TC PRL  +CALBER+MALAMUD+MELLEMA+SCHLEIN+ //// UCLA  JP
DE BAERE 67 NC 49A 374        +CEBAISIEUX+FAST+FILIPPAS+ ///// CERN+BRUX
   AND PRIVATE COMMUNICATION BY B. JCNGEJANS
LUDLAM   67  HEIDELBERG CONF. +LACH,SANCWEISS,TAFT               //  YALE
PARK     67  HEIDELBERG CCNF  +KIM,CHANCLER,WANGLER,AMMAR+ // ILL+ANL+NW
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K_A (1230) 2C KA (123C,JP=) I=1/2

```
                  FORMERLY CALLEC C MESON
                  (JP = 1+ FAVOREC)

                  SEE NCTE PRECEDING KA(120C-135C)

                  2C  KA (123C)  MASS (MEV)

M          1230.0     15.0          BASSCMPIE 67 HBC  +   5. K+ P           11/67
M          1230.0                   BRITISH   67 HBC  +  10.0 K+ P          1C/67
M          1250.0     1C.0          GCLCHABER 67 HBC      9.0 K+ P          1C/67
M          1230.0     15.0          MARECHAL  67 HBC  +-C 0. PBAR P          9/67
M          . . . . . . . . . .
M    AVG   1240.5E62  7.2761   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
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                  2C  KA (123C) WIDTH (MEV)

W            60.0     20.0          BASSCMPIE 67 HBC  +   5. K+ P           11/67
W            50.0     20.C          GCLCHABER 67 HBC      9.0 K+ P          10/67
W            60.0                   MARECHAL  67 HBC  +-C 0. PBAR P          9/67
W          . . . . . . . . . .
W    AVG    55.0000  14.1421   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
------ --------- --------- --------- --------- --------- --------- ---------

                  2C  KA (123C) PARTIAL CECAY MODES

P1       KC INTO K RHC                                    S1CU 9
P2       KC INTO K* PI                                    L18S 8
P3       KC INTO K PI PI                                  S11S 8S 8
------ --------- --------- --------- --------- --------- --------- ---------

                  2C  KA (123C) BRANCHING RATIOS

R1   *   KA(1230) INTC (K RHC)/TCTAL  (UNITS OF 10**-2)  (P1)/TOTAL
R1           75.0     10.0          ARMENTERC 64 HBC

R2   *   KA(1230) INTC (K* PI)/TCTAL  (UNITS OF 10**-2)  (P2)/TOTAL
R2           25.0     10.0          ARMENTERC 64 HBC
****** ********* ********* ********* ********* ********* ********* *********
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REFERENCES FCR KA (1230)


```
ARMENTER 64 DUBNA CONF 1 577  ARMENTEROS,EDWARCS,D ANDLAL +//// CERN+CDF
                        SEE ALSO PL 9, 2C7
    ALSC    DUBNA CCNF 1 617  R ARMENTEROS (RAPPORTEUR)
SEE ALSC 66 PR  145  1095     BARASH,KIRSCH,MILLER,TAN        // COLUMBIA

BASSCMPI 67  PREPRINT TC PL   BASSOMPIERRE,GOLCSCHMIDT+ //CERN+BRUX+BIRM IJP
BRITISH  67  HEIDELBERG CCNF                // BIRMINGHAM+GLASGOW+CXFCRC
GOLCHABER67 PRL 19  972       G.GOLCHABER,FIRESTONE,SHEN           // LRL
MARECHAL 67  HEIDELBERG CCNF. +BARLCW,F.JAMES+//CERN+CCF+IPN.PARIS+LPGOL
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K_A (1280) 26 KA(1280,JP=) I=1/2

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                  SEE NOTE PRECEDING KA(120C-1350)

                  26  KA(1280) MASS  (MEV)

M          35 1280.0     10.C           BASSCMPIE 67 HBC  +   5. K+ P           11/67
M     N    45 1300.                     CRENNELL  67 HBC    C 6 PI- P            7/67
M     N       1300.      10.            GCSHAW    67 HBC    C 3.5 K+ P           7/67
M     N    THESE PEAKS MAY BETTER BE ASSOCIATEC WITH THE KA(1320).
M     S       1280.0                    SHEN      66 HBC  + C 4.6 K+P           11/67
M     S    SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATEC WITH KA(1320).
M     G       1250.0     10.C           GCLCHABER 67 HBC      9.0 K+ P          10/67
M     G    THIS PEAK MAY BETTER BE ASSCCIATEC WITH THE KA(123C).
M     B       1310.      10.            GCSHAW    67 HBC  + C 3.5 K+ P (K PI) 11/67
M     B    SEEN IN (K PI) MODE OF 4-BCDY FINAL STATE, FROM WCRK OF BISHCP.
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                  26  KA(128C) WICTH (MEV)

W          35   80.C     20.0           BASSOMPIE 67 HBC  +   5. K+ P           11/67
W     N    45   60.                     CRENNELL  67 HBC    C 6 PI- P            7/67
W     N         40.      15.            GOSHAW    67 HBC    C 3.5 K+ P           7/67
W     N    THESE PEAKS MAY BETTER BE ASSOCIATEC WITH THE KA(1320).
W     S       100.0      20.0           SHEN      66 HBC  + C 4.6 K+ P          11/67
W     S    SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATEC WITH KA(1320).
W     G        50.C      20.0           GCLCHABER 67 HBC      9.0 K+ P          1C/67
W     G    THIS PEAK MAY BETTER BE ASSCCIATEC WITH THE KA(123C).
W     B        40.       20.            GOSHAW    67 HBC  + C 3.5 K+ P (K PI) 11/67
W     B    SEEN IN (K PI) MOCE OF 4-BCCY FINAL STATE, FROM WCRK CF BISHCP.
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                    26  KA (128C) PARTIAL CECAY MOCES

P1          KA INTC K*(890) PI                                  L18S08
P2          KA INTC K RHU                                       S11U09
P3          KA INTC K CMEGA                                     S11UC1
P4          KA INTC K PI                                        S1CS 8
P5          KA INTC K ETA                                       S10S14

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                    26  KA (128C) BRANCHING RATIOS

R1  *       KA(128C) INTC (K PI) / (K*(890) PI)
R1  S          0.8   CR LESS          SHEN      66 HBC                   11/67
R1  S   SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATEC WITH KA(1320).

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                              REFERENCES FOR KA(1280)

SHEN      66 PRL  17  726      +BUTTERWORTH,FU,GCLCHABERS,TRILLING // LRL
  ALSO SHEN  BERKELEY CONF     +EUTTERWORTH,FU,GOLCHABERS,TRILLING // LRL
BASSOMPI 67  PREPRINT TC PL    BASSOMPIERRE,GOLCSCHMIDT+ //CERN+BRUX+BIRM IJP
CRENNELL 67 PRL 19  44         +KALBFLEISCH,LAI,SCARR,SCHLMANN ////// BNL I
GOLCHABER67 PRL 19  972        G.GOLCHABER,FIRESTONE,SHEN           // LRL
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG ////////////// WISC
SEE ALSC 66 PRL  16  1069      BISHOP,GOSHAW,ERWIN,THOMPSCN,WALKER+//WISC

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K_A(1320)

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                    21  KA (132C,JP= ) I=1/2

                    (JP = 1+ FAVCREC)

                    SEE NOTE PRECEDING KA(120C-135C)

                    21  KA (132C) MASS (MEV)

M       12 1320.0     25.0            ALMEIDA   65 HBC  +   3-5 K+  P
M       70 1320.0     10.C            SHEN      66 HBC  +   4.6 K+  P
M          1320.0     15.0            BASSOMPIE 67 HBC  +   5. K+ P        11/67
M          1330.0                     BRITISH   67 HBC  +  10.0 K+ P       10/67
M          1360.0     10.C            GCLCHABER 67 HBC      9.0 K+ P       1C/67
M          1320.0                     MARECHAL  67 HBC      C. PBAR P       9/67
M   S      1280.0                     SHEN      66 HBC  + C 4.6 K+P        11/67
M   S   SEEN IN FIVE-BOCY FINAL STATE. MAY BE ASSOCIATEC WITH KA(1280).
M   N   45 1300.                      CRENNELL  67 HBC    C 6 PI- P         7/67
M   N      1300.      1C.             GOSHAW    67 HBC    C 3.5 K+ P        7/67
M   N   THESE PEAKS MAY POSSIBLY BE ASSOCIATED WITH THE KA(1280).
M   B      1310.      1C.             GOSHAW    67 HBC  + 0 3.5 K+ P (K PI) 11/67
M   B   SEEN IN (K PI) MOCE OF 4-BOCY FINAL STATE, FROM WCRK OF BISHOP.
M          . . . . . . . . . .
M   AVG    1335.3584  11.2317   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.8)

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                    21  KA (132C) WICTH (MEV)

W       12   60.0     20.0            ALMEIDA   65 HBC  +
W       70   80.0     20.0            SHEN      66 HBC  +
W            60.0     2C.0            BASSOMPIE 67 HBC  +   5. K+ P        11/67
W            80.0     20.0            GCLCHABER 67 HBC      9.0 K+ P       10/67
W            60.0                     MARECHAL  67 HBC      0. PBAR P       9/67
W   S       100.0     20.0            SHEN      66 HBC  + C 4.6 K+ P       11/67
W   S   SEEN IN FIVE-BOCY FINAL STATE. MAY BE ASSOCIATEC WITH KA(1280).
W   N   45   60.                      CRENNELL  67 HBC    C 6 PI- P         7/67
W   N        40.      15.             GCSHAW    67 HBC    0 3.5 K+ P        7/67
W   N   THESE PEAKS MAY POSSIBLY BE ASSCCIATEC WITH THE KA(1280).
W   B        40.      20.             GCSHAW    67 HBC  + C 3.5 K+ P (K PI) 11/67
W   B   SEEN IN (K PI) MOCE CF 4-BOCY FINAL STATE, FROM WCRK CF BISHOP.
W          . . . . . . . . . .
W   AVG      70.0000  10.0000   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)

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                    21  KA (132C) PARTIAL DECAY MOCES

P2          KA INTC K RHC                                       S11UC9
P3          KA INTC K CMEGA                                     S11UC1
P4          KA INTC K PI                                        S10S 8
P5          KA INTC K ETA                                       S10S14
P1          KA INTC K*(890) PI                                  L18SC8

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                    21  KA (132C) BRANCHING RATIOS

R1  *       KA INTC K*(890) PI AND K RHO (CVERLAPPING BANCS)
R1      70    1.0                     SHEN      66 HBC  +

R2  *       KA INTC(K OMEGA)/(K*(890) PI)                  (P3)/(P1)
R2            0.1   OR LESS           SHEN      66 HBC  +
R2          . . . . . . . . . .
R2  FIT        .065      .066   VALUE FROM CONSTRAINEC FIT

R3  *       KA (1320) INTO (K*(890) PI)/ TCTAL                  (P1)/TCTAL
R3             0.92      C.02      0.2C  GOSHAW    67 HBC  (ASS. NO K PI MCDE)  7/67
R3  C          0.46      0.11            GCSHAW    67 HBC  (IF K PI MCDE EX.)   7/67
R3          . . . . . . . . . .
R3  FIT        .920      .110   VALLE FROM CONSTRAINEC FIT

R4  *       KA(1320) INTC (K PI) / TCTAL                        (P4)/TOTAL
R4  C          0.51      0.11            GOSHAW    67 HBC  +                  7/67

R5  *       KA (1320) INTO (K RHC) / TCTAL                      (P2)/TOTAL
R5  G          0.06      C.06            BISHOP    66 HBC
R5  G   LATER PAPER BY GOSHAW+67 DOES NOT OBSERVE K RHC MCDE BUT DCES NOT    .7/67
R5  G   GIVE A LIMITING VALUE GN THE BRANCHING RATIO.                         7/67

R6  *       KA (1320) INTO (K ETA) / TCTAL                      (P5)/TOTAL
R6             0.0C      0.12            GOSHAW    67 HBC  +                  7/67

R7  *       KA (1320) INTO ( K CMEGA ) / TOTAL                  (P3)/TOTAL
R7             0.06      0.06            GCSHAW    67 HBC  +                  7/67
R7          . . . . . . . . . .
R7  FIT        .060      .C60   VALLE FROM CONSTRAINEC FIT

R8  *       KA (1320) INTO (K PI) / (K*(89C) PI)                 (P4)/(P1)
R8             0.30  CR LESS             SHEN      66 HBC  +

R9  *       KA (1320) INTO (K+ PI-) / (K+0 PIC+ PI-)
R9             0.2   CR LESS (CL=.9C)    CRENNELL  67 HBC    0                7/67

R10 *       KA (1320) INTO (KO PI+ PI- PIO) / (K+C PIO+ PI-)
R10            0.1   CR LESS (CL=.90)    CRENNELL  67 HBC    C                7/67

R   C   EXISTENCE OF K PI MODE IS CCNTROVERSIAL. SEE GCSHAW+67.               7/67
R   *FOR 1+ NONET SU3 RATES SEE E.G. GOLCHABER, REVIEW EERKELEY CONF.1966

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                              REFERENCES FOR KA(1320)

ALMEIDA  65 PL 16 184          ALMEICA,ATHERTON,BYER,DCRNAN,FORSON+/CAMBR
BISHCP   66 PRL  16  1069      BISHOP,GOSHAW,ERWIN,THOMPSCN,WALKER+//WISC
SHEN     66 PRL  17  726       +BUTTERWORTH,FU,GOLCHABERS,TRILLING // LRL
  ALSO SHEN  BERKELEY CCNF     +BUTTERWORTH,FU,GCLCHABERS,TRILLING // LRL

BASSCMPI 67  PREPRINT TO PL    BASSOMPIERRE,GOLCSCHMIDT+ //CERN+BRUX+BIRM IJP
BRITISH  67  HEIDELBERG CONF                  // BIRMINGHAM+GLASGOW+OXFORD
CRENNELL 67 PRL 19  44         +KALBFLEISCH,LAI,SCARR,SCHLMANN ////// BNL I
GOLCHABER67 PRL 19  972        G.GOLCHABER,FIRESTONE,SHEN           // LRL
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG ////////////// WISC
   SEE ALSC BISHOP 66 ABOVE
MARECHAL 67  HEIDELBERG CONF. +BARLOW,F.JAMES+//CERN+CCF+IPN.PARIS+LPCOL

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K_V(1420)

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                    22  KV (142C,JP=2+) I=1/2

                    JP = 3- IS LNLIKELY BLT NCT YET COMPLETELY RULEC CUT.

                    22  KV(1420) MASS (MEV)

M            1404.0    15.0                FOCARCI   65 HBC   -C 3.  K- P (K PI)
M         35 1407.0    10.C                CRENNELL  66 HBC    C 6. PI- P (K PI)
M            1390.0    3C.C                SHEN      66 HBC   + C 4.6 K+ P (K PI)
M            1435.0    10.0                BARNHAM   67 HBC   +  10.0 K+ P (K PI) 11/67
M            1402.0     8.0                BRITISH   67 HBC   -C 3.5 K- P (K PI) 11/67
M            1446.0     7.9                CAHL      67 HBC    C 4.PI- P (KPI)
M            1427.     15.0                DE BAERE  67 HBC   +  3.5 K+P (KC PI+)
M            1440.     24.C       40.      DE BAERE  67 HBC   +  3.5 K+P (K+ PIC)
M            1430.0    20.0                GEORGE    67 HBC    C 5.  K+ P (K PI)
M            1405.0    18.0                SCHWEINGR 67 HBC    C 4.1 K- P (K PI)   9/67
M            1401.0     8.0                SCHWEINGR 67 HBC   -  4.1 K- P (K PI)   9/67
M            1397.0    19.0                SCHWEINGR 67 HBC    C 5.5 K- P (K PI)   9/67
M            1427.0     9.C                SCHWEINGR 67 HBC   -  5.5 K- P (K PI)   9/67
M            1400.0    20.0                BADIER    65 HBC   -  3.  K- P (K*PI)
M            1430.0                        BRITISH   66 HBC    C 6.  K- P (K*PI)
M            1430.0    10.0                SHEN      66 HBC   + C 4.6 K+ P (K*PI)
M            1421.0    13.0                ABCLV CCL 67 HBC     10.1 K- P          10/67
M            1420.0    10.0                BASSCMPIE 67 HBC   +   5. K+ P (K 2PI) 11/67
M            1440.                         CRENNELL  67 HBC    C 6 PI- P (K 2PI)  7/67
M            1420.0    10.0                GCLCHABER 67 HBC      9.0 K+ P(K 2PI) 1C/67
M            1410.0    20.0                LUDLAM    67 HBC    12.6 K-P             9/67
M    *    THE FOLLOWING VALUES ARE FROM BOTH (K PI) ANC (K 2PI) MCCES
M            1425.0    10.0                BISHCP    66 HBC   +   3.5 K+ P
M            1400.0    10.0                DUBAL     66 MMS   -   7-12 K- P
M            1423.0     7.0                BASSANO   67 HBC   -C 4.6, 5.C K- P    10/67
M            . . . . . . . . . .
M    AVG     1418.6034   3.1504   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.3)
                        (SEE IDEOGRAM)

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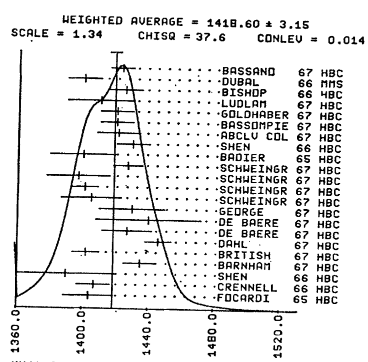

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                  22  KV(1420) WIDTH (MEV)

W            92.0      14.0                 FOCARDI   65 HBC   -C 3.0 K- P (K PI)
W     35     70.       30.       15.        CRENNELL  66 HBC    C 6.0 PI-P
W            75.0      25.0                 SHEN      66 HBC     4.6 K+ P
W            75.0      25.0                 BARNHAM   67 HBC   +  10.0 K+ P (K PI) 11/67
W           140.0      20.0                 BRITISH   67 HBC   -C 3.5 K- P (K PI) 11/67
W            61.0      24.0                 DAHL      67 HBC    C 3.8-4.2 PI- P
W            90.0      28.0                 DE BAERE  67 HBC   +    3.5 K+ P
W           110.0      40.0                 GEORGE    67 HBC    C 5.0 K+ P
W           107.0      20.C                 SCHWEINGR 67 HBC   -C 4.1+5.5 K-P       9/67
W           105.0      30.0                 BADIER    65 HBC
W           145.0      33.0                 ABCLV CCL 67 HBC     10.1 K- P         10/67
W            80.0      20.0                 BASSOMPIE 67 HBC   +   5. K+ P (K* PI) 11/67
W            80.0      20.0                 GOLDHABER 67 HBC       9.0 K+ P(K 2PI) 10/67
W            90.0      20.0                 LUDLAM    67 HBC     12.6 K-P           9/67
W            96.0      10.0                 BISHOP    66 HBC   +   3.5 K+ P
W            62.0      16.0                 DUBAL     66 MMS   -   7-12 K- P
W            65.0      20.0                 BASSANO   67 HBC   -C 4.6, 5.C K- P    10/67
W              . . . . . . . . . .
W   AVG       89.0557   5.1029   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)
                    (SEE IDEOGRAM)

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                  22  KV (1420) PARTIAL DECAY MODES

P1        KV(1420) INTO K PI                                 S10S 8
P2        KV(1420) INTO K*(890) PI                           L18S 8
P3        KV(1420) INTO K RHO                                S10U 9
P4        KV(1420) INTO K OMEGA                              S10U 1
P5        KV(1420) INTO K ETA                                S10S14

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                  U22  KV(1420) BRANCHING RATIOS

R1  *   KV(1420) INTO (K PI)/TOTAL                       (P1)/TOTAL
R1  R        0.37      0.19          BADIER    65 HBC
R1  R        0.33      0.07          BISHOP    66 HBC
R1  R        0.39      0.11          BASSANO   67 HBC   -  4.6, 5.C K- P    10/67
R1  R        0.62      0.09          BRITISH   67 HBC   -C 3.5 K- P        11/67
R1  R   THIS BRANCHING RATIO CONTAINS REDUNDANT INFORMATION, SINCE WE
R1  R   CONSTRAIN THE SUM OF ALL BRANCHING RATIOS TO BE 1.C
R1           . . . . . . . . . .
R1  FIT       .065      .066     VALUE FROM CONSTRAINED FIT

R2  *   KV(1420) INTO (K*(890) PI) / TOTAL               (P2)/TOTAL
R2           0.41      0.14          BADIER    65 HBC
R2           0.56      0.10          BISHOP    66 HBC
R2           0.47      0.10          BASSANO   67 HBC   -  4.6, 5.C K- P    10/67
R2           0.26      0.06          BRITISH   67 HBC   -C 3.5 K- P        11/67
R2           . . . . . . . . . .
R2  AVG       .3709     .0712    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)
R2  FIT       .327      .026     VALUE FROM CONSTRAINED FIT

R3  *   KV(1420) INTO (K RHO)/TOTAL                      (P3)/TOTAL
R3           0.14      0.05          BADIER    65 HBC
R3           0.10      0.05          BISHOP    66 HBC
R3           0.14      0.10          BASSANO   67 HBC    0 4.6, 5.C K- P    10/67
R3           0.05  CR LESS           BRITISH   67 HBC   -C 3.5 K- P        11/67
R3           . . . . . . . . . .
R3  AVG       .1222     .0333    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R3  FIT       .119      .030     VALUE FROM CONSTRAINED FIT

R4  *   KV(1420) INTO (K OMEGA)/TOTAL                    (P4)/TOTAL
R4           0.07      0.04          BADIER    65 HBC
R4           0.08      0.05          BRITISH   67 HBC   -0 3.5 K- P        11/67
R4           0.03  OR LESS           LEITNER   67 HBC   -  4.6,5 K- P       9/67
R4           . . . . . . . . . .
R4  AVG       .0739     .0312    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R4  FIT       .024      .009     VALUE FROM CONSTRAINED FIT

R5  *   KV(1420) INTO (K ETA)/TOTAL                      (P5)/TOTAL
R5           0.02      0.02          BADIER    65 HBC
R5           0.03  CR LESS           BRITISH   67 HBC   -C 3.5 K- P        11/67
R5           0.03  CR LESS           LEITNER   67 HBC   -  4.6,5 K- P       9/67
R5           . . . . . . . . . .
R5  FIT       .021      .010     VALUE FROM CONSTRAINED FIT

R6  *   KV(1420) INTO (K*(890) PI) / (K PI)              (P2)/(P1)
R6      6    0.33      0.33          CHUNG     65 HBC   + C  3.9-4.2 PI- P
R6           0.65      0.20          SHEN      66 HBC     C  N* PRODUCED
R6           0.63      0.20          SHEN      66 HBC   +    NO N* PRODUCED
R6           0.62      0.11          SCHWEINGR 67 HBC     0 4.1+5.5 K- P    10/67
R6           . . . . . . . . . .
R6  AVG       .6083     .0840    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R6  FIT       .643      .076     VALUE FROM CONSTRAINED FIT

R7  *   KV(1420) INTO (K OMEGA) / K PI                   (P4)/(P1)
R7  *        0.08  CR LESS           SHEN      66 HBC
R7      4    0.02      0.024         GOSHAW    67 HBC      3.5 K+ P            7/67
R7           . . . . . . . . . .
R7  FIT       .047      .018     VALUE FROM CONSTRAINED FIT
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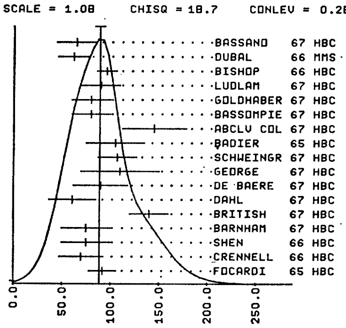
WEIGHTED AVERAGE = 89.06 ± 5.10
SCALE = 1.08 CHISQ = 18.7 CONLEV = 0.285



KV(1420) WIDTH (MEV)

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R8  *   KV(1420) INTO (K RHO) / (K PI)                   (P3)/(P1)
R8  *        0.09  CR LESS           CHUNG     65 HBC   + C  3.9-4.2 PI- P
R8           0.31      0.16          SCHWEINGR 67 HBC     C 4.1+5.5 K- P    10/67
R8           . . . . . . . . . .
R8  FIT       .233      .068     VALUE FROM CONSTRAINED FIT

R9  *   KV(1420) INTO (K RHO) / (K*(890) PI)             (P3)/(P2)
R9  *        0.39  CR LESS           BASSOMPIE 67 HBC   +   5. K+ P              9/67
R9  *        0.40  CR LESS  (CL=.9C) FIELD     67 HBC   -  3.8 K- P              6/67

R10 *   KV(1420) INTO (K OMEGA) / (K*(890) PI)           (P4)/(P2)
R10          0.10      0.04          FIELD     67 HBC   -  3.8 K- P              6/67
R10          . . . . . . . . . .
R10 FIT       .073      .030     VALUE FROM CONSTRAINED FIT

R11 *   KV(1420) INTO (K ETA) / (K*(890) PI)             (P5)/(P2)
R11          0.07      0.04          FIELD     67 HBC   -  3.8 K- P              6/67
R11          . . . . . . . . . .
R11 FIT       .066      .032     VALUE FROM CONSTRAINED FIT

R12 *   KV(1420) INTO (K ETA) / (K PI)                   (P5)/(P1)
R12     2    0.05      0.06          GOSHAW    67 HBC      3.5 K+ P              7/67
R12          . . . . . . . . . .
R12 FIT       .042      .020     VALUE FROM CONSTRAINED FIT

R   *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SCCOLOW, PRL 15,329(65)

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                           REFERENCES FOR KV(1420)

BADIER   65 PL 19 612          BADIER,DEMOLLIN,GOLDBERG+//EP+SACLY+ZEEMAN
CHUNG    65 PRL  15  325       +DAHL,HARDY,HESS,JACOBS,KIRZ,MILLER // LRL
FOCARDI  65 PL 16 351          FOCARDI,MINGUZZI RANZI,SERRA+ /BOLOGNA+CEN

BISHOP   66 PRL 16 1069        BISHOP,GOSHAW,ERWIN,THOMPSON+ // WISCONSIN
BRITISH  66  BERKELEY CONF.    BIRM+GLASGOW+LONDON(IC)+MUNICH+OXFORD+RUTH
CRENNELL 66  BERKELEY CONF     +KALBFLEISCH,LAI,SCARR,SCHUMANN+//////, BNL IJP
DUBAL    66  BERKELEY CONF     CERN MISSING MASS SPECTROMETER GROUP//CERN
SHEN     66  BERKELEY CONF     +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
ALSO SHEN66 PRL  17  726       +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
    ALSO 66  (PRIVATE COMMUN)GERSON GOLDHABER                     /// LRL

ABCLV CC 67  HEIDELBERG CONF.  AACHEN+BERLIN+CERN+LONDON IC+VIENNA COLLAB
SEE ALSO 66 PL 22 357          BARTSCH,DEUTSCHMANN,MORRISON+ // ABCL(IC)V
BARNHAM  67  HEIDELBERG CONF   +BEANEY,HUGHES,BOWLER+ // BIRM+GLASGOW+OXF
BASSANO  67 PRL  19  968       +GOLDBERG,GOZ,BARNES,LEITNER+/BNL+SYRACUSE
BASSOMPI 67  PREPRINT TO PL    BASSOMPIERRE,GOLDSCHMIDT+ //CERN+BRUX+BIRM IJP
BRITISH  67  PREPRINT          BIRM-GLASGOW-LONDON(IC)-OXFORD-RUTH COLLAB IJP
CRENNELL 67 PRL 19  44         +KALBFLEISCH,LAI,SCARR,SCHUMANN ////// BNL
DAHL     67  UCRL-16978        +HARDY+HESS+KIRZ+MILLER ////////////// LRL
SEE ALSO 65 PRL 14 401         HARDY,CHUNG,DAHL,HESS,KIRZ,MILLER //// LRL
DE BAERE 67 NC 51 A 401        +GOLDSCHMIDT-CLERMONT,HENRI+ /// BRUX+CERN
FIELD    67 PL 24B 638         +HENDRICKS+PICCIONI+YAGER //////// LAJOLLA
GEORGE   67 NC 49A 9           +GOLDSCHMIDT-CLERMONT+HENRI+ /// CERN+BRUX
GOLDHABER67 PRL 19  972        G.GOLDHABER,FIRESTONE,SHEN           // LRL
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG ////////////// WISC
LEITNER  67  PRIVATE COMMUN.                                      SYR+BNL
LUDLAM   67  HEIDELBERG CONF.  +LACH,SANDWEISS,TAFT                // YALE
SCHWEING 67  PREPRINT TO PR    SCHWEINGRUBER,DERRICK,FIELDS,AMMAR+/ANL+NW
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K(1660)

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27  KV (1660, JP=  )  I = 1/2

     EVIDENCE NOT COMPELLING, OMITTED FROM TABLE

                  27  KV (1660) MASS  (MEV)

M          1660.0                         CARMONY   67 HBC   -  3.8 K-P,OMEGA K 11/67
M          1660.0     10.0                JOBES     67 HBC   +   5. K+ P         11/67
M    J   CLAIMED BY JOBES IN (K PI), (K*(890) PI), AND (K*(1420) PI) MODES.  11/67
M    J   JOBES 67 SEES THE K PI BUMP MOSTLY IN INTERFERENCE WITH N*(1236).    11/67

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                  27  KV (1660) WIDTH (MEV)

W            60.0     20.0                JOBES     67 HBC   +   5. K+ P         11/67

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                  27  KV (1660) PARTIAL DECAY MODES

P1      KV*(1660) INTO K PI                               S10S 8
P2      KV*(1660) INTO K PI PI                            S10S 8S 8
P3      KV*(1660) INTO K*(890) PI                         L18S 8
P4      KV*(1660) INTO KV*(1430) PI                       L22S 8

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                           REFERENCES FOR KV(1660)

CARMONY  67 PRL  18  615      D.CARMONY,T.HENDRICKS,L.LANDER // LA JOLLA
JOBES    67  PREPRINT TO PL   +BASSOMPIERRE,DE BAERE + // BIRM+CERN+BRUX
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K_A(1800)

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23    KA (1800, JP=  )  I = 1/2

               (ALSO CALLED L MESON)
               (JP = 1+, 2- SEEM MOST LIKELY)

              L23   KA (1800) MASS (MEV)

M            1790.0      10.0              ABCLV CCL 67 HBC   - 10.C K- P           10/67
M            1780.0                        BARNHAM   67 HBC   +  10. K+P(K PI PI) 11/67
M        20  1780.                         BERLINGHI 67 HBC   +                      7/67
M            1740.0                        FIRESTONE 67 HBC   +  9. K+ P TO P+MM    11/67
M            1760.0      15.0              JOBES     67 HBC   +   5. K+ P           11/67
M              . . . . . . . . . .
M   AVG      1780.7692   13.8462   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.7)

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              L23   KA (1800) WIDTH (MEV)

W             120.0      40.0              ABCLV CCL 67 HBC   - 10.C K- P           10/67
W             200.0                        BARNHAM   67 HBC   +  10. K+P(K PI PI) 11/67
W        20    80.                         BERLINGHI 67 HBC   +                      7/67
W             120.0                        FIRESTONE 67 HBC   +  9. K+ P TO P+MM    11/67
W              60.0      20.0              JOBES     67 HBC   +   5. K+ P           11/67
W              . . . . . . . . . .
W   AVG        72.0000   24.0000   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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            623   KA (1800) PARTIAL DECAY MODES

P1    KA   INTO K PI                                S11S 9
P2    KA   INTO K RHO                               S11U 9
P3    KA   INTO K*(890) PI                          S 9U18
P4    KA   INTO K OMEGA                             S11U 1
P5    KA   INTO K PI PI                             S11S 9S 9
P6    KA   INTO K*(1420) PI                         S 9U22
P7    KA   INTO K ETA                               S11S14

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            623   KA (1800) BRANCHING RATIOS

R1  * KA   INTO (K PI)/TOTAL                        (P1)/TOTAL
R1            0.023 CR LESS        ABCLV CCL 67 HBC  - 10.0 K- P      10/67

R2  * KA   INTO (K RHO)/TOTAL
R2            0.059    0.06        ABCLV CCL 67 HBC  - 10.0 K- P      10/67

R3  * KA   INTO (K*(890) PI)/TOTAL
R3            0.244    0.08        ABCLV CCL 67 HBC  - 10.0 K- P      10/67

R4  * KA   INTO (K OMEGA)/TOTAL
R4            0.048    0.02        ABCLV CCL 67 HBC  - 10.0 K- P      10/67
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R6  * KA   INTO (K PI PI)/(TOTAL)                   (P5)/TOTAL
R6            0.445    0.15        ABCLV CCL 67 HBC  - 10.0 K- P      10/67

R7  * KA   INTO (K*(1420) PI) / TOTAL               (P6)/TOTAL
R7            0.164    0.08        ABCLV CCL 67 HBC  - 10.0 K- P      10/67

R8  * KA   INTO (K ETA)/TOTAL                       (P7)/TOTAL
R8            0.01  CR LESS        ABCLV CCL 67 HBC  - 10.0 K- P      10/67

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                         REFERENCES FOR KA(1800)

ABCLV CC 67  HEIDELBERG CONF.  AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
SEE ALSC 66 PL 22 357          BARTSCH,DEUTSCHMANN,MORRISON+ // ABCL(IC)V
BARNHAM  67  HEIDELBERG CONF   +BEANEY,HUGHES,ECWLER+ // BIRM+GLASGOW+OXF
BERLINGH 67 PRL 18 1087        BERLINGHIERI+FARBER+FERBEL+FORMAN+ // ROCH I
FIRESTON 67  HEIDELBERG CONF   A.FIRESTONE,G.GOLDHABER,E.SHEN      // LRL
JOBES    67. PREPRINT TO PL    +BASSOMPIERRE,DE BAERE + // BIRM+CERN+BRUX

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DATA ON BARYON RESONANCES

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CODE EVENTS QUANTITY  ERROR+  ERROR-  REFERENCE YR TECN SIGN COMMENTS    DATE
   ABOVE                                                                 PUNCHED
 BACKGROUND
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p

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            16   PROTON  (938, J=1/2)  I=1/2
                 SEE LISTINGS OF STABLE PARTICLES

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n

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            17   NEUTRON  (939, J=1/2)  I=1/2
                 SEE LISTINGS OF STABLE PARTICLES

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Δ(1236)

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            81   N*3/2(1236, JP=3/2+) I=3/2      P3,3
            81   N*3/2(1236) MASS (MEV)      --------------------------

M    *      1234.0                   ROPER     65 RVUE 0++PHASE-SHIFT ANAL
M++         1236.0      0.55         OLSSON    65 RVUE ++ TOTAL-SIGMA DATA
M++  *      1232.0      6.0          FERRO-LUZ 65 HBC  ++ K+P TO K0 P PI+
M++  *      1233.4      4.4          GIDAL     66 DBC  ++ D D TO NN(NN) PI
M++         1236.0                   DEANS     66 RVUE ++ PI+P TOTAL
M    *      1235.6                   LOVELACE  67 RVUE    PHASE-SHIFT ANAL 11/67
M0          1236.45     0.65         OLSSON    65 RVUE 0
M-   *      1241.3      5.1          GIDAL     66 DBC  -

----------------   81   N*(0) - N*(++) MASS DIFFERENCE (MEV)   ------------

D    R         0.45     0.65         OLSSON    65 RVUE
D    R      REDUNDANT WITH DATA IN MASS LISTING.

----------------   81   N*(-) - N*(++) MASS DIFFERENCE (MEV)   ------------

D              7.9      6.8          GIDAL     66 DBC

----------------   81   N*3/2(1236) WIDTH (MEV)   -------------------------

W++          120.0      2.0          OLSSON    65 RVUE ++
W++  *       125.0     30.0          FERRO-LUZ 65 HBC  ++
W++  *       124.0     14.0          GIDAL     66 DBC  ++
W++          121.0                   DEANS     66 RVUE ++
W0           119.6      2.4          OLSSON    65 RVUE 0
W-   *       149.0     16.0          GIDAL     66 DBC  -
W            125.1                   LOVELACE  67 RVUE    PHASE-SHIFT ANAL 11/67

----------------   81   N*3/2(1236) PARTIAL DECAY MODES   -----------------

P1       N*3/2(1236) INTO PI N                          S 8S16

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                     REFERENCES -- N*3/2(1236)

OLSSON   65 PRL 14 118        M G OLSSON                        //WISC
FERRO-LU 65 NC 36 1101        FERRO-LUZZI,GEORGE, +             //CERN
ROPER    65 PR 138 B190       L D ROPER, R M WRIGHT, B T FELD  //LRL,MIT  JP
GIDAL    66 PR 141 1261       G GIDAL, A KERNAN, S KIM          //LRL
DEANS    66 PREPRINT          S R DEANS, W G HOLLADAY     //VANDERBILT
LOVELACE 67 HEIDELBERG CONF.  C LOVELACE                   //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT          A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

      FOR EXTENSIVE REFERENCES TO DATA AND PHASE-SHIFT ANALYSES TILL 1965,
      SEE ROPER 65, ESPECIALLY APPENDIX II.

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N(1470)

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            61   N*1/2(1470, JP=1/2+) I=1/2      P1,1
                 WHETHER THE BUMP NEAR 1400 MEV SEEN IN INELASTIC PP
                 SCATTERING IS A RESONANCE OR A KINEMATIC EFFECT IS A
                 SUBJECT OF DEBATE.  SEE GELLERT 66 FOR THE VIEW THAT
IT IS A KINEMATIC EFFECT -- SEE ALMEIDA 66 FOR THE OPPOSITE VIEW.  WE
LIST BUT STAR RESULTS OF PP SCATTERING EXPERIMENTS.  PHASE-SHIFT ANAL-
YSES APPEAR TO GIVE BETTER EVIDENCE FOR A RESONANCE IN THIS REGION.
                 THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
                 OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.
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----------------   61   N*1/2(1470) MASS (MEV)   --------------------------

M    *      1400.0       APPROX      COCCONI   64 CNTR +  PP 3.6-12 BEV/C
M    *      1425.0       APPROX      ADELMAN   64 HBC  +  K-P 1.45 BEV/C
M    *      1430.0       APPROX      ANKENBRAN 65 CNTR +  PP 7.1 BEV/C
M    *      1400.0       APPROX      BELLETTIN 65 SPRK +  PP,D 10-26 BEV/C
M    *      1405.0     15.0          ANDERSON  66 SPRK +  PP 6-30 BEV/C
M    *      1410.0     15.0          BLAIR     66 CNTR +  PP 2.8-7.9 BEV/C
M    *      1450.0     15.0          ALMEIDA   67 HBC  +  PP 2PI 10 BEV/C
M    *      1380.0                   ROPER     65 RVUE    PHASE-SHIFT ANAL
M    *      1400.0     30.0          FOLEY     67 CNTR    PI+- P AND PP     11/67
M    *      1370.0                   BRANDSEN  65 RVUE    PHASE-SHIFT ANAL
M    1      1470.0                   BAREYRE   67 RVUE    PHASE-SHIFT ANAL 11/67
     1      WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M    2      1505.0                   BAREYRE   67 RVUE    PHASE-SHIFT ANAL 11/67
     2      WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
     2      IS GREATEST.
M           1466.0                   LOVELACE  67 RVUE    PHASE-SHIFT ANAL 11/67
            WHERE THE ABSORPTION IS GREATEST.
            SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------   61   N*1/2(1470) WIDTH (MEV)   -------------------------

W    1       255.0                   BAREYRE   67 RVUE    PHASE-SHIFT ANAL 11/67
W    2       205.0                   BAREYRE   67 RVUE    PHASE-SHIFT ANAL 11/67
W            211.0                   LOVELACE  67 RVUE    PHASE-SHIFT ANAL 11/67
            THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

----------------   61   N*1/2(1470) PARTIAL DECAY MODES   -----------------

P1          N*1/2(1470) INTO PI N                       S 8S16
P2          N*1/2(1470) INTO N SIGMA (SIGMA MESON)      S16U 7
P3          N*1/2(1470) INTO N*3/2(1236) PI             U8IS 8

----------------   61   N*1/2(1470) BRANCHING RATIOS   --------------------

R1          N*1/2(1470) INTO (PI N)/TOTAL               (P1)/TOTAL
R1   1         0.68                  BAREYRE   67 RVUE    PHASE-SHIFT ANAL 11/67
R1             0.658                 LOVELACE  67 RVUE    PHASE-SHIFT ANAL 11/67
            THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

R2          N*1/2(1470) INTO (N SIGMA)/TOTAL            (P2)/TOTAL
R2          DOMINANT INELASTIC DECAY THURNAUER 65 RVUE -                   11/67
R2          DOMINANT INELASTIC DECAY NAMYSLOWS 66 RVUE -                   11/67
R2          DOMINANT INELASTIC DECAY MORGAN    67 RVUE -                   11/67
R2          DOMINANT INELASTIC DECAY ROSENFELD 67 RVUE -                   11/67

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                     REFERENCES -- N*1/2(1470)

COCCONI  64 PL 8 134          +LILLETHUN,SCANLON,STAHLBRANDT, +   //CERN
ADELMAN  64 PRL 13 555        S L ADELMAN               //CAMBRIDGE(CERN)
ANKENBRA 65 NC 35 1052        ANKENBRANDT,CLYDE,CORK,KEEFE,KERTH,+ //LRL
BELLETTI 65 PL 18 167         BELLETTINI,COCCONI,DIDDENS, +       //CERN
ANDERSON 66 PRL 16 855        +BLESER,COLLINS,FUJII, +    //BNL,CARNEGIE
BLAIR    66 PRL 17 789        +TAYLOR,CHAPMAN,+//HARWELL,QUEENMARY,RTHFD
GELLERT  66 PRL 17 884        +SMITH,WOJCICKI,COLTON,SCHLEIN,+//LRL,UCLA
ALMEIDA  67 NC 50A 1000       +RUSHBROOKE, +            //CAVNDSH,HAMBURG
FOLEY    67 PRL 19 397        +JONES,LINDENBAUM,LOVE,OZAKI, +       //BNL
ROPER    65 PR 138 B190       LD ROPER,RM WRIGHT,BT FELD  //LRL-LVMR,MIT IJP
BRANDSEN 65 PR 139 B1566      +DONNELL, MOORHOUSE         //DURHAM,RTHFD IJP
THURNAUE 65 PRL 14 985        P G THURNAUER                       //ROCH
NAMYSLOW 66 PR 157 1328       NAMYSLOWSKI,RAZMI,ROBERTS  //STAN,EDINB,IC
MORGAN   67 PREPRINT RPP/A27  D MORGAN                           //RTHFD
ROSENFEL 67 IRVINE CONF       A H ROSENFELD, P SODING              //LRL
BAREYRE  67 PR (SUBMITTED)    P BAREYRE, C BRICMAN, G VILLET   //SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.  C LOVELACE                         //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT          A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

                 PAPERS NOT REFERRED TO IN DATA CARDS.

BAREYRE  64 PL 8 137          +BRICMAN,VALLADAS,VILLET, +  //SACLAY,CAEN  IJ
ADELMAN  65 PRL 14 1043       S L ADELMAN               //CAMBRIDGE(CERN)
DALITZ   65 PL 14 159         R H DALITZ, R G MOORHOUSE       //OXF,RTHFD
     --  DALITZ 65 REVIEWS EARLY PHASE-SHIFT-ANALYSIS RESULTS (AND DISCUSSES
         WHETHER THEY IN FACT REQUIRE THE EXISTENCE OF A RESONANCE).
BAREYRE  65 PL 18 342         +BRICMAN, STIRLING, VILLET       //SACLAY IJP
FRIDMAN  66 PL 23 386         +MAURER,MICHALON, +     //STRASBOURG,HEIDEL
    THE FOLLOWING ARE THEORETICAL PAPERS CONCERNING THE N*1/2(1470) --
RESNICK  66 PR 150 1292       L RESNICK                        //NIELS BOHR
SCHWARZ  66 PR 152 1325       J H SCHWARZ                            //LRL
GOLDBERG 67 PR 154 1558       H GOLDBERG                         //CORNELL
BALL     67 PR 155 1725       JS BALL, GL SHAW, DY WONG  //UCLA,UCI,UCSD

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

N(1518)

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62  N*1/2(1518, JP=3/2-) I=1/2     D1,3

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------- 62  N*1/2(1518) MASS (MEV) ---------------------------

M  *    1536.0                  ROPER     65 RVUE   PHASE-SHIFT ANAL.
M  *    1530.0                  BRANDSEN  65 RVUE   PHASE-SHIFT ANAL
M  1    1510.0                  BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   1    WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M  2    1515.0                  BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   2    WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
   2    IS GREATEST.
M       1526.0                  LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
        WHERE THE ABSORPTION IS GREATEST.
        SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------- 62  N*1/2(1518) WIDTH (MEV) --------------------------

W  1    125.0                   BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W  2    110.0                   BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W       114.0                   LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
        THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

----------------- 62  N*1/2(1518) PARTIAL DECAY MODES ------------------

P1      N*1/2(1518) INTO PI N                       S 8S16
P2      N*1/2(1518) INTO N*3/2(1236) PI             U81S 8
P3      N*1/2(1518) INTO N PI PI                    S16S 8S 8
P4      N*1/2(1518)+ INTO NEUTRON PI+               S17S 8
P5      N*1/2(1518)+ INTO PROTON PI+ PI-            S16S 8S 8
P6      N*1/2(1518) INTO N ETA                      S17S14

----------------- 62  N*1/2(1518) BRANCHING RATIOS ---------------------

R1      N*1/2(1518) INTO (PI N)/TOTAL               (P1)/TOTAL
R1 1      0.54                  BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
R1        0.570                 LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
        THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

  ALMOST THE ENTIRE INELASTICITY IS IN N PI PI (ONLY N ETA COULD COMPETE,
  AND IT DOESNT).  THE N PI PI SEEMS TO BE MAINLY N*3/2(1236) PI, IN BOTH
  S AND D WAVES.

R2      N*1/2(1518) INTO (N*3/2(1236) PI)/TOTAL     (P4)/TOTAL
R2        DOMINANT INEL DECAY    OLSSON   66 RVUE    PI P TO PI PI N
R2        0.20      0.05         KIRZ     66 HBC  C  ASSUMING R1=0.72

R3      N*1/2(1518) INTO (N PI)/(N PI PI)           (P1)/(P3)
R3        1.25      0.44      0.71  A-BORELLI 67 HBC  C  PBAR P 5.7 BEV/C

R4      N*1/2(1518) INTO (N*3/2(1236) PI)/(N PI PI)   (P2)/(P3)
R4        0.00      0.09         A-BORELLI 67 HBC
R4        LARGE                  THURNAUER 65 RVUE  -                  11/67
R4        LARGE                  NAMYSLOWS 66 RVUE  -                  11/67
R4        LARGE                  MORGAN    67 RVUE  -                  11/67
R4        LARGE                  ROBERTS   67 RVUE  -                  11/67
R4        LARGE                  ROSENFELD 67 RVUE  -                  11/67

R5      N*1/2(1518) INTO (NEUTRON PI+)/(P PI+ PI-)    (P4)/(P5)
R5        0.77      0.45         ALEXANDER 67 HBC  +  PP 5.5 BEV/C

R6      N*1/2(1518) INTO (PI N)/(PI N*3/2(1236))      (P1)/(P2)
R6        0.42   OR LESS         LEE       67 HBC                      11/67

R7      N*1/2(1518) INTO (N ETA)/TOTAL                (P6)/TOTAL
R7        0.006   APPROX         DAVIES    66 RVUE                     11/67
  DAVIES 66 GIVES SEVERAL VALUES DEPENDING ON INPUT DATA.  ALL ARE SMALL.

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                   REFERENCES -- N*1/2(1518)

       SEE A PREVIOUS EDITION (RMP 37, 633, 1965) FOR EARLIER REFERENCES.

ROPER     65 PR 138 B190        LD ROPER,RM WRIGHT,BT FELD  //LRL-LVMR,MIT IJP
BRANDSEN  65 PR 139 B1566       +ODONNELL, MOORHOUSE        //DURHAM,RTHFD IJP
THURNAUE  65 PRL 14 985         P G THURNAUER                        //ROCH
DAVIES    66 PREPRINT           A T DAVIES, R G MOORHOUSE   //GLASGOW,RTHFD
NAMYSLOW  66 PR 157 1328        NAMYSLOWSKI,RAZMI,ROBERTS   //STAN,EDINB,IC
KIRZ      66 PRIVATE COMM       J KIRZ                                //LRL
  --  NUMBER EXTRACTED FROM DATA DISCUSSED IN KIRZ 63.
A-BORREL  67 NC 47 232          ALLES-BORELLI,FRENCH,FRISK,MICHEJDA //CERN
ALEXANDE  67 PR 154 1284        ALEXANDER,BENARY,CZAPEK,+ //WEIZMANN(CERN)
LEE       67 PR 159 1156        +MOEBS,ROE,SINCLAIR,VANDER VELDE    //MICH
MORGAN    67 PREPRINT RPP/A27   D MORGAN                            //RTHFD
ROBERTS   67 PREPRINT           R G ROBERTS                        //DURHAM
ROSENFEL  67 IRVINE CONF        A H ROSENFELD, P SODING               //LRL
BAREYRE   67 PR (SUBMITTED)     P BAREYRE, C BRICMAN, G VILLET  //SACLAY IJP
LOVELACE  67 HEIDELBERG CONF.   C LOVELACE                       //CERN IJP
            SEE ALSO --
DONNACHI  67 PREPRINT           A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

                    PAPERS NOT REFERRED TO IN DATA CARDS.

KIRZ      63 PR 130 2481        J KIRZ, J SCHWARTZ, R D TRIPP         //LRL
CROUCH    65 DESY CONF II 21    +  //BROWN,CEA,HARVARD,MIT,PADOVA,WEIZMANN
DERADO    65 ATHENS CONF 244    +KENNEY,LAMSA, +      //NOTRE DAME,KENTUCKY
BAREYRE   65 PL 18 342          + BRICMAN, STIRLING, VILLET     //SACLAY IJP
OLSSON    66 PR 145 1309        M G OLSSON, G B YODH              //WISC,MD
   --  SUPERSEDED BY MORGAN 67.
MERLO     66 P ROY SOC 289 469 J P MERLO, G VALLADAS             //SACLAY
   -- THE ABOVE PAPERS DISCUSS INELASTIC CHANNELS NEAR THE RESONANCE.

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N(1550)

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63  N*1/2(1550, JP=1/2-) I=1/2     S1,1

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

             63  N*1/2(1550) MASS (MEV) ---------------------------

M  *    1519.0                  HENDRY    65 RVUE   ETA N + S11 PI N
M       1570.0                  MICHAEL   66 RVUE   FITS BAREYRE S11
M  N    1557.0  OR  1565.0      UCHIYAMA- 66 RVUE   FITS N ETA DATA
M  N    FITTING GIVES TWO SOLUTIONS.  PROBLEMS MATCHING PI P PHASE SHIFTS.
M  1    1535.0                  BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   1    WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M  2    1515.0                  BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   2    WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
   2    IS GREATEST.
M       1546.0                  LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
        WHERE THE ABSORPTION IS GREATEST.
        SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------- 63  N*1/2(1550) WIDTH (MEV) --------------------------

W  *    130.0                   HENDRY    65 RVUE
W       130.0                   MICHAEL   66 RVUE
W  N    156.0  OR  144.0        UCHIYAMA- 66 RVUE   SEE NOTE ON MASS
W  1    155.0                   BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W  2    105.0                   BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W       116.0                   LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
        THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

----------------- 63  N*1/2(1550) PARTIAL DECAY MODES ------------------

P1      N*1/2(1550) INTO PI N                       S 8S16
P2      N*1/2(1550) INTO N ETA                      S17S14
P3      N*1/2(1550) INTO N PI PI                    S16S 8S 8

----------------- 63  N*1/2(1550) BRANCHING RATIOS ---------------------

R1      N*1/2(1550) INTO (PI N)/TOTAL               (P1)/TOTAL
R1 *      0.69                  HENDRY    65 RVUE
R1        0.31   OR   0.43      DAVIES    66 RVUE   SOLUT. B OR C    11/67
R1 *      0.32                  MICHAEL   66 RVUE
R1 N      0.71   OR   0.28      UCHIYAMA- 66 RVUE   SEE NOTE ON MASS
R1        0.326                 LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67

R2      N*1/2(1550) INTO (N ETA)/TOTAL              (P2)/TOTAL
R2        DOMINANT INEL DECAY   HENDRY    65 RVUE
R2        0.69   OR   0.45      DAVIES    66 RVUE   SOLUT. B OR C    11/67
R2        0.68                  MICHAEL   66 RVUE
R2 N      0.29   OR   0.71      UCHIYAMA- 66 RVUE   SEE NOTE ON MASS

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                   REFERENCES -- N*1/2(1550)

HENDRY    65 PL 18 171          A W HENDRY, R G MOORHOUSE           //RTHFD
   --  REVIEWS EARLY PHASE-SHIFT-ANALYSIS RESULTS AND PI- P TO ETA N
       EXPERIMENTS.  WE TAKE NUMBERS FROM THE SOLUTION USING BRANDSEN 65.
BAREYRE   65 PL 18 342          + BRICMAN, STIRLING, VILLET     //SACLAY IJP
DAVIES    66 PREPRINT           A T DAVIES, R G MOORHOUSE   //GLASGOW,RTHFD
MICHAEL   66 PL 21 93           C MICHAEL                            //OXF
UCHIYAMA  66 PR 149 1220        F UCHIYAMA-CAMPBELL, R K LOGAN   //ILL IJP
BAREYRE   67 PR (SUBMITTED)     P BAREYRE, C BRICMAN, G VILLET  //SACLAY IJP
LOVELACE  67 HEIDELBERG CONF.   C LOVELACE                       //CERN IJP
            SEE ALSO --
DONNACHI  67 PREPRINT           A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

                    PAPERS NOT REFERRED TO IN DATA CARDS.

BRANDSEN  65 PR 139 B1566       +ODONNELL, MOORHOUSE        //DURHAM,RTHFD IJP
   --  BASIS OF NUMBERS WE QUOTE FROM HENDRY 65.

       THERE IS GETTING TO BE A WHOLE LITERATURE ON THE REACTIONS PI- P TO
       ETA N AND GAMMA P TO ETA P NEAR THRESHOLD AND THEIR CONNECTION WITH
       THE BEHAVIOR OF THE S11 AMPLITUDE AS DETERMINED IN PI P PHASE-SHIFT
       ANALYSIS.  THE READER IS INVITED TO PERUSE THE FOLLOWING RATHER IN-
       DIGESTIBLE COLLECTION.  FURTHER REFERENCES MAY BE FOUND IN THESE.

       MAINLY EXPERIMENTAL --
BULOS     64 PRL 13 486         +         //BROWN,BRANDEIS,HARVARD,MIT,PADOVA  I
RICHARDS  66 PRL 16 1221        +CHIU,EANDI,HELMHOLZ,KENNEY,+ //LRL,HAWAII  IJ
JONES     66 PL 23 597          +BINNIE,DUANE,HORSEY,MASON,+//IMPCOL,RTHFD
BACCI     66 NC 45A 983         +PENSO,SALVINI,MENCUCCINI,+//ROME,FRASCATI IJP
PREPOST   67 PRL 18 82          R PREPOST, D LUNDQUIST, D QUINN //STANFORD
       MAINLY THEORETICAL --
DOBSON    66 PR 146 1022        P N DOBSON                        //HAWAII
MINAMI    66 PR 147 1123        S MINAMI                           //OSAKA
BALL      66 PR 149 1191        J S BALL                            //UCLA
LOGAN     67 PR 153 1634        R K LOGAN, F UCHIYAMA-CAMPBELL       //ILL
MENCUCCI  67 NC 48A 579         C MENCUCCINI, A REALE           //FRASCATI
DEANS     67 PR 161 1466        S R DEANS, W G HOLLADAY       //VANDERBILT
MINAMI    67 PR 162 1619        S MINAMI                           //OSAKA

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Other possible N^* resonances, as reported by Lovelace (1967 Heidelberg Conference). The values are certainly not significant to the number of places given.

	Wave	Mass (MeV)	Γ_{tot} (MeV)	Γ_{el}/Γ_{tot}
Probable resonances.[a]	P_{33}	1688	281	0.098
	F_{35}	1913	350	0.163
	P_{31}	1934	339	0.299
	D_{13}	2057	293	0.260
Resonance interpretation in doubt.[b]	D_{33}	1691	269	0.137
	P_{13}	~1863	~296	~0.207
	D_{35}	~1954	~311	~0.154
Unconfirmed resonances.[c]	P_{11}	~1751	327	0.320
	F_{17}	1983	225	0.128

[a]There is some evidence for these in at least two of the three phase-shift analyses (CERN, LRL, Saclay).

[b]All analyses see something, but a resonance interpretation is in doubt. Possible threshold effects.

[c]Seen in only one analysis. Doubtful.

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Δ(1640)

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              82  N*3/2(1640, JP=1/2-) I=3/2      S3,1
              82  N*3/2(1640) MASS (MEV)     ---------------------------

                 THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
                 FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
                 OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
   LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
   AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

M  *   1646.0    12.0            DEVLIN    65 CNTR   PI+- P TOTAL
M  1   1695.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   1   WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M  2   1650.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   2   WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
   2   IS GREATEST.
M      1635.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       WHERE THE ABSORPTION IS GREATEST.
       SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------  82  N*3/2(1640) WIDTH (MEV)   -------------------------

W  1    250.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W  2    130.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W       177.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

----------------  82  N*3/2(1640) PARTIAL DECAY MODES   -----------------

P1     N*3/2(1640) INTO PI N                         S 8S16

----------------  82  N*3/2(1640) BRANCHING RATIOS   -------------------

R1     N*3/2(1640) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1        0.284                  LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67

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REFERENCES -- N*3/2(1640)


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DEVLIN   65 PRL 14 1031        T J DEVLIN,J SOLOMON,G BERTSCH //PRINCETON  I
BAREYRE  67 PR (SUBMITTED)     P BAREYRE, C BRICMAN, G VILLET    //SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.   C LOVELACE                          //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT           A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

               PAPERS NOT REFERRED TO IN DATA CARDS.

CARRUTHE 60 PRL 4 303          P CARRUTHERS                     //CORNELL  I
DEVLIN   62 PR 125 690         T J DEVLIN, B J MOYER, V PEREZ-MENDEZ//LRL  I
HELLAND  64 PR 134 B1062       +DEVLIN,HAGGE,LONGO,MOYER,WOOD        //LRL  I
BAREYRE  65 PL 18 342          + BRICMAN, STIRLING, VILLET       //SACLAY IJP
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N(1680)

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              64  N*1/2(1680, JP=5/2-) I=1/2      D1,5

                 THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
                 FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
                 OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
   LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
   AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------  64  N*1/2(1680) MASS (MEV)   -------------------------

M  *   1674.0                    DUKE      65 CNTR   PI+- P EL DSIG,P
M  *   1650.0      APPROX        BRANDSEN  65 RVUE   PHASE-SHIFT ANAL
M  1   1680.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   1   WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M  2   1655.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   2   WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
   2   IS GREATEST.
M      1678.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       WHERE THE ABSORPTION IS GREATEST.
       SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------  64  N*1/2(1680) WIDTH (MEV)   ------------------------

W  1    135.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W  2    105.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W       173.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

----------------  64  N*1/2(1680) PARTIAL DECAY MODES   -----------------

P1     N*1/2(1680) INTO  PI N                        S 8S16
P2     N*1/2(1680) INTO  N ETA                       S17S14
P3     N*1/2(1680) INTO  LAMBDA K                    S18S11
P4     N*1/2(1680) INTO N*3/2(1236) PI               U81S 8

----------------  64  N*1/2(1680) BRANCHING RATIOS   -------------------

R1     N*1/2(1680) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1  1     0.41                   BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
R1        0.391                  LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

R2     N*1/2(1680) INTO (N ETA)/TOTAL                (P2)/TOTAL
R2        0.025     OR LESS      TRIPP     67 RVUE                     8/67

R3     N*1/2(1680) INTO (LAMBDA K)/TOTAL             (P3)/TOTAL
R3        0.016     OR LESS      TRIPP     67 RVUE                     8/67

  SEE NOTE PRECEDING THE N*1/2(1688) INELASTIC DECAY MODE MEASUREMENTS.

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REFERENCES -- N*1/2(1680)


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DUKE     65 PRL 15 468         +JONES,KEMP,MURPHY,PRENTICE, + //RTHFC,OXF IJP
BRANDSEN 65 PL 19 420          +ODONNELL, MOORHOUSE        //DURHAM,RTHFD IJP
TRIPP    67 NP B3 10           + LEITH, +   //LRL,SLAC,CERN,HEIDEL,SACLAY
BAREYRE  67 PR (SUBMITTED)     P BAREYRE, C BRICMAN, G VILLET    //SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.   C LOVELACE                          //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT           A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

               PAPER NOT REFERRED TO IN DATA CARDS.

BAREYRE  65 PL 18 342          + BRICMAN, STIRLING, VILLET       //SACLAY IJP
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N(1688)

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              65  N*1/2(1688, JP=5/2+) I=1/2      F1,5

                 THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
                 FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
                 OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
   LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
   AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------  65  N*1/2(1688) MASS (MEV)   -------------------------

M  *   1688.0      APPROX        DUKE      65 CNTR   PI+- P EL DSIG,P
M  *   1680.0                    BRANDSEN  65 RVUE   PHASE SHIFT ANAL
M  1   1690.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   1   WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M  2   1680.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   2   WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
   2   IS GREATEST.
M      1692.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       WHERE THE ABSORPTION IS GREATEST.
       SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------  65  N*1/2(1688) WIDTH (MEV)   ------------------------

W  1    110.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W  2    105.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W       132.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

----------------  65  N*1/2(1688) PARTIAL DECAY MODES   -----------------

P1     N*1/2(1688) INTO  PI N                        S 8S16
P2     N*1/2(1688) INTO  N ETA                       S17S14
P3     N*1/2(1688) INTO  LAMBDA K                    S18S11
P4     N*1/2(1688) INTO N*3/2(1236) PI               U81S 8
P5     N*1/2(1688) INTO N PI                         S16S 8S 8
P6     N*1/2(1688)+ INTO NEUTRON PI+                 S17S 8
P7     N*1/2(1688)+ INTO PROTON PI+ PI-              S16S 8S 8
P8     N*1/2(1688)+ INTO N*3/2(1236)++ PI-           U81S 8

----------------  65  N*1/2(1688) BRANCHING RATIOS   -------------------

R1     N*1/2(1688) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1  1     0.64                   BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
R1        0.683                  LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

   WE LIST MEASUREMENTS OF THE INELASTIC DECAY MODES OF THE 1688 MEV BUMP.
   SUCH MEASUREMENTS HAVE NOT UNTANGLED THE D15 AND F15 (AND POSSIBLE S11)
   COMPONENTS.  IT IS CLEAR THAT BOTH D15 AND F15 DECAY ALOT INTO N PI PI.
   MERLO 66 FINDS SOME N*3/2(1236) PI (SLIGHTLY MORE THAN PHASE SPACE).
   ROBERTS 67 SUGGESTS THAT THE DOMINANT MODE IS N*1/2(1518).

R2     N*1/2(1688) INTO (N ETA)/TOTAL                (P2)/TOTAL
R2        0.025     OR LESS      KRAEMER   64 DBC  + PI+D 1.23 BEV/C
R2        0.042 OR LESS (95PC CL) A-BORELLI 67 HBC + PBAR P 5.7 BEV/C  8/67
R2        0.015                  TRIPP     67 RVUE                     8/67

R3     N*1/2(1688) INTO (N ETA)/(PI N)               (P2)/(P1)
R3        0.027     OR LESS      HEUSCH    66 RVUE + PI0, ETA PHOTO

R4     N*1/2(1688) INTO (LAMBDA K)/TOTAL             (P3)/TOTAL
R4        0.013 OR LESS (95PC CL) A-BORELLI 67 HBC +                   8/67
R4        0.0013                 TRIPP     67 RVUE                     8/67

R5     N*1/2(1688) INTO (N PI)/(N PI PI)             (P1)/(P5)
R5        1.26 OR LESS (95PC CL) A-BORELLI 67 HBC  +                   8/67

R6     N*1/2(1688) INTO (N*3/2(1236) PI)/(N PI PI)   (P4)/(P5)
R6        NO EVIDENCE            A-BORELLI 67 HBC  +                   8/67
R6     SEE MERLO 66 FOR A REVIEW.

R7     N*1/2(1688) INTO (NEUTRON PI+)/(P PI+ PI-)    (P6)/(P7)
R7        0.67      0.40         ALEXANDER 67 HBC  + PP 5.5 BEV/C     11/67

R8     N*1/2(1688) INTO (N*(1236)++ PI-)/(P PI+ PI-) (P8)/(P7)
R8        0.74      0.14         ALEXANDER 67 HBC  + PP 5.5 BEV/C     11/67
R8        1.0            0.3     ALMEIDA   66 HBC  + PP 10 BEV/C

R9     N*1/2(1688) INTO (LAMBDA K)/(P PI+ PI-)       (P3)/(P7)
R9        0.034     OR LESS      ALEXANDER 67 HBC  + PP 5.5 BEV/C     11/67

R10    N*1/2(1688) INTO (PI N)/(PI N*3/2(1236))      (P1)/(P4)
R10       0.77   OR LESS         LEE       67 HBC                     11/67

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REFERENCES -- N*1/2(1688)

SEE A PREVIOUS EDITION (RMP 37, 633, 1965) FOR EARLIER REFERENCES.


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KRAEMER  64 PR 136 B496        +MADANSKY,+ //J HOPKINS,NWESTERN,WOODSTOCK  I
DUKE     65 PRL 15 468         +JONES,KEMP,MURPHY,PRENTICE, + //RTHFC,OXF IJP
BRANDSEN 65 PL 19 420          +ODONNELL, MOORHOUSE        //DURHAM,RTHFD IJP
HEUSCH   66 PRL 17 1019        C A HEUSCH, C Y PRESCOTT, R F DASHEN //CIT
ALMEIDA  66 BERKELEY CONF      +RUSHBROOKE, +           //CAVNDSH,DESY(CERN)
MERLO    66 P ROY SOC 289 489  J P MERLO, G VALLADAS                //SACLAY
ALEXANDE 67 PR 154 1284        ALEXANDER,BENARY,CZAPEK,+ //WEIZMANN(CERN)
A-BORREL 67 NC 47 232          ALLES-BORELLI,FRENCH,FRISK,MICHEJDA //CERN
LEE      67 PR 159 1156        +MOEBS,ROE,SINCLAIR,VANDER VELDE     //MICH
TRIPP    67 NP B3 10           + LEITH, +   //LRL,SLAC,CERN,HEIDEL,SACLAY
BAREYRE  67 PR (SUBMITTED)     P BAREYRE, C BRICMAN, G VILLET    //SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.   C LOVELACE                          //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT           A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

               PAPERS NOT REFERRED TO IN DATA CARDS.

CROUCH   65 DESY CONF II 21    +  //BROWN,CEA,HARVARD,MIT,PADOVA,WEIZMANN
DERADO   65 ATHENS CONF 244    +KENNEY,LAMSA, +      //NOTRE DAME,KENTUCKY
ROBERTS  67 PREPRINT           R G ROBERTS                          //DURHAM
    --  THE ABOVE PAPERS DISCUSS INELASTIC CHANNELS NEAR THE BUMP.
BAREYRE  65 PL 18 342          + BRICMAN, STIRLING, VILLET       //SACLAY IJP
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N(1710)

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              66  N*1/2(1710, JP=1/2-) I=1/2      S1,1

                 THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
                 FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
                 OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
   LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
   AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

              66  N*1/2(1710) MASS (MEV)   ---------------------------

M  *   1695.0                    BRANDSEN  65 RVUE   PHASE-SHIFT ANAL
M  *   1700.0                    MICHAEL   66 RVUE   FITS BAREYRE S11
M  1   1710.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   1   WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M  2   1665.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
   2   WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
   2   IS GREATEST.
M      1709.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       WHERE THE ABSORPTION IS GREATEST.
       SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

----------------  66  N*1/2(1710) WIDTH (MEV)   ------------------------

W  *    240.0                    MICHAEL   66 RVUE
W  1    260.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W  2    110.0                    BAREYRE   67 RVUE   PHASE-SHIFT ANAL 11/67
W       300.0                    LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67
       THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.
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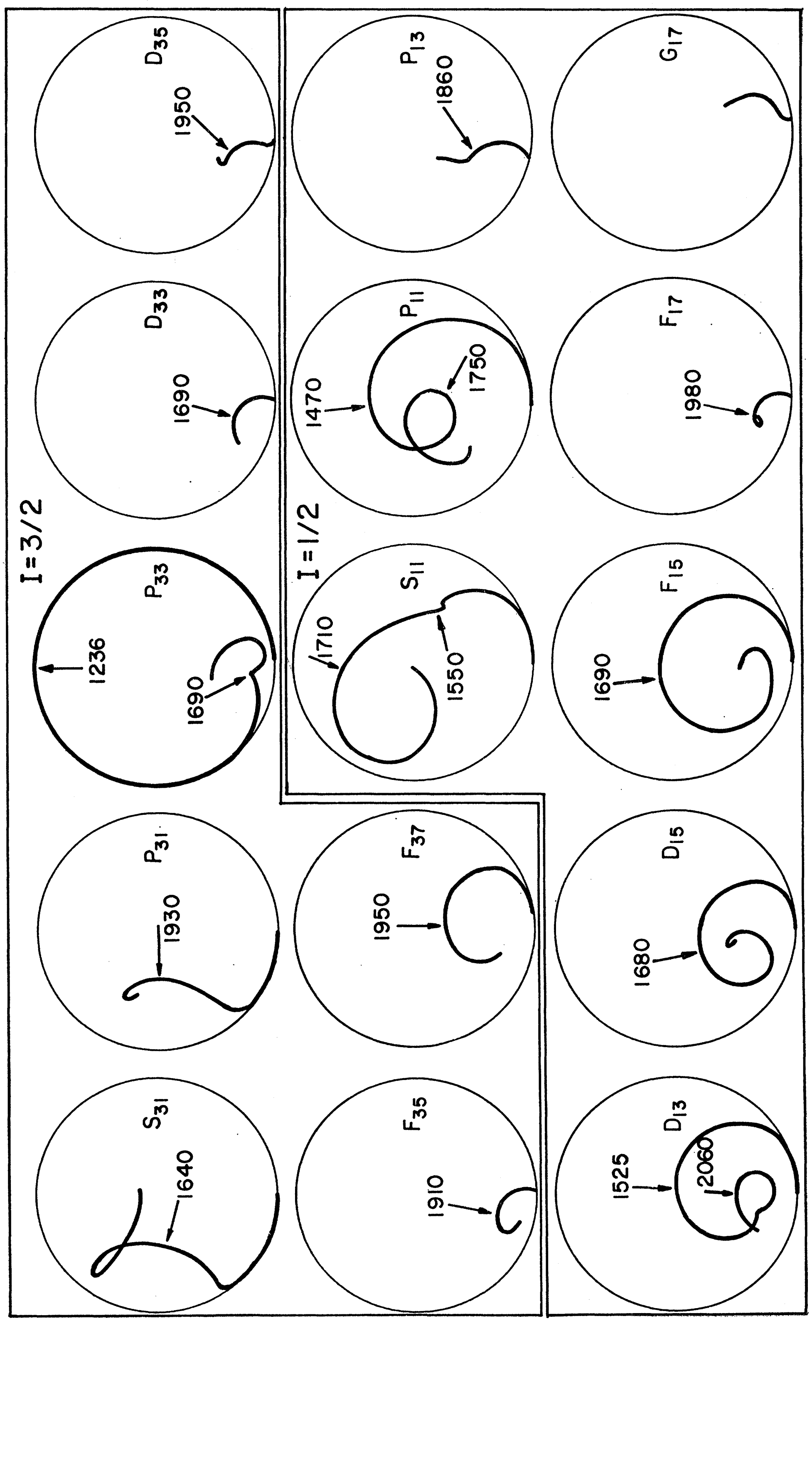
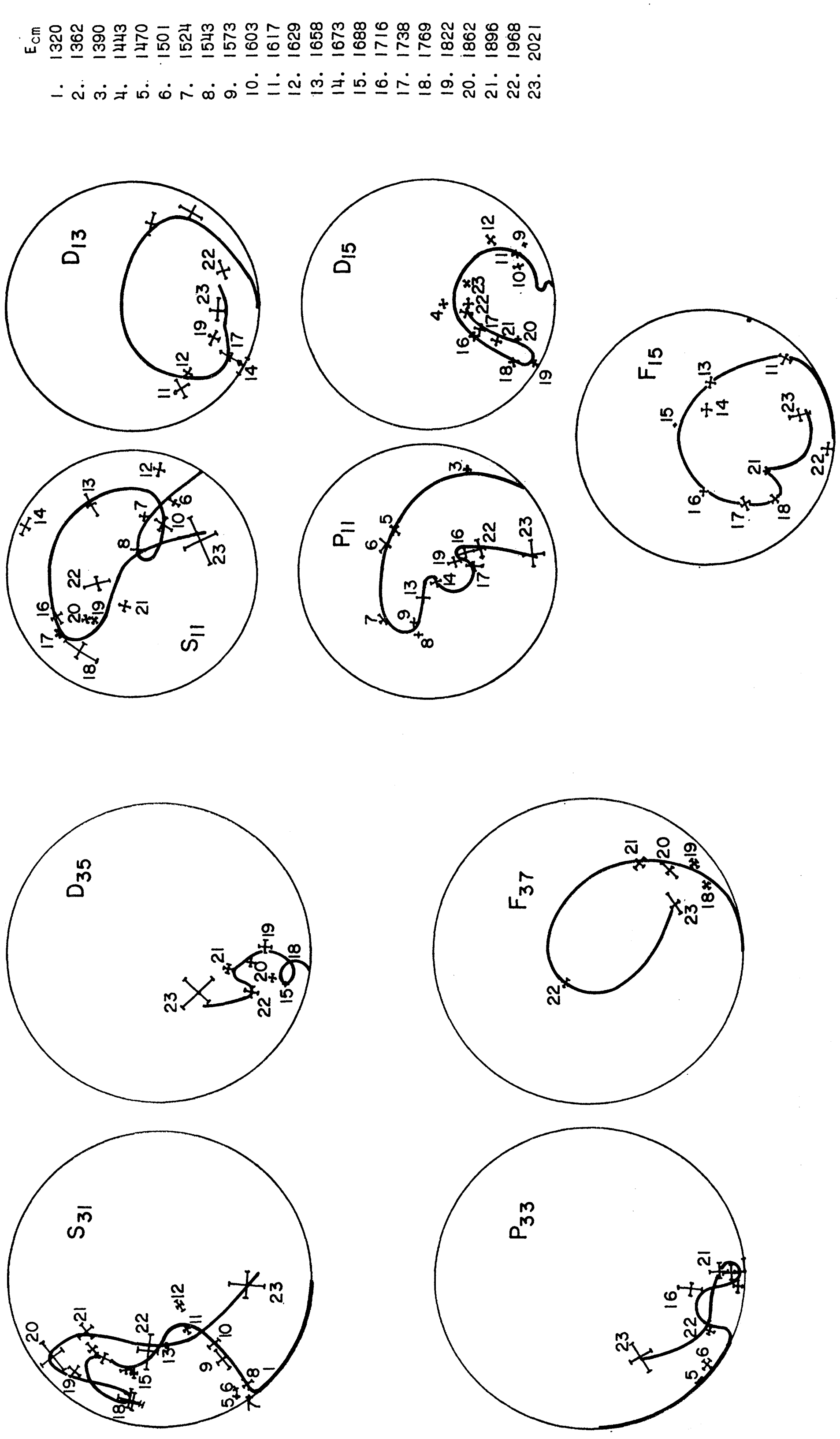
PARTIAL WAVE AMPLITUDES OBTAINED FROM THE DISPERSION RELATION RESULTS OF THE CERN GROUP
(Arrows point to approximate resonance positions.)



PARTIAL WAVE AMPLITUDES OBTAINED BY THE SACLAY PHASE SHIFT ANALYSIS (BAREYRE et al)



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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-----------------  66  N*1/2(1710) PARTIAL DECAY MODES  -------------------

P1        N*1/2(1710) INTO PI N                              S 8S16
P2        N*1/2(1710) INTO N ETA                             S17S14
P3        N*1/2(1710) INTO LAMBDA K                          S18S11

-----------------  66  N*1/2(1710) BRANCHING RATIOS  ----------------------

R1        N*1/2(1710) INTO (PI N)/TOTAL                  (P1)/TOTAL
R1  *        1.0          APPROX      MICHAEL    66 RVUE
R1  -        0.786                    LOVELACE   67 RVUE    PHASE-SHIFT ANAL 11/67

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                         REFERENCES -- N*1/2(1710)

BAREYRE  65 PL 18 342        + BRICMAN, STIRLING, VILLET         //SACLAY IJP
BRANDSEN 65 PL 19 420        +ODONNELL, MOORHOUSE           //DURHAM,RTHFD IJP
MICHAEL  66 PL 21 93         C MICHAEL                              //OXF
BAREYRE  67 PR (SUBMITTED)   P BAREYRE, C BRICMAN, G VILLET      //SACLAY IJP
LOVELACE 67 HEIDELBERG CONF. C LOVELACE                          //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT         A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

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Δ(1920)

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83  N*3/2(1920, JP=7/2+) I=3/2        F3,7
63  N*3/2(1920) MASS (MEV)    ---------------------------

          THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE
          FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
          OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE
    LATEST PHASE-SHIFT ANALYSES.  SEE THE TABLE FOLLOWING THE N*1/2(1518)
    AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

M   *     1922.0         APPROX       COOL       56 CNTR    PI+ P TOTAL
M   *     1912.0    15.0              BRISSON    61 CNTR    PI+ P TOTAL
M   N     1956.0                      LAYSON     63 RVUE    PI P TOTAL, EL
M   N     ASSUMES AN N*3/2(1655).
M   *     1920.0                      HOHLER     64 RVUE    DATA + DISP REL
M   *     1900.0     9.0              DEVLIN     65 CNTR    PI+ P TOTAL
M   *     1920.0         APPROX       DUKE       65 CNTR    PI+- P EL, POLAR
M   *     1950.0         APPROX       YOKOSAWA   66 CNTR    PI- P DSIG + POL
M   1     1975.0                      BAREYRE    67 RVUE    PHASE-SHIFT ANAL 11/67
    1     WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.
M   2     1980.0                      BAREYRE    67 RVUE    PHASE-SHIFT ANAL 11/67
    2     WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM
    2     IS GREATEST.
M         1946.0                      LOVELACE   67 RVUE    PHASE-SHIFT ANAL 11/67
          WHERE THE ABSORPTION IS GREATEST.
          SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

-----------------  63  N*3/2(1920) WIDTH (MEV)   -------------------------
W   *      170.0                      HOHLER     64 RVUE
W   *      256.0    39.0              DEVLIN     65 CNTR
W   *      170.0                      DUKE       65 CNTR
W   *      200.0         APPROX       YOKOSAWA   66 CNTR
W   1      180.0                      BAREYRE    67 RVUE    PHASE-SHIFT ANAL 11/67
W   2      140.0                      BAREYRE    67 RVUE    PHASE-SHIFT ANAL 11/67
W          221.0                      LOVELACE   67 RVUE    PHASE-SHIFT ANAL 11/67
          THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

-----------------  63  N*3/2(1920) PARTIAL DECAY MODES  -------------------

P1        N*3/2(1920) INTO PI N                              S 8S16
P2        N*3/2(1920) INTO SIGMA K                           S20S10
P3        N*3/2(1920) INTO N*3/2(1236) PI                    U81S 8

-----------------  63  N*3/2(1920) BRANCHING RATIOS  ----------------------

R1        N*3/2(1920) INTO (PI N)/TOTAL                  (P1)/TOTAL
R1  N        0.33                     LAYSON     63 RVUE
R1  N     ASSUMES AN N*3/2(1655).
R1  *        0.73         OR LESS     HOHLER     63 RVUE    DATA + DISP REL
R1  *        0.57     0.12            DEVLIN     65 CNTR
R1  *        0.41                     DUKE       65 CNTR    VERY ENERGY DEP
R1  *        0.4          APPROX      YOKOSAWA   66 CNTR
R1  1        0.57                     BAREYRE    67 RVUE    PHASE-SHIFT ANAL 11/67
R1           0.386                    LOVELACE   67 RVUE    PHASE-SHIFT ANAL 11/67
          THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.

R2        N*3/2(1920) INTO (SIGMA K)/TOTAL               (P2)/TOTAL
R2           SEEN                     HOLLADAY   65 RVUE    PI+P DATA        11/66

R3        N*3/2(1920) INTO (PI N)/(PI N*3/2(1236))       (P1)/(P3)
R3           0.55     OR LESS         LEE        67 HBC                      11/67

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                         REFERENCES -- N*3/2(1920)

COOL     56 PR 103 1082      R COOL, O PICCIONI, D CLARK            //BNL  I
BRISSON  61 NC 19 210        +DETOEUF,FALK-VAIRANT,VAN ROSSUM,+//SACLAY  I
LAYSON   63 NC 27 724        W M LAYSON                            //CERN IJ
HOHLER   63 NP 48 470        G HOHLER, G EBEL                 //KARLSRUHE  I
HOHLER   64 PL 12 149        G HOHLER, J GIESECKE             //KARLSRUHE  I
DEVLIN   65 PRL 14 1031      T J DEVLIN,J SOLOMON,G BERTSCH //PRINCETON  I
DUKE     65 PRL 15 468       +JONES,KEMP,MURPHY,PRENTICE, + //RTHFD,OXF IJP
HOLLADAY 65 PR 139 B1348     W G HOLLADAY                   //VANDERBILT
YOKOSAWA 66 PRL 16 714       +SUWA, HILL, ESTERLING, BOOTH    //ARG,CHI IJP
LEE      67 PR 159 1156      +MOEBS,ROE,SINCLAIR,VANDER VELDE     //MICH
BAREYRE  67 PR (SUBMITTED)   P BAREYRE, C BRICMAN, G VILLET    //SACLAY IJP
LOVELACE 67 HEIDELBERG CONF. C LOVELACE                          //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT         A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

                 PAPERS NOT REFERRED TO IN DATA CARDS.

HELLAND  64 PR 134 B1062     +DEVLIN,HAGGE,LONGO,MOYER,WOOD         //LRL  IJ
AUVIL    64 NC 33 473        P AUVIL, C LOVELACE                 //IMPCOL IJP

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N(2080)

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70  N*   (2080, JP=    ) I=

          YOON 67 SEE A NARROW BUMP IN THE INVARIANT MASS OF
          (P PI+ PI- PI0) FROM 3 BEV/C PI- P TO (PI- P PI+ PI-
    RHO-.  AT 3.2 BEV/C, WITH APPROXIMATELY THREE TIMES THE NUMBER OF
    EVENTS, THE EFFECT IS NOT SEEN (CHUNG 66 AND KIRZ 67).  OMITTED FROM
    TABLE.

-----------------  70  N*   (2080) MASS (MEV)   ---------------------------

M        2080.0    12.0            YOON       67 HBC  +  3 BEV/C PI-P     8/67

-----------------  70  N*   (2080) WIDTH (MEV)   --------------------------

W          40.0    20.0            YOON       67 HBC  +                   8/67

-----------------  70  N*   (2080) PARTIAL DECAY MODES   -----------------

P1        N*   (2080) INTO PI N
P2        N*   (2080) INTO N*3/2(1236) RHO

-----------------  70  N*   (2080) BRANCHING RATIOS       ----------------

R1        N*   (2080) INTO (N*3/2(1236) RHO)/TOTAL      (P2)/TOTAL
R1              SEEN                   YOON     67 HBC  +                 8/67

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                         REFERENCES -- N*   (2080)

YOON     67 PL 24B 307       +BERENYI,KEY,PRENTICE, +      //TORONTO,WISC
CHUNG    66 UCRL-16881 THESIS S U CHUNG                             //LRL
KIRZ     67 PRIVATE COMM.     J KIRZ                                //LRL

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N(2190)

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71  N*1/2(2190, JP=7/2-) I=1/2        G1,7
71  N*1/2(2190) MASS (MEV)    ---------------------------

M          2190.0                      DIDDENS   63 CNTR   PI+- P TOTAL
M          2210.0                      HOHLER    64 RVUE   DATA + DISP REL
M          2190.0       APPROX         YOKOSAWA  66 CNTR   PI- P DSIG + POL
M          2265.0                      LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67

-----------------  71  N*1/2(2190) WIDTH (MEV)   -------------------------

W           200.0                      DIDDENS   63 CNTR
W           200.0                      HOHLER    64 RVUE
W           220.0       APPROX         YOKOSAWA  66 CNTR
W           298.0                      LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67

-----------------  71  N*1/2(2190) PARTIAL DECAY MODES   ------------------

P1        N*1/2(2190) INTO PI N                           S 8S16
P2        N*1/2(2190) INTO LAMBDA K                       S18S11

-----------------  71  N*1/2(2190) BRANCHING RATIOS   --------------------

R1        N*1/2(2190) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1           0.3        APPROX         DIDDENS.  63 CNTR
R1           0.3        APPROX         YOKOSAWA  66 CNTR
R1           0.349                     LOVELACE  67 RVUE   PHASE-SHIFT ANAL 11/67

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                         REFERENCES -- N*1/2(2190)

DIDDENS  63 PRL 10 262       +JENKINS, KYCIA, RILEY                //BNL  I
HOHLER   64 PL 12 149        G HOHLER, J GIESECKE             //KARLSRUHE  I
YOKOSAWA 66 PRL 16 714       +SUWA,HILL,ESTERLING,BOOTH          //ARG,CHI JP
LOVELACE 67 HEIDELBERG CONF. C LOVELACE                          //CERN IJP
         SEE ALSO --
DONNACHI 67 PREPRINT         A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS.

CARROLL  66 PRL 16 288       +CORBETT,DAMERELL,MIDDLEMAS, + //RTHFD,OXF J-L
CARROLL  66 PRL 17 1274      +CORBETT,DAMERELL,MIDDLEMAS, + //RTHFD,OXF J-L
     --  ERRATUM CHANGING THE RATHER WEAK DETERMINATION OF J-L TO +1/2.
KORMANYO 66 PRL 16 709       KORMANYOS,KRISCH,OFALLON, +      //MICH,ARG  P
BARGER   66 PRL 16 913       V BARGER, D CLINE                      //WISC  P

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Δ(2420)

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84  N*3/2(2420, JP=11/2+) I=3/2

    PARTIAL WAVE ANALYSIS OF BELLAMY 67 SUGGESTS J=11/2

84  N*3/2(2420) MASS (MEV)    ---------------------------

M   *     2360.0                      DIDDENS    63 CNTR    PI+ P TOTAL
M   *     2520.0    40.0              ALVAREZ    64 CNTR    PI PHOTOPROD
M   *     2400.0         APPROX       WAHLIG     64 SPRK C  PI-P CH EX
M   *     2440.0                      HOHLER     64 RVUE  . DATA + DISP REL
M         2423.0    10.0              CITRON     66 CNTR    PI+ P TOTAL
M   B     2452.0                      BARGER     66 RVUE    TOTAL + CH EX    11/67

-----------------  84  N*3/2(2420) WIDTH (MEV)   -------------------------

W   *      200.0                      DIDDENS    63 CNTR
W   *      245.0                      HOHLER     64 RVUE
W          310.0    20.0              CITRON     66 CNTR
W   B      275.0                      BARGER     66 RVUE    TOTAL + CH EX    11/67


-----------------  84  N*3/2(2420) PARTIAL DECAY MODES   -----------------

P1        N*3/2(2420) INTO PI N                              S 8S16
P2        N*3/2(2420) INTO SIGMA K                           S20S10

-----------------  84  N*3/2(2420) BRANCHING RATIOS   --------------------

R1        N*3/2(2420) INTO (PI N)/TOTAL                  (P1)/TOTAL
R1  *        0.067        APPROX      DIDDENS    63 CNTR   ASSUMING J=11/2
R1           0.113    0.0036          CITRON     66 CNTR   ASSUMING J=11/2
R1  B        0.117    0.004           BARGER     66 FIT    ASSUMING J=11/2  11/67
R1  B        0.12                     BARGER     67 FIT    ASSUMING J=11/2  11/67
    B  USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE
    B  FOR CRITICISM  TO THIS METHOD SEE  DOLEN 67
R1  D        0.163                    DIKMEN     67 FIT    ASSUMING J=11/2  11/67
    D  USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES
R1           0.06                     KORMANYOS 67 CNTR    ASSUMING J=11/2  11/67

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                         REFERENCES -- N*3/2(2420)

DIDDENS  63 PRL 10 262       +JENKINS, KYCIA, RILEY                //BNL  I
ALVAREZ  64 PRL 12 710       +BAR-YAM,KERN,LUCKEY,OSBORNE, +  //MIT,CEA
WAHLIG   64 PRL 13 103       +MANNELLI,SODICKSON,FACKLER,WARD, +  //MIT
HOHLER   64 PL 12 149        G HOHLER, J GIESECKE             //KARLSRUHE  I
CITRON   66 PR 144 1101      +GALBRAITH,KYCIA,LEONTIC,PHILLIPS, + //BNL  I
BARGER   66 PR 151 1123      V BARGER, M OLSSON                     //WISC
BARGER   67 PR 155 1792      V BARGER, D CLINE                      //WISC  P
DIKMEN   67 PRL 18 798       F N DIKMEN                             //MICH
DOLEN    67 CALT-68-143      DOLEN,HORN,SCHMID/////////////////CALTECH
KORMANYO 67 PR (ACCEPTED)    KORMANYOS,KRISCH,OFALLON, +      //MICH,ARG  P

                 PAPERS NOT REFERRED TO IN DATA CARDS.

DOBROWOL 67 PL 24B 203       DOBROWOLSKI,GUSKOV,LIKHACHEV, +      //DUBNA  P
BELLAMY  67 PRL 19 476       +BUCKLEY,DOBINSON, +    //WESTFIELD,UNICOL  JP
BAACKE   67 NC 51A 761       J BAACKE, M YVERT          //KARLSRUHE,ORSAY J-L

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

N(2650)

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72  N*1/2(2650, JP=    -) I=1/2

72  N*1/2(2650) MASS (MEV)      ---------------------------

M    *     2700.0                     ALVAREZ   64 CNTR    PI PHOTOPROD
M    *     2600.0       APPROX        WAHLIG    64 SPRK C  PI-P CH EX
M    *     2660.0                     HOHLER    64 RVUE    DATA + DISP REL
M          2649.0    10.0             CITRON    66 CNTR    PI+- P TOTAL
M    *     2633.0                     BARGER    66 FIT     TOTAL + CH EX    11/67

----------------  72  N*1/2(2650) WIDTH (MEV)   --------------------------

W    *      100.0                     ALVAREZ   64 CNTR
W    *      200.0                     HOHLER    64 RVUE
W           360.0    20.0             CITRON    66 CNTR
W    *      425.0                     BARGER    66 FIT     TOTAL + CH EX    11/67

----------------  72  N*1/2(2650) PARTIAL DECAY MODES     -----------------

P1         N*1/2(2650) INTO PI N                         S 8S16
P2         N*1/2(2650) INTO LAMBDA K                     S18S11

----------------  72  N*1/2(2650) BRANCHING RATIOS    --------------------

R1         N*1/2(2650) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1    ONLY (J+1/2)*( PI N/TOTAL) MEASURED FOR THIS STATE
R1             0.436     0.028        CITRON    66 CNTR    TOTAL CRCSS-SEC. 11/67
R1   B         0.456     0.018        BARGER    66 RVUE    TOTAL + CH EXC.  11/67
R1   B         0.30                   BARGER    67 RVUE    USES KORMANYOS67 11/67
     B  USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE
     B  FOR CRITICISM  TO THIS METHOD SEE  DOLEN 67
R1   D         0.24                   DIKMEN    67 RVUE    USES KORMANYOS66 11/67
     D  USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES
R1             0.06                   KORMANYOS 67 CNTR    PI-P AT 180 DEG. 11/67

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                        REFERENCES -- N*1/2(2650)

ALVAREZ  64 PRL 12 710        +BAR-YAM,KERN,LUCKEY,OSBORNE, +  //MIT,CEA
WAHLIG   64 PRL 13 103        +MANNELLI,SODICKSON,FACKLER,WARD, +  //MIT
HOHLER   64 PL 12 149         G HOHLER, J GIESECKE             //KARLSRUHE  I
CITRON   66 PR 144 1101       +GALBRAITH,KYCIA,LEONTIC,PHILLIPS, + //BNL  I
BARGER   66 PR 151 1123       V BARGER, M OLSSON                     //WISC
BARGER   67 PR 155 1792       V BARGER, D CLINE                      //WISC  P
DIKMEN   67 PRL 18 798        F N DIKMEN                             //MICH
DOLEN    67 CALT-68-143       DOLEN,HORN,SCHMID/////////////////CALTECH
KORMANYO 67 PR (ACCEPTED)     KORMANYOS,KRISCH,OFALLON, +     //MICH,ARG  P

               PAPER NOT REFERRED TO IN DATA CARDS.

BAACKE   67 NC 51A 761        J BAACKE, M YVERT        //KARLSRUHE,ORSAY J-L
KORMANYO 66 PRL 16 709        KORMANYOS,KRISCH,OFALLON+/////////MICH,ARG

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Δ(2850)

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85  N*3/2(2850, JP=    +) I=3/2

85  N*3/2(2850) MASS (MEV)     ---------------------------

M    *     2700.0       APPROX        WAHLIG    64 SPRK C  PI-P CH EX
M    *     2870.0                     HOHLER    64 RVUE    DATA + DISP REL
M          2850.0    12.0             CITRON    66 CNTR    PI+ P TOTAL
M    *     2850.0                     BARDADIN  66 HBC  ++ N* TO P + 3 PIS

----------------  85  N*3/2(2850) WIDTH (MEV)    --------------------------

W           400.0    40.0             CITRON    66 CNTR
W    *      150.0                     BARDADIN  66 HBC  ++

----------------  85  N*3/2(2850) PARTIAL DECAY MODES     -----------------

P1         N*3/2(2850) INTO PI N                         S 8S16
P2         N*3/2(2850) INTO P PI PI PI                   S16S 8S 8S 8

----------------  85  N*3/2(2850) BRANCHING RATIOS    --------------------

R1         N*3/2(2850) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1    ONLY (J+1/2)*( PI N/TOTAL) MEASURED FOR THIS STATE
R1             0.261     0.048        CITRON    66 CNTR    TOTAL CRCSS.SEC. 11/67
R1   B         0.224     0.016        BARGER    66 RVUE    TOTAL + CH EXC.  11/67
R1   B         0.40                   BARGER    67 RVUE    USES KORMANYOS66 11/67
     B  USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE
     B  FOR CRITICISM  TO THIS METHOD SEE  DOLEN 67
R1   D         0.49                   DIKMEN    67 RVUE    USES KORMANYOS67 11/67
     D  USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES
R1             0.10                   KORMANYOS 67 CNTR    PI-P AT 180 DEG. 11/67
R1             0.39                   DOBROWOLS 67 CNTR    PI+P AT 180 DEG

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                        REFERENCES -- N*3/2(2850)

WAHLIG   64 PRL 13 103        +MANNELLI,SODICKSON,FACKLER,WARD, +  //MIT
HOHLER   64 PL 12 149         G HOHLER, J GIESECKE             //KARLSRUHE  I
CITRON   66 PR 144 1101       +GALBRAITH,KYCIA,LEONTIC,PHILLIPS, + //BNL  I
BARDADIN 66 PL 21 357         BARDADIN-OTWINOWSKA,DANYSZ, +      //WARSAW
BARGER   66 PR 151 1123       V BARGER, M OLSSON                     //WISC
KORMANYO 66 PRL 16 709        KORMANYOS,KRISCH,OFALLON+/////////MICH,ARG
BARGER   67 PR 155 1792       V BARGER, D CLINE                      //WISC  P
DIKMEN   67 PRL 18 798        F N DIKMEN                             //MICH
DOLEN    67 CALT-68-143       DOLEN,HORN,SCHMID/////////////////CALTECH
DOBROWOL 67 PL 248 203        DOBROWOLSKI,GUSKOV,LIKHACHEV, +     //DUBNA  P
KORMANYO 67 PR (ACCEPTED)     KORMANYOS,KRISCH,OFALLON, +      //MICH,ARG  P

               PAPERS NOT REFERRED TO IN DATA CARDS.

BAACKE   67 NC 51A 761        J BAACKE, M YVERT        //KARLSRUHE,ORSAY J-L

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N(3030)

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73  N*1/2(3030, JP=     ) I=1/2

73  N*1/2(3030) MASS (MEV)     ---------------------------

M    *     3080.0                     HOHLER    64 RVUE    DATA + DISP REL
M          3030.0                     CITRON    66 CNTR    PI+- P TOTAL

----------------  73  N*1/2(3030) WIDTH (MEV)    --------------------------

W           400.0                     CITRON    66 CNTR

----------------  73  N*1/2(3030) PARTIAL DECAY MODES     -----------------

P1         N*1/2(3030) INTO PI N                         S 8S16

----------------  73  N*1/2(3030) BRANCHING RATIOS    --------------------

R1         N*1/2(3030) INTO (PI N)/TOTAL                 (P1)/TOTAL
R1    ONLY (J+1/2)*( PI N/TOTAL) MEASURED FOR THIS STATE
R1             0.048                  CITRON    66 CNTR    TOTAL CRCS.SEC.  11/67
R1   B         0.068     0.016        BARGER    66 RVUE    TOTAL + CH EXC.  11/67
R1   B         0.12                   BARGER    67 CNTR    USES KORMANYOS66 11/67
     B  USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE
     B  FOR CRITICISM  TO THIS METHOD SEE  DOLEN 67
R1   D         0.016                  DIKMEN    67 RVUE    USES KORMANYOS67 11/67
     D  USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES

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                        REFERENCES -- N*1/2(3030)

HOHLER   64 PL 12 149         G HOHLER, J GIESECKE             //KARLSRUHE  I
CITRON   66 PR 144 1101       +GALBRAITH,KYCIA,LEONTIC,PHILLIPS, + //BNL  I
BARGER   66 PR 151 1123       V BARGER, M OLSSON                     //WISC
KORMANYO 66 PRL 16 709        KORMANYOS,KRISCH,OFALLON+/////////MICH,ARG
BARGER   67 PR 155 1792       V BARGER, D CLINE                      //WISC  P
DIKMEN   67 PRL 18 798        F N DIKMEN                             //MICH
DOLEN    67 CALT-68-143       DOLEN,HORN,SCHMID/////////////////CALTECH

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Δ(3230)

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86  N*3/2(3230, JP=     ) I=3/2

86  N*3/2(3230) MASS (MEV)     ---------------------------

M          3230.0                     CITRON    66 CNTR    PI+ P TOTAL

----------------  86  N*3/2(3230) WIDTH (MEV)    --------------------------

W           440.0                     CITRON    66 CNTR

----------------  86  N*3/2(3230) PARTIAL DECAY MODES     -----------------

P1         N*3/2(3230) INTO PI N                         S 8S16

----------------  86  N*3/2(3230) BRANCHING RATIOS    --------------------

R1    ONLY (J+1/2)*( PI N/TOTAL) MEASURED FOR THIS STATE
R1             0.06                   CITRON    66 CNTR    TOTAL CRCS. SEC. 11/67
R1   B         0.03      0.01         BARGER    66 RVUE    TOTAL + CH EXC.  11/67
R1   B         0.03   TO 0.1          BARGER    67 CNTR    USES KORMANYOS66 11/67
     B  USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE
     B  FOR CRITICISM  TO THIS METHOD SEE  DOLEN 67
R1   D         0.25                   DIKMEN    67 RVUE    USES KORMANYOS67 11/67
     D  USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES

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                        REFERENCES -- N*3/2(3230)

CITRON   66 PR 144 1101       +GALBRAITH,KYCIA,LEONTIC,PHILLIPS, + //BNL  I
BARGER   66 PR 151 1123       V BARGER, M OLSSON                     //WISC
KORMANYO 66 PRL 16 709        KORMANYOS,KRISCH,OFALLON+/////////MICH,ARG
BARGER   67 PR 155 1792       V BARGER, D CLINE                      //WISC  P
DIKMEN   67 PRL 18 798        F N DIKMEN                             //MICH
DOLEN    67 CALT-68-143       DOLEN,HORN,SCHMID/////////////////CALTECH

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N?(3245)

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74  N*   (3245, JP=    +)

    EXISTENCE NOT CONCLUSIVELY ESTABLISHED.  I-SPIN
    NOT DETERMINED, BUT THE NARROW WIDTH PRECLUDES
    IDENTIFICATION WITH THE N*3/2(3230).  OMITTED
    FROM TABLE.

----------------  74  N* /2(3245) MASS (MEV)    --------------------------

M          3245.0    10.0             KORMANYOS 66 CNTR    PI-P EL AT 180 D

----------------  74  N* /2(3245) WIDTH (MEV)    --------------------------

W            35.0     OR LESS         KORMANYOS 66 CNTR

----------------  74  N* /2(3245) PARTIAL DECAY MODES     -----------------

P1         N* /2(3245) INTO PI N                         S 8S16

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                        REFERENCES -- N* /2(3245)

KORMANYO 67 PR (ACCEPTED)     KORMANYOS,KRISCH,OFALLON, +      //MICH,ARG  P

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N(3690)

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75  N*1/2(3690, JP=     ) I=1/2

    A BUMP SEEN IN THE INVARIANT MASS OF A VERY COMPLI-
    CATED STATE (N + SEVEN PIS), SO AS EVIDENCE FOR
    A NEW RESONANCE IT IS NOT CONCLUSIVE.  NOT INCLUDED
    IN TABLE.

----------------  75  N*1/2(3690) MASS (MEV)    --------------------------

M          3690.0    10.0             BARTKE    67 HBC   + PI+P 8 PRONGS     8/67

----------------  75  N*1/2(3690) WIDTH (MEV)    --------------------------

W            50.0    30.0             BARTKE    67 HBC   +                   8/67

----------------  75  N*1/2(3690) PARTIAL DECAY MODES     -----------------

P1         N*1/2(3690) INTO N + 7 PIS                    +

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                        REFERENCES -- N*1/2(3690)

BARTKE   67 PL 248 118        +CZYZEWSKI,DANYSZ, +  //CRACOW,ORSAY(CERN)  I

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N*5/2(1560)

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91  N*5/2(1560, JP=     ) I=5/2

    IT HAS BEEN SUSPECTED ALMOST FROM THE BEGINNING THAT
    THIS IS A KINEMATIC EFFECT AND NOT A RESONANCE.  RE-
    CENT EVIDENCE STRONGLY SUPPORTING THIS INTERPRETATION
    IS GIVEN IN GOLDHABER 67.  OMITTED FROM TABLE.

----------------  91  N*5/2(1560) MASS (MEV)    --------------------------

M          1560.0    20.0             GOLDHABER 64 HBC  +++3.65 BEV/C PI+ P
M          1570.0                     ALEXANDER 67 HBC  +++PP 4PI 5.5 BEV/C
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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-----------------   91  N*5/2(1560) WIDTH (MEV)   ---------------------------

W          220.0      20.0            GOLDHABER 64 HBC   +++
W          140.0                      ALEXANDER 67 HBC   +++

-----------------   91  N*5/2(1560) PARTIAL DECAY MODES   -------------------

P1        N*5/2(1560) INTO N PI PI                         S16S 8S 8
P2        N*5/2(1560) INTO N*3/2(1236) PI                  L61S 8

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                      REFERENCES -- N*5/2(1560)

GOLDHABE 64 DUBNA CONF 1 480  G+S GOLDHABER,OHALLORAN,SHEN    //LRL(BNL)  I
DASH     65 LRL UCID-2752     + DASH, G GOLDHABER, J SWIHART        //LRL
CONTE    66 BERKELEY CONF     +DAKERI,RATTI,RUSSO, + //GENOVA,MILANO,OXF
ALEXANDE 67 PR 154 1284       ALEXANDER,BENARY,CZAPEK,+ //WEIZMANN(CERN)
GOLDHABE 67 CORAL GABLES 190  G GOLDHABER                           //LRL

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$Z_0(1865)$

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                 96  Z*0(1865, JP=     ) I=0

                   THE SIZE AND NARROWNESS OF THE I=0 PEAK MAKE IT DIFFI-
                   CULT TO INTERPRET IT AS OTHER THAN RESONANT.  THE DIS-
                   PERSION-RELATION ANALYSIS BY CARTER 67 SUPPORTS
   A RESONANCE INTERPRETATION.  BUT IN VIEW OF THE IMPLICATIONS OF THE
   EXISTENCE OF S=+1 BARYONS, IT MUST BE STRESSED THAT THE RESONANCE
   INTERPRETATION IS NOT CONCLUSIVELY ESTABLISHED.

-----------------   96  Z*0(1865) MASS (MEV)   -----------------------------

M          1868.0     10.0            KYCIA     67 CNTR   K+P, D TOTAL     8/67
M          1860.0     15.0            CARTER    67 THEO   DISPERSION REL.  8/67
M          . . . . . . . . . .
M    AVG   1865.5385   8.3205   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

-----------------   96  Z*0(1865) WIDTH (MEV)   ----------------------------

W          160.0      30.0            KYCIA     67 CNTR                    8/67
W          200.0      50.0            CARTER    67 THEO                    8/67
W          . . . . . . . . . .
W    AVG   170.5882   25.7248   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

-----------------   96  Z*0(1865) PARTIAL DECAY MODES   --------------------

P1        Z*0(1865) INTO K N                               S10S17

-----------------   96  Z*0(1865) BRANCHING RATIOS   -----------------------

R1        Z*0(1865) INTO (K N)/TOTAL                      (P1)/TOTAL
R1          0.40      0.05            KYCIA     67 CNTR    IF J=1/2        8/67
R1          0.31      0.05            CARTER    67 THEO    IF J=1/2        8/67
R1          . . . . . . . . . .
R1   AVG      .3550     .0450   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)

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                      REFERENCES -- Z*0(1865)

KYCIA     67 PRIVATE COMM.      T F KYCIA                           //BNL  I
CARTER    67 PRL 18 801         A A CARTER                    //CAVENDISH

                 PAPER NOT REFERRED TO IN DATA CARDS.

COOL      66 PRL 17 102         +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
      --  REPLACED BY KYCIA 67.

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$Z_1(1900)$

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                 97  Z*1(1900, JP=     ) I=1

                   MOST OF THE BUMP IN THE CROSS SECTION IS DUE TO A BUMP
                   IN THE KN* CHANNEL NEAR ITS THRESHOLD.  ANALYSIS OF
                   THIS CHANNEL (BLAND 67) NEITHER REQUIRES NOR SUGGESTS
   THAT ANY OF THE MAIN AMPLITUDES PRESENT BE RESONATING.  NEITHER DOES A
   DISPERSION RELATION ANALYSIS OF THE TOTAL CROSS-SECTION DATA (CARTER
   67) SUGGEST THE EXISTENCE OF A RESONANCE.  AN ANALYSIS USING THE
   K-MATRIX FORMALISM (HITE 67) REPRODUCES THE MAIN FEATURES OF THE DATA
   WITHOUT INVOKING A RESONANCE.  OMITTED FROM TABLE.
                   THERE IS EVIDENCE FOR OTHER STRUCTURE IN K+ NUCLEON
   INTERACTIONS.  SEE THE SUPPLEMENTARY REFERENCES FOR SOURCES AND
   COMMENTS.  A CONSERVATIVE INTERPRETION, ADVISABLE IN THE LIGHT OF THE
   IMPLICATIONS OF S=+1 BARYONS, IS THAT THE EFFECTS CAN EVENTUALLY BE
   EXPLAINED AS THRESHOLD EFFECTS OR, IN THE CASE OF PRODUCTION EXPERI-
   MENTS, AS REFLECTIONS AND KINEMATIC EFFECTS.  TUNE IN NEXT ISSUE.

-----------------   97  Z*1(1900) MASS (MEV)   -----------------------------

M          1900.0     10.0            KYCIA     67 CNTR ++ K+P TOTAL       8/67

-----------------   97  Z*1(1900) WIDTH (MEV)   ----------------------------

W          200.0      50.0            KYCIA     67 CNTR ++                 8/67

-----------------   97  Z*1(1900) PARTIAL DECAY MODES   --------------------

P1        Z*1(1900) INTO K N                               S10S16
P2        Z*1(1900) INTO N*3/2(1236) K                     L81S10

-----------------   97  Z*1(1900) BRANCHING RATIOS   -----------------------

R1        Z*1(1900) INTO (K N)/TOTAL                      (P1)/TOTAL
R1          0.25      0.06            KYCIA     67 CNTR ++ IF J=1/2        8/67
R1          0.10        OR LESS       CARTER    67 THEO    DISPERSION REL. 8/67

R2        Z*1(1900) INTO (N*3/2(1236) K)/TOTAL            (P2)/TOTAL
R2          DOMINANT CONTR TO PEAK    BLAND .   67 HBC  ++                 8/67

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                      REFERENCES -- Z*1(1900)

KYCIA     67 PRIVATE COMM.      T F KYCIA                           //BNL  I
CARTER    67 PRL 18 801         A A CARTER                    //CAVENDISH
BLAND     67 PRL 18 1077        +BOWLER,BROWN,G+S GOLDHABER,SEEGER,+ //LRL
HITE      67 THESIS             G E HITE                       //ILLINOIS

                 PAPERS NOT REFERRED TO IN DATA CARDS.

COOL      66 PRL 17 102         +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
      --  REPLACED BY KYCIA 67.
LEA       66 PL 23 380          LEA, MARTIN, OALES     //COPENHAGEN,NORDITA
      --  A PRELIMINARY PHASE-SHIFT ANALYSIS.  THERE IS NOT MUCH DATA TO
          ANALYZE.  THE ONLY WAVE CANDIDATE FOR RESONANCEHOOD IS THE P1/2.
ABRAMS    67 PRL 19 259         +COOL,GIACOMELLI,KYCIA,LEONTIC,LI, + //BNL
      --  NEW TOTAL CROSS-SECTION DATA SHOWING SMALL I=1 BUMPS AT 2190 AND
          2505 AND BORDERLINE INDICATIONS OF I=0 STRUCTURE.
TYSON     67 PRL 19 255         +GREENBERG,HUGHES,LU,MINEHART,MORI, //YALE
      --  GAMMA + P TO K- + MISSING MASS.  ARE THE BUMPS IN THE MISSING-MASS
          DISTRIBUTION DUE TO S=+1 BARYONS ...
BIRNBAUM 67 HEIDELBERG CONF.  +EDELSTEIN,HEIN,MCMAHON, +  //CARNEGIE,BNL
      --  PI- + P TO K- + MISSING MASS.  SAME QUESTION AS FOR TYSON 67.
MEYER     67 HEIDELBERG CONF.  J MEYER                          //SACLAY
      --  A SUMMARY BY THE RAPPORTEUR ON BARYONS WITH S NOT ZERO.

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                 18  LAMBDA  (1115,JP=1/2+)  I=0

                 SEE LISTINGS OF STABLE PARTICLES
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$\Lambda(1405)$

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                 37  Y*0(1405, JP=1/2-) I=0   S0,1

                   THIS RESONANCE CAN BE IDENTIFIED WITH THE VIRTUAL BOUND
                   STATE IN THE KBAR-N SYSTEM DEDUCED FROM THE I=0 SCATTER-
                   ING LENGTH DETERMINED FROM LOW ENERGY K-P INTERACTIONS.
   THE DIFFICULTIES IN EXTRAPOLATING FROM THE PHYSICAL REGION TO THE RESO-
   NANCE LOCATION ARE DISCUSSED BY DALITZ 67. PARAMETERS USED IN AVERAGING
   ARE FROM PRODUCTION EXPERIMENTS ONLY.

-----------------   37  Y*0(1405) MASS (MEV)   -----------------------------

M           1405.0                   ALSTON     61 HBC    K-P 1.15 BEV/C
M           1410.0                   ALEXANDER 62 HBC     PI-P 2.1 BEV/C
M           1405.0                   ALSTON     62 HBC    K-P 1.2-.5 BEV/C
M           1400.0     24.0          MUSGRAVE   65 HBC    PBAR P 3-4 BEV/C
M    *      1382.0      8.0          ENGLER     65 HDBC   PI-P, PI+D 1.68
M    *      1410.7      1.0          KIM        65 HBC    O-EFF-RANGE FIT
M    N      1409.6      1.7          SAKITT     65 HBC    O-EFF-RANGE FIT
M    N       DATA OF SAKITT ARE USED IN FIT BY KITTEL.
M    *      1407.5      1.2          KITTEL     66 HBC    O-EFF-RANGE FIT
M        67 1400.0      5.0          BIRMINGHA 66 HBC      3.5 K- P        9/67
M    *      1403.0      3.0          KIM        67 HBC    K MATRIX FIT(KP) 8/67
M           . . . . . . . . . .
M    AVG    1400.0000   4.8949   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

-----------------   37  Y*0(1405) WIDTH (MEV)   -----------------------------

W             20.0                   ALSTON     61 HBC
W             35.0      5.0          ALEXANDER 62 HBC
W             50.0                   ALSTON     62 HBC
W             60.0     20.0          MUSGRAVE   65 HBC
W    *        69.0     20.0          ENGLER     65 HDBC
W    *        37.0      3.2          KIM        65 HBC
W    N        28.2      4.1          SAKITT     65 HBC
W    N       DATA OF SAKITT ARE USED IN FIT BY KITTEL.
W    *        34.1      4.1          KITTEL     66 HBC
W        67   50.0     10.0          BIRMINGHA 66 HBC      3.5 K- P        9/67
W    *        50.0      5.0          KIM        67 HBC    K MATRIX FIT(KP) 8/67
W           . . . . . . . . . .
W    AVG      39.0476   5.3026   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)

-----------------   37  Y*0(1405) PARTIAL DECAY MODES   ---------------------

P1          Y*0(1405) INTO SIGMA PI                          S20S 8

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                      REFERENCES -- Y*0(1405)

ALSTON    61 PRL 6 698          +ALVAREZ,EBERHARD,GOOD,GRAZIANO, +    //LRL  I
ALEXANDE 62 PRL 8 447           ALEXANDER,KALBFLEISCH,MILLER,SMITH    //LRL  I
ALSTON    62 CERN CONF 311      +ALVAREZ,FERRO-LUZZI,ROSENFELD, +     //LRL  I
MUSGRAVE 65 NC 35 735           +PETMEZAS,+//BIRMGHM,CERN,EP,IMPCOL,SACLAY
ENGLER    65 PRL 15 224         +FISK,KRAEMER,MELTZER,WESTGARD,+//CRNG,BNL  IJ
KIM       65 PRL 14 29          J K KIM                         //COLUMBIA IJP
SAKITT    65 PR 139 B719        +DAY,GLASSER,SEEMAN,FRIEDMAN, +   //MD,LRL IJP

KITTEL    66 PL 21 349          W KITTEL, G OTTER, I WACEK        //VIENNA IJP
BIRMINGH 66 PR  152  1148       BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
DALITZ    67 PR 153 1617        DALITZ, WONG, RAJASEKARAN  //OXFORD,BOMBAY
KIM       67 PRL 19 1074        J KIM  /////////////////////////////////YALE JP

                 PAPERS NOT REFERRED TO IN DATA CARDS.

ABRAMS    65 PR 139 B454        G S ABRAMS, B SECHI-ZORN              //MD IJP
KADYK     66 PRL 17 599         +CREN, G+S GOLDHABER, TRILLING        //LRL IJP
DONALD    66 PL 22 711          + EDWARDS, LYS, NISAR, MOORE   //LIVERPOOL
      --  ABRAMS 65, KADYK 66, AND DONALD 66 SUPPORT THOSE EFFECTIVE-RANGE-
          FIT SOLUTIONS GIVING AN I=0 S1/2 RESONANCE.

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$\Lambda(1520)$

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                 38  Y*0(1520, JP=3/2-) I=0   D0,3

                 38  Y*0(1520) MASS (MEV)   --------------------------------

M            1519.4      2.0          WATSON     63 HBC    K-P ALL CHANNELS
M        145 1517.2      3.0          GALTIERI   63 DBC    K-D 1.51 BEV/C
M         29 1520.0      4.0          ALMEIDA    64 HBC    K-P 1.45 BEV/C
M            1511.0     15.0          MUSGRAVE   65 HBC    PBAR P 3-4 BEV/C
M    *    30 1510.0      2.0          BIRMINGHA 66 HBC      3.5 K- P        9/67
M           . . . . . . . . . .
M    AVG     1518.8293   1.5264   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

W    -------------   38  Y*0(1520) WIDTH (MEV)   ----------------------------
W              16.4      2.0          WATSON     63 HBC
W    *         19.0     19.0          MUSGRAVE   65 HBC
W    *    30   50.0     10.0          BIRMINGHA 66 HBC      3.5 K- P        9/67
W              18.0       OR LESS     HARDY      66 HBC

-----------------   38  Y*0(1520) PARTIAL DECAY MODES   ---------------------

P1          Y*0(1520) INTO KBAR N                            S11S17
P2          Y*0(1520) INTO SIGMA PI                          S20S 8
P3          Y*0(1520) INTO LAMBDA PI PI                      S18S 8S 8

-----------------   38  Y*0(1520) PARTIAL WIDTHS (MEV)   --------------------

W1          Y*0(1520) INTO KBAR N                            (P1)
W1             4.8      0.5           WATSON     63 HBC

W2          Y*0(1520) INTO SIGMA PI                          (P2)
W2             9.0      1.0           WATSON     63 HBC

-----------------   38  Y*0(1520) BRANCHING RATIOS   ------------------------

R1      Y*0(1520) INTO (SIGMA PI)/(KBAR N)                   (P2)/(P1)
R1             0.96      0.20         HARDY      66 HBC     PI-P 1.6-4 GEV/C
R1             0.73      0.11         DAUBER     67 HBC    K-P AT 2.GEV/C   8/67
R1             1.72       .78         MUSGRAVE   65 HBC                     8/67
R1          . . . . . . . . . .
R1   AVG        .7975     .0974   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R2      Y*0(1520) INTO (LAMBDA PI PI)/(KBAR N)               (P3)/(P1)
R2             0.17      0.05         HESS       66 HBC     PI-P 1.6-4 GEV/C
R2             0.21      0.18         DAUBER     67 HBC    K-P AT 2.GEV/C   8/67
R2          . . . . . . . . . .
R2   AVG        .1729     .0482   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R3     Y*0(1520) INTO (SIGMA PI)/(LAMBDA PI PI)              (P2)/(P3)
R3             4.5       1.0          ARMENTERO 65 HBC
R3             3.3       1.1          BIRMINGHA 66 HBC      3.5 K- P        9/67
R3             4.8       1.2          UHLIG      67 HBC    K-P .9-1.0 BEV/C
R3          . . . . . . . . . .
R3   AVG       4.1892     .6298   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                              REFERENCES -- Y*0(1520)

WATSON   63 PR 131 2248          M B WATSON, M FERRO-LUZZI, R D TRIPP //LRL IJP
GALTIERI 63 PL 6 296             A BARBARO-GALTIERI,A HUSSAIN,RD TRIPP//LRL
ALMEIDA  64 PL 9 204             S P ALMEIDA, G R LYNCH              //CERN
MUSGRAVE 65 NC 35 735            +PETMEZAS,+//BIRMGHM,CERN,EP,IMPCOL,SACLAY
ARMENTER 65 PL 19 338            ARMENTEROS,F-LUZZI, + //CERN,HEIDEL,SACLAY
BIRMINGH 66 PR  152  1148        BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
HARDY    66 UCRL-16788 THESIS L M HARDY                              //LRL
HESS     66 UCRL-16832 THESIS R I HESS                               //LRL
DAUBER   67 PL 24B 525           +MALAMUD,SCHLEIN,SLATER,STORK/////////UCLA
UHLIG    67 PR 155 1448          +CHARLTON,CONDON,GLASSER,YODH,+///MD,USNRL

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Λ (1670)

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                40  Y*0(1670, JP=1/2-) I=0   S0,1
                40  Y*0(1670) MASS (MEV)    -----------------------------

M          1680.0                   Y-CHANG   64 PBC      PI-PRP 7-8 BEV/C
M          1670.0                   BERLEY    65 HBC      K-P TO LAM ETA
M    N  50 1645.0       6.0         BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67
M    N  AUTHORS SEE A SIGNAL IN NEUTRAL (SIG PI)  BUT NOT IN CHARGED. IT IS
     NOT CLEAR THAT IT CORRESPONDS TO THIS STATE
M          1660.                    BUBELEV   67 PBC      PI-PRP AT 4GEV/C  8/67

----------------  40  Y*0(1670) WIDTH (MEV)   ----------------------------

W            20.0        OR LESS    Y-CHANG   64 PBC
W            18.0                   BERLEY    65 HBC
W    N  50   40.0       10.0        BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67
W    N  AUTHORS SEE A SIGNAL IN NEUTRAL (SIG PI)  BUT NOT IN CHARGED. IT IS
     NOT CLEAR THAT IT CORRESPONDS TO THIS STATE
W            20.   OR  LESS         BUBELEV   67 PBC      PI-PRP AT 4GEV/C  8/67

----------------  40  Y*0(1670) PARTIAL DECAY MODES   --------------------

P1          Y*0(1670) INTO KBAR N                           S11S17
P2          Y*0(1670) INTO LAMBDA ETA                       S18S14
P3          Y*0(1670) INTO SIGMA PI                         S20S 8

----------------  40  Y*0(1670) BRANCHING RATIOS   -----------------------

R1   *      Y*0(1670) INTO ((KBAR N)(LAM ETA))/TOTAL**2    (P1*P2)/TOTAL**2
R1             0.046                BERLEY    65 HBC

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                              REFERENCES -- Y*0(1670)

Y-CHANG  64 DUBNA CONF I 615  YUNG-CHANG, IN, KLADNITSKAYA, +    //DUBNA  I
BERLEY   65 PRL 15 641        +CONNOLLY,HART,RAHM,STONEHILL, +     //BNL IJP
BIRMINGH 66 PR  152  1148     BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
BUBELEV  67 PL 24B 246        +CHADRAA,CHUVILO,HI IN+//////JINR,BUC,CERN

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Λ (1690)

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                55  Y*0(1690, JP=3/2-) I=0   D0,3
                SPIN-PARITY DETERMINATION TENTATIVE.

                55  Y*0(1690) MASS (MEV)    -----------------------------

M    S     1682.0      2.0          ARMENTERO 67 HBC   C KP TO SIGMA PI     8/67
M    S     1699.0      2.0          ARMENTER1 67 HBC   0 K-P ELAST+CH.EX    8/67
M    S   SYSTEMATIC ERRORS NOT INCLUDED. ONLY INDETERM. IN FIT QUOTED     11/67
M          1698.0      5.0          DAVIES    67 CNTR    K-P, D TOTAL      11/66

----------------  55  Y*0(1690) WIDTH (MEV)   ----------------------------

W    S       55.0      4.0          ARMENTERO 67 HBC   C KP TO SIGMA PI     8/67
W    S       33.0     15.0          ARMENTER1 67 HBC   0 K-P ELAST+CH.EX    8/67
W    S   SYSTEMATIC ERRORS NOT INCLUDED. ONLY INDETERM. IN FIT QUOTED     11/67
W            40.0     10.0          DAVIES    67 CNTR                      11/66

----------------  55  Y*0(1690) PARTIAL DECAY MODES   --------------------

P1          Y*0(1690) INTO KBAR N                           S11S17
P2          Y*0(1690) INTO SIGMA PI                         S20S 8

----------------  55  Y*0(1690) BRANCHING RATIOS   -----------------------

R1          Y*0(1690) INTO (KBAR N)/TOTAL                   (P1)/TOTAL
R1            0.19     0.07         ARMENTER1 67 HBC   0 K-P ELAST+CH.EX    8/67
R1            0.24                  DAVIES    67 CNTR    ASSUMING J=3/2    11/66

R2      Y*0(1690) INTO (SIGMA PI)*(KBAR N)/TOTAL**2       (P2*P1)/TOTAL**2  8/67
R2            0.116    0.014        ARMENTERO 67 HBC   C                    8/67

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                              REFERENCES -- Y*0(1690)

ARMENTER 66 BERKELEY CONF       ARMENTEROS,F-LUZZI, + //CERN,HEIDEL,SACLAY IJP
ARMENTER 67 PL 24B 198          ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE1 67  CERN 67-17 TBP     ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
DAVIES   67 PRL 18 62           +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH I

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Λ (1815)

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                39  Y*0(1815, JP=5/2+) I=0   F0,5
                39  Y*0(1815) MASS (MEV)    -----------------------------

M    *     1815.0                   GALTIERI  63         K-P RVUE
M          1815.0                   BIRGE     65 HBC     KBAR N,LAM PI PI
M    .  50 1810.0     20.0          BIRMINGHA 66 HBC      3.5 K- P          9/67
M    N     1811.0      4.0          GELFAND   66 HBC   C BGD PURE IMAG      8/67
M    N     1811.0      4.0          LEVI SETT 66 RVUE    SOME REAL BGD
M    N     RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 67 FITS TOO.
M          1819.0      2.0          ARMENTER1 67 HBC   0 K-P ELAST+CH.EX    8/67
M          1813.0      2.0          ARMENTERO 67 HBC   0 K-P TO SIGMA PI    8/67
M          1816.0      4.0          BELL      67 HDBC   OKP,KD TO SIG PI   11/67
M          1819.0      5.0          DAVIES    67 CNTR    K-P, D TOTAL      11/66
M          . . . . . . . . . .
M    AVG   1816.1736   1.6324   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)

----------------  39  Y*0(1815) WIDTH (MEV)   ----------------------------

W    *       70.0                   GALTIERI  63
W            60.0                   BIRGE     65 HBC
W       50  110.0     50.0          BIRMINGHA 66 HBC      3.5 K- P          9/67
W    N       73.0     10.0          LEVI SETT 66 RVUE    SOME REAL BGD
W    N       73.0     10.0          GELFAND   66 HBC   C BGD PURE IMAG      8/67
W    N     RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 66 FITS TOO.
W            87.0     15.0          ARMENTERO 67 HBC   0 K-P TO SIGMA PI    8/67
W            70.0      7.0          ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67
W            64.0     12.0          BELL      67 HDBC   OKP,KD TO SIG PI   11/67
W            90.0     15.0          DAVIES    67 CNTR                      11/66
W          . . . . . . . . . .
W    AVG     73.7874   5.2241   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

----------------  39  Y*0(1815) PARTIAL DECAY MODES · --------------------

P1          Y*0(1815) INTO KBAR N                           S11S17
P2          Y*0(1815) INTO SIGMA PI                         S20S 8
P3          Y*0(1815) INTO Y*1(1385) PI                     L43S 8
P4          Y*0(1815) INTO LAMBDA ETA                       S18S14

----------------  39  Y*0(1815) BRANCHING RATIOS   -----------------------

R1          Y*0(1815) INTO (KBAR N)/TOTAL                   (P1)/TOTAL
R1   *        0.8                   GALTIERI  63          K-P RVUE
R1   N        0.67     0.06         LEVI SETT 66 RVUE    SOME REAL BGD
R1   N        0.67     0.06         GELFAND   66 HBC   C BGD PURE IMAG      8/67
R1   N     RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 66 FITS TOO.
R1            0.80                  KYCIA     67 CNTR    TOTAL CROSS-SEC.   8/67
R1            0.63     0.01         ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67
R1            0.74                  DAVIES    67 CNTR                      11/66

R2      Y*0(1815) INTO (SIGMA PI)*(KBAR N)/TOTAL**2       (P2*P1)/TOTAL**2
R2            0.073    0.005        ARMENTERO 67 HBC   C                    8/67
R2            0.054    0.012        BELL      67 HDBC   OKP,KD TO SIG PI   11/67
R2         . . . . . . . . . .
R2   AVG      .0702    .0067    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)

R3      Y*0(1820) INTO (Y*1(1385) PI)*(KBAR N)/TOTAL**2   (P3*P1)/TOTAL**2
R3            0.057    0.013        ARMENTER2 67 HBC   0 K-P TO LAM.PI PI   8/67

R4          Y*0(1815) INTO (Y*1(1385) PI)/TOTAL             (P3)/TOTAL
R4            0.20     0.05         BIRGE     65 HBC

R5          Y*0(1815) INTO (LAMBDA ETA)/TOTAL               (P4)/TOTAL
R5            0.01                  ARMENTERO 66 HBC

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                              REFERENCES -- Y*0(1815)

GALTIERI 63 PL 6 296           A BARBARO-GALTIERI,A HUSSAIN,RD TRIPP//LRL IJ
BIRGE    65 ATHENS CONF 296    +ELY,KALMUS,KERNAN,LOUIE,SAHOURIA, + //LRL IJP
BIRMINGH 66 PR  152  1148      BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
GELFAND  66 PRL 17 1224        +HARMSEN,LEVI-SETTI,PREDAZZI+//EFINS,ARGON
LEVI SET 66 BERKELEY CONF      R LEVI SETTI, E PREDAZZI                //CHI
ARMENTER 67 PL 24B 198         ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY IJP
ARMENTE1 67  CERN 67-17 TBP    ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY IJP
ARMENTE2 67 ZEIT.PHYS.202,486  ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
BELL     67 PRL 19 936         R B BELL ///////////////////////////////L R L
DAVIES   67 PRL 18 62          +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH
KYCIA    67 PRIVATE COMM.      T F KYCIA                              //BNL  I

                    PAPERS NOT REFERRED TO IN DATA CARDS.

CHAMBERL 62 PR 125 1696        CHAMBERLAIN,CROWE,KEEFE,KERTH, +      //LRL  I
      --  FIRST SEEN IN CHAMBERLAIN 62 TOTAL CROSS SECTION MEASUREMENTS.
SODICKSO 64 PR 133 B757        SODICKSON,MANNELLI,FRISCH,WAHLIG//MIT(BNL)  J
HOLLEY   65 UCRL-16274 THESIS W R HOLLEY                             //LRL  J
      --  SODICKSON 64 AND HOLLEY 65 ELASTIC SCATTERING WORK INDICATED J=5/2.

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Λ (1830)

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                56  Y*0(1830, JP=5/2-)  I=0   D0,5
                56  Y*0(1830) MASS (MEV)

M          1827.0      3.0          ARMENTERO 67 HBC   0 K-P TO SIGMA PI    8/67
M          1817.0     20.           ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67
M          1837.      11.           BELL      67 HDBC   OKP,KD TO SIG PI   11/67
M          . . . . . . . . . .
M    AVG   1827.4730   2.6645   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

                56  Y*0(1830) WIDTH (MEV)

W            75.0      9.0          ARMENTERO 67 HBC   0 K-P TO SIGMA PI    8/67
W            97.0     30.           ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67
W            74.0     18.0          BELL      67 HDBC   OKP,KD TO SIG PI   11/67
W          . . . . . . . . . .
W    AVG     76.2910   7.7748   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

                56  Y*0(1830) PARTIAL DECAY MODES

P1       Y*0(1830) INTO KBAR N                              S11S17
P2       Y*0(1830) INTO SIGMA PI                            S20S 8

                56  Y*0(1830) BRANCHING RATIOS

R1       Y*0(1830) INTO (KBAR N)/TOTAL                      (P1)/TOTAL
R1            0.08     0.01         ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67

R2       Y*0(1830) INTO (SIGMA PI)*(KBAR N)/TOTAL**2        (P2*P1)/TOTAL**2
R2            0.0225   0.006        ARMENTERO 67 HBC   C K-P TO SIG PI      8/67
R2            0.037    0.003        BELL      67 HDBC  C KP,KD TO SIG PI   11/67
R2         . . . . . . . . . .
R2   AVG      .0341    .0058    AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.2)

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                              REFERENCES -- Y*0(1830)

ARMENTER 67 PL 24B 198         ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE1 67  CERN 67-17 TBP    ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
BELL     67 PRL 19 936         R B BELL ///////////////////////////////L R L

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Λ (1860)

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                60  Y*0(1860, JP=7/2+) I=0   F0,7
                    PARTIAL WAVE ANALYSIS OF ELASTIC AND CHARGE EXCHANGE
                    DATA REQUIRE A RESONANT F07 AMPLITUDE. EXISTENCE NOT
                    CONCLUSIVELY ESTABLISHED.

--------------          Y*0(1860)  MASS (MEV)   ---------------------------

M           1864.0      2.0             ARMENTERO 67 HBC   C K-P EL. +CH.EXC. 11/67

--------------          Y*0(1860)  WIDTH (MEV)  ---------------------------

W             34.0      5.0             ARMENTERO 67 HBC   C K-P EL. +CH.EXC. 11/67

--------------          Y*0(1860) PARTIAL DECAY MODES  --------------------

P1      Y*0(1860) INTO KBAR N                                  S11S17

--------------          Y*0(1860)  BRANCHING RATIOS  ----------------------

R1      Y*0(1860) INTO (KBAR N)/TOTAL                         (P1)/TOTAL
R1             0.13     0.02            ARMENTERO 67 HBC   C K-P EL. +CH.EXC. 11/67

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                              REFERENCES -- Y*1(1860)

ARMENTER 67 CERN TC 67-17      ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Λ(2100)

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41  Y*0(2100, JP=7/2-) I=C

41  Y*0(2100) MASS (MEV)
M   *   2097.0    6.0           BOCK      65 HBC    PBAR P 5.7 BEV/C
M   *   2120.0                  WOHL      66 HBC    K-P CH EX
M       2103.0   10.0           KYCIA     67 CNTR   K-P, D TOTAL       8/67

41  Y*0(2100) WIDTH (MEV)
W   *     24.0   14.0    24.0   BOCK      65 HBC    INTO KBAR N (PI)
W   *    145.0                  WOHL      66 HBC
W        143.0   10.0           KYCIA     67 CNTR                      8/67

41  Y*0(2100) PARTIAL DECAY MODES
P1        Y*0(2100) INTO KBAR N                     S11S17
P2        Y*0(2100) INTO SIGMA PI                   S20S 8
P3        Y*0(2100) INTO LAMBDA ETA                 S18S14
P4        Y*0(2100) INTO XI K                       S22S11
P5        Y*0(2100) INTO LAMBDA OMEGA               S18U 1
P6        Y*0(2100) INTO KBAR N PI                  S11S17S 8

41  Y*0(2100) BRANCHING RATIOS
R1        Y*0(2100) INTO (KBAR N)/TOTAL             (P1)/TOTAL
R1  *        0.25                WOHL      66 HBC
R1           0.333    0.013      KYCIA     67 CNTR                     8/67

R2    Y*0(2100) INTO (SIGMA PI)*(KBAR N)/TOTAL**2   (P2)*(P1)/TOTAL**2
R2           0.0145              GALTIERI  67 HBC    K-P TO SIG PI     8/67

R3    Y*0(2100) INTO (LAMBDA ETA)*(KBAR N)/TOTAL**2 (P3)*(P1)/TOTAL**2
R3           0.0087              FLATTE 2  67 HBC    K-P TO LAM ETA    8/67

R4    Y*0(2100) INTO (XI K)*(KBAR N)/TOTAL**2       (P4)*(P1)/TOTAL**2
R4           0.0029              TRIPP     67 RVUE                     8/67

R5        Y*0(2100) INTO (LAMBDA OMEGA)/TOTAL       (P5)/TOTAL
R5           0.1       OR LESS   FLATTE 1  67 HBC                      8/67

R6        Y*0(2100) INTO (KBAR N PI)/TOTAL          (P6)/TOTAL
R6              SEEN             BOCK      65 HBC

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                    REFERENCES -- Y*0(2100)

BOCK       65 PL 17 166          +COOPER,FRENCH,KINSON, +      //CERN,SACLAY
WOHL       66 PRL 17 107         C G WOHL, F T SOLMITZ, M L STEVENSON //LRL IJP
KYCIA      67 PRIVATE COMM.      T F KYCIA                         //BNL  I
FLATTE 1 67 PR 155 1517          S M FLATTE                        //LRL
TRIPP      67 NP B3 10           + LEITH, +   //LRL,SLAC,CERN,HEIDEL,SACLAY
FLATTE 2 67 PR 163               S M FLATTE, C G WOHL              //LRL
GALTIERI 67 PRIVATE COMM         L BARBARO-GALTIERI                //LRL

             PAPER NOT REFERRED TO IN DATA CARDS.

COOL       66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
    --  REPLACED BY KYCIA 67.
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Λ(2350)

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42  Y*0(2350, JP=    ) I=C

42  Y*0(2350) MASS (MEV)
M          2352.0    11.0         KYCIA     67 CNTR   K-P, D TOTAL      8/67

42  Y*0(2350) WIDTH (MEV)
W           210.0    50.0         KYCIA     67 CNTR                     8/67

42  Y*0(2350) PARTIAL DECAY MODES
P1        Y*0(2350) INTO KBAR N                      S11S17

42  Y*0(2350) BRANCHING RATIOS
R1        Y*0(2350) INTO (KBAR N)/TOTAL              (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1           0.68     0.10        KYCIA     67 CNTR                     8/67
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                    REFERENCES -- Y*0(2350)

KYCIA      67 PRIVATE COMM.      T F KYCIA                         //BNL  I

             PAPER NOT REFERRED TO IN DATA CARDS.

COOL       66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
    --  REPLACED BY KYCIA 67.
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Σ+

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19  SIGMA +    (1189,JP=1/2+)  I=1

SEE LISTINGS OF STABLE PARTICLES

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Σ−

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20  SIGMA -    (1198,JP=1/2+)  I=1

SEE LISTINGS OF STABLE PARTICLES

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Σ0

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21  SIGMA 0    (1193,JP=1/2+)  I=1

SEE LISTINGS OF STABLE PARTICLES

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Σ(1385)

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43  Y*1(1385, JP=3/2+) I=1          P1,3

FOR THE TABLES WE USE ONLY THE UNSTARRED DATA, WHICH ARE
ATTEMPTS TO OBTAIN THE SEPARATE CHARGE-STATE MASSES AND
WIDTHS.  SEE HOWEVER THE IDEOGRAMS INSERTED IN LISTINGS.
THESE INDICATE SERIOUS SYSTEMATICS, PERHAPS ARISING FROM INTERFERENCE EF-
FECTS THAT CHANGE WITH PRODUCTION MECHANISM AND BEAM MOMENTUM.

43  Y*1(1385) MASS (MEV)
M    *  141 1384.0                 ALSTON    60 HBC  +- K-P 1.15 BEV/C
M    *   38 1384.0                 MARTIN    61 HBC  0+ K20 P .98 BEV/C
M    *      1385.0                 BERGE     61 HBC  +- K-P .4-.85 BEV/C
M    *      1392.0     7.0         COLLEY    62 PBC  0- PI- PRP 2. BEV/C
MO   *  106 1381.0     4.0         CURTIS    63 SPRK 0  PI-P 1.5 BEV/C
M    *      1392.0    10.0         MUSGRAVE  65 HBC  +-OPBAR P 3-4 BEV/C
M    *      1389.0     3.0         BALTAY    65 HBC  +- PBAR P 3.7 BEV/C

M+      154 1376.0     3.0         ELY       61 PBC  +  K-P 1.11 BEV/C
M+      170 1375.0     3.9         COOPER    64 HBC  +  K-P 1.45 BEV/C
M+      859 1381.0     1.6         HUWE      64 HBC  +  K-P 1.22 BEV/C
M+          1382.0     1.0         ARMENTERO 65 HBC  +  K-P .9-1.2 BEV/C
M+          1382.6     1.4         SMITH     65 HBC  +  K-P 1.95 BEV/C
M+          1384.3     1.1         SMITH     65 HBC  +  K-P 1.8 BEV/C
M+       40 1383.0     2.0         BIRMINGHA 66 HBC  +  3.5 K- P         9/67
M+          1376.0     5.0         LONDON    66 HBC  +  K-P 2.24 BEV/C
M+          . . . . . . . . . .
M+   AVG    1382.2440   .7961   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
                  (SEE IDEOGRAM)
M-       93 1382.0     3.0         DAHL      61 DBC  -  K-D 0.45 BEV/C
M-      224 1376.0     3.0         ELY       61 PBC  -
M-      200 1392.0     6.2         COOPER    64 HBC  -
M-     1086 1385.3     1.5         HUWE      64 HBC  -
M-          1384.0     1.0         ARMENTERO 65 HBC  -
M-          1391.5     1.6         SMITH     65 HBC  -  K-P 1.6 BEV/C
M-          1399.8     1.4         SMITH     65 HBC  -  K-P 1.95 BEV/C
M-          1389.0     9.0         LONDON    66 HBC  -
M-          . . . . . . . . . .
M-   AVG    1388.0068   3.0064  AVERAGE (ERROR INCLUDES SCALE FACTOR = 4.6)
                  (SEE IDEOGRAM)

43  Y*(-) - Y*(+) MASS DIFFERENCE (MEV)
D    R          0.0     4.2        ELY       61 PBC  +- K-P 1.11 BEV/C
D    R          4.3     2.2        HUWE      64 HBC  +- K-P 1.22 BEV/C
D    R          2.0     1.5        ARMENTERO 65 HBC  +- K-P .9-1.2 BEV/C
D    R          7.2     2.1        SMITH     65 HBC  +- K-P 1.6 BEV/C
D    R         17.2     2.0        SMITH     65 HBC  +- K-P 1.95 BEV/C
     R    REDUNDANT WITH DATA IN MASS LISTING.
D    R         11.0     9.0        LONDON    66 HBC  +- K-P 2.24 BEV/C
D               9.0     6.0        LONDON    66 HBC  +- LAMBDA 3 PI EVTS

43  Y*1(1385) WIDTH (MEV)
W    *         64.0                ALSTON    60 HBC  +-
W    *         20.0     OR LESS    MARTIN    61 HBC  0+
W    *         40.0                BERGE     61 HBC  +-
W    *         80.0    10.0        COLLEY    62 PBC  0-
W    *         30.0     9.0        CURTIS    63 SPRK 0
W    *         36.0     9.0        MUSGRAVE  65 HBC  +-0
W    *         26.0     5.0        BALTAY    65 HBC  +-

W+             48.0     8.0        ELY       61 PBC  +
W+             51.0    10.0        COOPER    64 HBC  +
W+             46.5     3.0        HUWE      64 HBC  +
W+             32.0     3.0        ARMENTERO 65 HBC  +
W+             30.3     3.1        SMITH     65 HBC  +  K-P 1.8 BEV/C
W+             33.1     3.8        SMITH     65 HBC  +  K-P 1.95 BEV/C
W+       40    25.0     6.0        BIRMINGHA 66 HBC  +  3.5 K- P         9/67
W+          . . . . . . . . . .
W+   AVG       35.9114  3.0978  AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)
                  (SEE IDEOGRAM)
W              40.0                DAHL      61 DBC  -
W-             66.0    10.0        ELY       61 PBC  -
W-             66.0    10.0        COOPER    64 HBC  -
W-             62.0.    7.0        HUWE      64 HBC  -
W-             36.0     3.0        ARMENTERO 65 HBC  -
W-             29.2     5.7        SMITH     65 HBC  -  K-P 1.60 BEV/C
W-             17.1     4.4        SMITH     65 HBC  -  K-P 1.95 BEV/C
W-          . . . . . . . . . .
W-   AVG       37.6555  7.7088  AVERAGE (ERROR INCLUDES SCALE FACTOR = 3.7)
                  (SEE IDEOGRAM)
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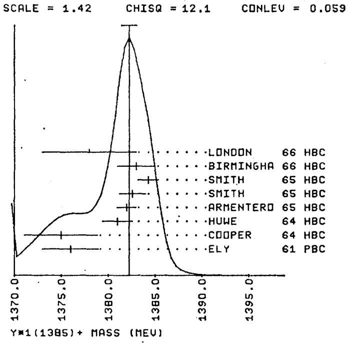
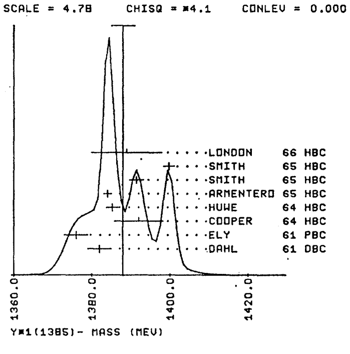
WEIGHTED AVERAGE = 1382.244 ± 0.796
SCALE = 1.42 CHISQ = 12.1 CONLEV = 0.059



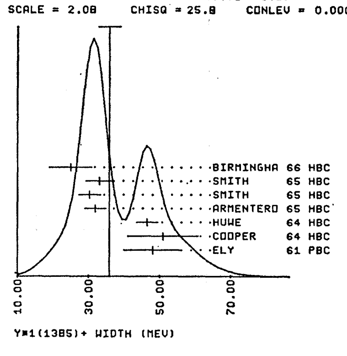
Y*1(1385)+ MASS (MEV)

WEIGHTED AVERAGE = 1388.01 ± 3.01
SCALE = 4.78 CHISQ = *4.1 CONLEV = 0.000



Y*1(1385)- MASS (MEV)

WEIGHTED AVERAGE = 35.91 ± 3.10
SCALE = 2.08 CHISQ = 25.8 CONLEV = 0.000



Y*1(1385)+ WIDTH (MEV)

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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-----------------   43  Y*1(1385) PARTIAL DECAY MODES    --------------------

P1          Y*1(1385) INTO LAMBDA PI                         S18S 8
P2          Y*1(1385) INTO SIGMA PI                          S20S 8

-----------------   43  Y*1(1385) BRANCHING RATIOS   ----------------------

R1          Y*1(1385) INTO (SIGMA PI)/(LAMBDA PI)            (P2)/(P1)
R1             0.04      0.04          BASTIEN   61 HBC  +-
R1   *         0.04        OR LESS     ALSTON    62 HBC  +-0
R1             0.09      0.04          HUWE      64 HBC  +-
R1             0.163     0.035         ARMENTERO 65 HBC  +-
R1             0.06      0.06          LONDON    66 HBC  +
R1          . . . . . . . . . .
R1   AVG        .1009     .0284   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
                       (SEE IDEOGRAM)

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                             REFERENCES -- Y*1(1385)

ALSTON    60 PRL 5 520          +ALVAREZ,EBERHARD,GOOD,GRAZIANO, +    //LRL   I
DAHL      61 PRL 6 142          +HORWITZ,MILLER,MURRAY,WHITE          //LRL
MARTIN    61 PRL 6 283          +LEIPUNER,CHINOWSKY,SHIVELY, +  //BNL,YALE
BERGE     61 PRL 6 557          +BASTIEN,DAHL,FERRO-LUZZI,KIRZ, +     //LRL
BASTIEN   61 PRL 6 702          P BASTIEN,M FERRO-LUZZI,A H ROSENFELD//LRL
ELY       61 PRL 7 461          +FUNG,GIDAL,PAN,POWELL,WHITE          //LRL   J
ALSTON    62 CERN CONF 311      +ALVAREZ,FERRO-LUZZI,ROSENFELD, +     //LRL
COLLEY    62 PR 126 1930        +GELFAND,NAUENBERG, +   //COLUMBIA,RUTGERS  JP
CURTIS    63 PR 132 1771        +COFFIN,MEYER,TERWILLIGER            //MICH   J
COOPER    64 PL 8 365           +FILTHUTH,FRIDMAN,MALAMUD, +  //CERN,AMSTR
HUWE      64 UCRL-11291 THESIS  D O HUWE ///////////////////////////// //LRL  JP
MUSGRAVE  65 NC 35 735          +PETMEZAS,+//BIRMGHM,CERN,EP,IMPCOL,SACLAY
ARMENTER  65 PL 19 75           ARMENTEROS, +          //CERN,HEIDEL,SACLAY
BALTAY    65 PR 140 B1027       +SANDWEISS,TAFT,CULWICK,KOPP, + //YALE,BNL
SMITH     65 THESIS (UCLA)      L T SMITH/////////////////////////////////UCLA
BIRMINGH  66 PR  152  1146      BIRMINGHAM,GLASGOW,I.C., OXFORDYRUTHERFORD
LONDON    66 PR 143 1034        +RAU,SAMIOS,YAMAMOTO,GOLDBERG,+ //BNL,SYCR  J

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS.

SHAFER    64 PR 134 B1372       J B SHAFER, D O HUWE                  //LRL  JP
MALAMUD   64 PL 10 145          E MALAMUD, P E SCHLEIN          //CERN,UCLA  JP

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Σ (1660)

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                44  Y*1(1660, JP=3/2-) I=1    D1,3

                THE Y*1(1660) HAS APPEARED IN BOTH FORMATION AND PRO-
                DUCTION EXPERIMENTS. THE PRESENT DATA ON FORMATION EX-
                PERIMENTS IS NOT SUFFICENT TO CLARIFY THE SITUATION OF
   THE I=1 STATE. PRODUCTION EXPERIMENTS HAVE SHOWN LARGE INCONSISTENCIES
   IN THE BRANCHING RATIOS (CHANGING WITH INCIDENT ENERGY). THE Y*(1690)
   MIGHT BE A SECOND I=1 STATE IN THIS ENERGY REGION. BRANCHING  RATIOS
   HOWEVER ARE NOT YET DISENTANGLED.
        AS FOR THE QUANTUM NUMBERS, THE ANALYSES OF LAMBDA PI CHANNEL (IN
   FORMATION EXP.) AND Y*0(1405)+PI CHANNEL (IN PROD. EXP.) ARE CONSISTENT
   WITH JP=3/2-. JP OF Y*1(1690) NOT YET KNOWN.

-----------------   44  Y*1(1660) MASS (MEV)    -----------------------------

M           1685.0                        ALEXANDER 62 HBC  0- PI-P 2-2.2 BEV/C
M           1660.0     10.0               ALVAREZ   63 HBC  +  K-P 1.51 BEV/C
M           1660.0                        BERLEY    64 HBC  C  K-P TO LAM PIO
M           1645.0      7.0               LEVEQUE   65 HBC  +  K-P TO Y*1660 PI
M           1662.0      5.0               DAVIES    67 CNTR    K-P, D TOTAL C.S
M           1665.0      3.0               ARMENTERO 67 HBC   C K-P TO SIGMA PI   8/67
M           . . . . . . . . . .
M    AVG    1661.8149   3.5678   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)
                       (SEE IDEOGRAM)

-----------------   44  Y*1(1660) WIDTH (MEV)    ----------------------------

W            45.0                        ALEXANDER 62 HBC  C-
W            40.0     10.0               ALVAREZ   63 HBC  +
W            60.0                        BERLEY    64 HBC  C
W            55.0     10.0               LEVEQUE   65 HBC  +
W            45.0     15.0               DAVIES    67 CNTR                    11/66
W            32.0      4.0               ARMENTERO 67 HBC   C K-P TO SIGMA PI   8/67
W    C       46.0      7.                ARMENTERI 67 HBC    0K-P EL. +CH.EXC. 11/67
W    C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
W           . . . . . . . . . .
W    AVG     36.2300   4.4328   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                    (SEE IDEOGRAM)

-----------------   44  Y*1(1660) PARTIAL DECAY MODES   --------------------

P1          Y*1(1660) INTO KBAR N                           S11S17
P2          Y*1(1660) INTO LAMBDA PI                        S18S 8
P3          Y*1(1660) INTO SIGMA PI                         S20S 8
P4          Y*1(1660) INTO LAMBDA PI PI                     S18S 6S 8
P5          Y*1(1660) INTO SIGMA PI PI                      S20S 8S 8
P6          Y*1(1660) INTO Y*1(1385) PI                     U43S 8
P7          Y*1(1660) INTO Y*0(1405) PI                     U37S 8

-----------------   44  Y*1(1660) BRANCHING RATIOS   ---------------------

R1          Y*1(1660) INTO (KBAR N)/TOTAL                    (P1)/TOTAL
R1             0.05        OR LESS     ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R1   B         0.16        OR MORE     BASTIEN 2 63 HBC  C
R1   B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)              11/67
R1             0.2         OR LESS     LONDON    66 HBC  + K-P AT 2.25 BEV/C
R1   C         0.06      0.03          ARMENTERI 67 HBC  0 K-P EL. +CH.EXC.  11/67
R1   C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
R1             0.065                   DAVIES    67 CNTR C  ASSUMING J=3/2   11/66

R2          Y*1(1660) INTO (LAMBDA PI)/TOTAL                 (P2)/TOTAL
R2             0.32                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R2   B         0.09        OR LESS     BASTIEN 2 63 HBC  0 K-P TO LAM. PI
R2   B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)              11/67
R2             0.2         OR LESS     LONDON    66 HBC  + K-P AT 2.25 BEV/C
R2             0.06      0.06          SMART     66 DBC  -  ASSUMING R1=0.15
R2             0.45                    ARMENTERO 66 HBC  C  ASSUMING R1=0.15

R3          Y*1(1660) INTO (SIGMA PI)/TOTAL                  (P3)/TOTAL
R3             0.27                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R3   B         0.22      0.06          BASTIEN 2 63 HBC  C K-P TO SIGMA PI
R3   B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)              11/67
R3             0.25      0.15          LONDON    66 HBC  + K-P AT 2.25 BEV/C
R3             0.67      0.10          ARMENTERO 67 HBC   C ASSUMING R1=0.10  8/67
R3          . . . . . . . . . .
R3   AVG        .5406     .1938   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3)

R4          Y*1(1660) INTO (LAMBDA PI PI)/TOTAL              (P4)/TOTAL
R4             0.18                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R4   B         0.16      0.05          BASTIEN 2 63 HBC  C
R4   B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)              11/67
R4             0.2         OR LESS     LONDON    66 HBC  + K-P AT 2.25 BEV/C

R5          Y*1(1660) INTO (SIGMA PI PI)/TOTAL               (P5)/TOTAL
R5             0.18                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R5   B         0.25      0.06          BASTIEN 2 63 HBC  C K-P TO SIG PI PI
R5   B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)              11/67

R6          Y*1(1660) INTO (Y*0(1405) PI)/TOTAL              (P7)/TOTAL
R6             0.75      0.25          LONDON    66 HBC  + K-P AT 2.25 BEV/C

R7          Y*1(1660) INTO (KBAR N)/(LAMBDA PI)              (P1)/(P2)
R7             0.43        OR MORE     SMITH     63 HBC  C-
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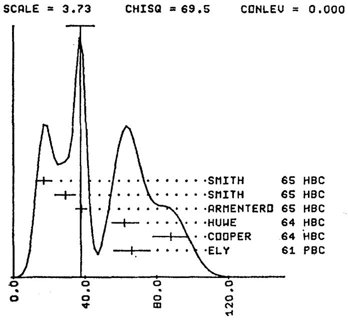
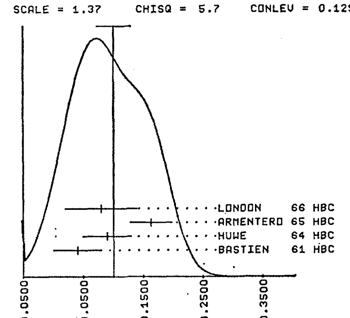
WEIGHTED AVERAGE = 37.66 ± 7.71
SCALE = 3.73   CHISQ = 69.5   CONLEV = 0.000



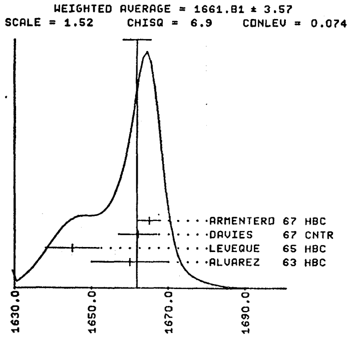
Y*1(1385)- WIDTH (MEV)

WEIGHTED AVERAGE = 0.1009 ± 0.0284
SCALE = 1.37   CHISQ = 5.7   CONLEV = 0.129



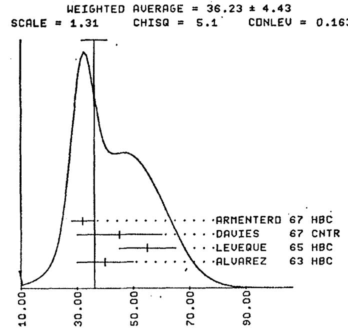
Y*1(1385) B.R. INTO (SIGMA PI)/LAMBDA PI

WEIGHTED AVERAGE = 1661.81 ± 3.57
SCALE = 1.52   CHISQ = 6.9   CONLEV = 0.074



Y*1(1660) MASS (MEV)

WEIGHTED AVERAGE = 36.23 ± 4.43
SCALE = 1.31   CHISQ = 5.1   CONLEV = 0.163



Y*1(1660) WIDTH (MEV)

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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R8          Y*1(1660) INTO (SIGMA PI)/(LAMBDA PI)              (P3)/(P2)
R8             0.86                     SMITH      63 HBC  C-
R8             6.8       3.0            HUWE       64 HBC  +

R9          Y*1(1660) INTO (LAMBCA PI PI)/(LAMBDA PI)          (P4)/(P2)
R9             0.14                     SMITH      63 HBC  C-

R10         Y*1(1660) INTO (Y*0(1405) PI)/(SIGMA PI PI)        (P7)/(P5)
R10            0.9C      0.10     0.16  EBERHARD  65       + K-P AT 2.45 BEV/C

R11         Y*1(1660) INTO (Y*0(1405) PI)/(Y*1(1385) PI)       (P7)/(P6)
R11            C.8         OR MORE      EBERHARC  65       +

R12     Y*1(1660) IN  (LAMBDA PI PI)/(SIGMA PI PI)         (P4)/(P5)
R12            G.35      0.2            BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67

R13     Y*1(1660) INTO (LAMBDA PI)/(SIGMA PI PI)           (P2)/(P5)
R13             .2   CR LESS            BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67

R14     Y*1(1660) INTC (SIGMA PI)/(SIGMA PI PI)            (P3)/(P5)
R14             .4   OR LESS            BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67

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                        REFERENCES -- Y*1(1660)

ALEXANDE 62 CERN CONF 320       ALEXANDER,JACOBS,KALBFLEISCH,MILLER,+//LRL  I
ALVAREZ  63 PRL 10 184          +ALSTON,FERRO-LUZZI,HUWE, +          //LRL  I
BASTIEN2 63 UCRL-10779 THESIS P L BASTIEN                            //LRL  IJ
SMITH    63 ATHENS CONF 67      G A SMITH                            //LRL
HUWE     64 UCRL-11291 THESIS D O HUWE                               //LRL
BERLEY   64 DUBNA CONF I 565    +CONNOLLY,HART,RAHM,STONEHILL, +     //BNL IJP
EBERHARD 65 PRL 14 466          +SHIVELY,ROSS,SIEGAL,FICENEC, +  //LRL,ILL  I
LEVEQUE  65 PL 18 69             +     //SACLAY,EP,GLASGOW,IMPCOL,OXF,RTHFD  JP
LONDON   66 PR 143 1034         +RAU,SAMIOS,YAMAMOTO,GOLDBERG,+ //BNL,SYCR  IJ
SMART    66 PRL 17 556          W M SMART,A KERNAN,G E KALMUS,R P ELY//LRL IJP
ARMENTER 66 BERKELEY CONF       ARMENTEROS,F-LUZZI, + //CERN,HEIDEL,SACLAY IJP
BIRMINGH 66 PR  152  1148       BIRMINGHAM,GLASGOW,I.C.Y OXFORDYRUOHERFORD
ARMENTER 67 PL 248 196          ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY JP
ARMENTE1 67 CERN TC 67-17       ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
DAVIES   67 PRL 18 62           +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH

                 PAPERS NOT REFERRED TO IN DATA CARDS.

BASTIEN1 63 PRL 10 188          P L BASTIEN, J P BERGE               //LRL  IJ
     -- REPLACED BY BASTIEN 2, BUT SIMILAR AND MORE READILY AVAILABLE.
T-ZADEH  63 PRL 11 470          TAHER-ZADEH,PROWSE,SCHLEIN,SLATER,+ //UCLA  JP
     -- SEE NOTE FOLLOWING SCHLEIN 66.
SLATER   65 BAPS 10 1196        +CAUBER, SCHLEIN, STORK, TICHO       //UCLA  JP
LEE      66 PRL 17 45           Y Y LEE, D D REEDER, R W HARTUNG     //WISC  JP
SCHLEIN  66 UCLA-1016           P E SCHLEIN, T G TRIPPE              //UCLA  JP
     -- REANALYZES DATA OF TAHER-ZADEH 63 AND BASTIEN 63 AND ALL PUBLISHED
        LAMBDA PI CROSS SECTION DATA IN THE LIGHT OF THE NOW KNOWN
        Y*1(1765) AND REVERSES THE MODEL-DEPENDENT CONCLUSION OF TAHER-
        ZADEH ON THE PREFERRED JP ASSIGNMENT (FROM 3/2+ TO 3/2-).
EBERHARD 67 PREPRINT            +PRIPSTEIN,SHIVELY,KRUSE,SWANSON //LRL,ILL IJP

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Σ (1690)

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                U56  Y*1(1690, JP=    ) I=1
                SEE NOTE PRECEDING Y*1(1660) LISTINGS

                U58  Y*1(1690) MASS (MEV)

M        30 1715.0      12.0             COLLEY     67 HBC  +  K-P AT 6.0 GEV/C   8/67
M        53 1683.0      15.0             DERRICK    67 HBC  +  K-P AT 5.5 GEV/C   8/67
M           . . . . . . . . . .
M    AVG    1702.5122  15.6098   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.7)

                U58  Y*1(1690) WIDTH (MEV)

W        30  100.0      35.0             COLLEY     67 HBC  +  K-P AT 6.0 GEV/C   8/67
W        53  120.       30.              DERRICK    67 HBC  +  K-P AT 5.5 GEV/C   8/67
W           . . . . . . . . . .
W    AVG     111.5294  22.7777   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

                U58  Y*1(1690) PARTIAL DECAY MODES

P1     Y*1(1690) INTO KBAR N                             S11S17
P2     Y*1(1690) INTO LAMBDA PI                          S18S 9
P3     Y*1(1690) INTO SIGMA  PI                          S20S 8
P4     Y*1(1690) INTO Y*1(1385) PI                       U43S 8

                U58  Y*1(1690) BRANCHING RATIOS

R1     Y*1(1690) INTO (LAMBDA PI)/(KBAR N)               (P2)/(P1)
R1       18     0.80       0.50          COLLEY     67 HBC  +  KO BAR FIN.STATE  8/67
R1       15     0.6        0.40          DERRICK    67 HBC  +  KO BAR FIN.STATE  8/67
R1          . . . . . . . . . .
R1   AVG         .6780      .3123    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R2     Y*1(1690) INTO (SIGMA PI)/(LAMBDA PI)             (P3)/(P2)
R2              0.3        0.3           COLLEY     67 HBC  +  CHARG.SIGMA F.S.  8/67
R2              0.25    OR  LESS         DERRICK    67 HBC  +  NEUTR. SIGMA F.S  8/67

R3     Y*1(1690) INTO (Y*1(1385) PI)/(LAMBDA PI)         (P4)/(P2)
R3       14     1.0        0.3           DERRICK    67 HBC  +  LAMBDA 2PI F.S.   8/67
R3              0.49       0.29          COLLEY     67 HBC  +  LAMBDA 2PI F.S.   8/67
R3          . . . . . . . . . .
R3   AVG         .7364      .2549    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)

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                        REFERENCES -- Y*1(1690)

COLLEY   67 PL 248 489          +MACDONALD,MUSGRAVE+/BI,LG,IC,MPI,OXF,RUTH
DERRICK  67 PRL 18 266          +FIELDS,LOKEN,AMMAR,DAVIS//ARGONNE,NORTHWE

                 PAPERS NOT REFERRED TC IN DATA CARDS

MEYER    67 HEIDELBERG CONF.  J MEYER - RAPPORTEUR ON BARYON RES./SACLAY

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Σ (1765)

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              45   Y*1(1765, JP=5/2-) I=1    D15
              45   Y*1(1765) MASS (MEV)    ----------------------------

M          1765.0     10.0            GALTIERI  63 DBC  C  K-D 1.51 BEV/C
M          1755.0     10.0            ARMENTERO 65 HBC  C  K-P TO Y*1520 PI
M          1760.0     10.0            BELL 1,2  66 DBC  -  K-N TO Y*1520 PI
M          1746.0      8.0            FENSTER   66 HBC  0  K-P TO Y*1520 PI
M    N     1758.0     11.0            GELFAND   66 HBC   0 BGD PURE IMAG      8/67
M    N     1758.0     11.0            LEVI SETT 66 RVUE    SOME REAL BGD
M    N     RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 67 FITS TOO.
M          1776.0      6.0            SMART     66 DBC  -  K-N TO LAM PI-
M          1766.0      4.0            ARMENTER1 67 HBC   0 K-P ELAST+CH.EX    8/67
M          1775.0      5.0            DAVIES    67 CNTR    K-P, 0 TCTAL      11/66
M          . . . . . . . . . .
M    AVG   1766.8259   3.6065   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)

-----------------   45  Y*1(1765) WIDTH (MEV)   -----------------------------

W           60.0      10.0            GALTIERI  63 DBC  C
W           70.0      20.0            BELL 2    66 DBC  -
W          129.0      16.0            SMART     66 DBC  -
W           70.0      20.0            FENSTER   66 HBC  0
W    N     113.0      25.0            LEVI SETT 66 RVUE    SOME REAL BGD
W    N     113.0      25.0            GELFAND   66 HBC   C BGD PURE IMAG      8/67
W    N     RES + DIFFRACTIVE BGD FO- K-P ELC  DATA A-E +- A-MENT 67 ++TS000+=
W          114.0       8.0            ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67
W          120.0      50.0            DAVIES    67 CNTR                      11/66
W          . . . . . . . . . .
W    AVG    93.9691   13.5027   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.5)

-----------------   45  Y*1(1765) PARTIAL DECAY MODES   ---------------------

P1         Y*1(1765) INTO KBAR N                            S11S17
P2         Y*1(1765) INTO LAMBDA PI                         S18S 9
P3         Y*1(1765) INTO SIGMA PI                          S20S 8
P4         Y*1(1765) INTO SIGMA ETA                         S21S14
P5         Y*1(1765) INTO Y*1(1385) PI                      U43S 8
P6         Y*1(1765) INTO Y*0(1520) PI                      U38S 8

P1         Y*1(1765) INTO KBAR N                            S11S17
P2         Y*1(1765) INTO LAMBDA PI                         S18S 9
P3         Y1*(1765) INTO Y*0(1520) PI                      U38S11
P4         Y*1(1765) INTO Y*1(1385) PI                      U43S 8
P5         Y*1(1765) INTO SIGMA PI                          S20S 8
P6         Y*1(1765) INTO SIGMA ETA                         S21S14

-----------------   45  Y*1(1765) BRANCHING RATIOS   -----------------------

R1     Y*1(1765) INTO (KBAR N)/TOTAL                      (P1)/TOTAL
R1   *         0.6                    GALTIERI  63 HBC  0  K-P RVUE
R1   N         0.46      0.05         GELFAND   66 HBC   0 BGD PURE IMAG      8/67
R1   N         0.46      0.05         LEVI SETT 66 RVUE    SOME REAL BGD
R1   N     RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 67 FITS TOO.
R1             0.34                   KYCIA     67 CNTR    TOTAL CRCSS-SEC.   8/67
R1             0.53      0.09         UHLIG     67 HBC  C
R1             0.45      0.02         ARMENTER1 67 HBC   C K-P ELAST+CH.EX    8/67
R1             0.43                   DAVIES    67 CNTR                      11/66
R1         . . . . . . . . . .
R1   AVG        .4538     .0195   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R1   FIT        .466      .017    VALUE FROM CONSTRAINED FIT

R2     Y*1(1765) INTO (LAMBDA PI)*(KBAR N)/TOTAL**2       (P2*P1)/TOTAL**2
R2             0.090     0.025        ARMENTERO 66 HBC    0
R2             0.07      0.01         SMART     66 DBC   -
R2         . . . . . . . . . .
R2   AVG        .0728     .0093   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R2   FIT        .072      .007    VALUE FROM CONSTRAINED FIT

R3     Y*1(1765) INTO (Y*0(1520) PI)*(KBAR N)/TOTAL**2   (P3*P1)/TOTAL**2
R3             0.075     0.015        ARMENTERO 66 HBC    OHYPERONS FIN.ST.
R3             0.12      0.03         FENSTER   66 HBC    CKBAR N  FIN. ST.
R3         . . . . . . . . . .
R3   AVG        .0840     .0180   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
R3   FIT        .070      .010    VALUE FROM CONSTRAINED FIT

R4     Y*1(1765) INTO (Y*1(1385) PI)*(KBAR N)/TOTAL**2   (P4*P1)/TOTAL**2
R4             0.09      0.03         ARMENTER2 67 HBC   0 K-P TO LAM.PI PI  8/67
R4         . . . . . . . . . .
R4   FIT        .065      .017    VALUE FROM CONSTRAINED FIT

R5     Y*1(1765) INTO (SIGMA PI)*(KBAR N)/TOTAL **2       (P5*P1)/TOTAL**2
R5             0.005     0.003        ARMENTERO 67 HBC   C K-P TO SIGMA PI   8/67
R5         . . . . . . . . . .
R5   FIT        .005      .003    VALUE FROM CONSTRAINED FIT

R6     Y*1(1765) INTO (LAMBDA PI)/(KBAR N)                (P2)/(P1)
R6             0.33      0.05         UHLIG     67 HBC   C K-P,.9 GEV/C
R6         . . . . . . . . . .
R6   FIT        .333      .036    VALUE FROM CONSTRAINED FIT

R7     Y*1(1765) INTO (Y*0(1520)/(KBAR N)                 (P3)/(P1)
R7             0.28      0.05         UHLIG     67 HBC   0 K-P,.9 GEV/C
R7         . . . . . . . . . .
R7   FIT        .322      .043    VALUE FROM CONSTRAINED FIT

R8     Y*1(1765) INTO (Y*1(1385)/(KBAR N)                 (P4)/(P1)
R8             0.25      0.09         UHLIG     67 HBC   0 K-P,.9 GEV/C
R8         . . . . . . . . . .
R8   FIT        .299      .076    VALUE FROM CONSTRAINED FIT

R9     Y*1(1765) INTO(SIGMA ETA)/TOTAL                    (P6)/TOTAL
R9             0.02        APPROX     ARMENTERO 66 HDBC C-
R9

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                        REFERENCES -- Y*1(1765)

GALTIERI 63 PL 6 296            A BARBARO-GALTIERI,A HUSSAIN,RD TRIPP//LRL IJ
ARMENTER 65 PL 19 338           ARMENTEROS, +      //CERN,HEIDELBERG,SACLAY IJP
BELL 1   66 PRL 16 203          R B BELL, R W BIRGE, Y-L PAN, R T PU //LRL IJP
BELL 2   66 UCRL-16936 THESIS R B BELL                               //LRL IJP
FENSTER  66 PRL 17 841          +GELFAND,HARMSEN,L-SETTI,+ //CHI,ARG(CERN) IJP
GELFAND  66 PRL 17 1224         +HARMSEN,LEVI-SETTI,PREDAZZI+//EFINS,ARGON
LEVI SET 66 BERKELEY CONF       R LEVI SETTI, E PREDAZZI                //CHI
SMART    66 PRL 17 556          W M SMART,A KERNAN,G E KALMUS,R P ELY//LRL IJP

KYCIA    67 PRIVATE COMM.       T F KYCIA                            //BNL  I
ARMENTER 67 PL 248 198          ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE1 67  CERN 67-17 TBP     ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE2 67 ZEIT.PHYS.202,486 ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
DAVIES   67 PRL 18 62           +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH
UHLIG    67 PR 155 1448         +CHARLTON,CONDON,GLASSER,YODH,+///MD,USNRL

                 PAPERS NOT REFERRED TO IN DATA CARDS.

YODH     65 ATHENS CONF 269     G B YODH                        //MARYLAND IJ
BIRGE    65 ATHENS CONF 296     +ELY,KALMUS,KERNAN,LOUIE,SAHOURIA, + //LRL IJP
     -- YODH 65 AND BIRGE 65 ARE PRECURSORS OF UHLIG 66 AND BELL 66.
ARMENTER 66  BERKELEY CONF.     ARMENTEROS,FERRO-LUZZI+//CERN,HEID.,SACLAY

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Σ (1780)

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                57  Y*1(1780, JP=    ) I=1
                 SIGMA ETA THRESHOLD EFFECT.  INTERPRETATION AS RESONANCE
                 NOT CONCLUSIVE.  SEE FERRO-LUZZI 66.  OMITTED FROM TABLE

-----------------   57  Y*1(1780) MASS (MEV)   ----------------------------

M          1780.0                     CLINE     66 DBC  -  K-N TO SIG- ETA

-----------------   57  Y*1(1780) WIDTH (MEV)   ---------------------------

W           100.0                     CLINE     66 DBC  -

-----------------   57  Y*1(1780) PARTIAL DECAY MODES   -------------------

P1         Y*1(1780) INTO KBAR N                            S11S17
P2         Y*1(1780) INTO SIGMA ETA                         S20S14

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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                        REFERENCES -- Y*1(1780)

FERRO-LU 66 BERKELEY 183       ARMENTEROS+FERRO-LUZZI+//CERN,HEIDE,SACLAY
CLINE    67 PL 25B 41          CLINE,OLSSON////////////////////WISCONSIN

                   PAPERS NOT REFERRED TO IN DATA CARDS

MEYER    67 HEIDELBERG CONF.  J MEYER - RAPPORTEUR ON BARYON RES./SACLAY

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Σ(1915)

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46  Y*1(1915, JP=5/2+) I=1   F15

PERHAPS SOME SLIGHT RESERVATION SHOULD BE HELD AGAINST
COMPLETE ACCEPTANCE OF THE INTERPRETATION OF THIS EFFECT
AS (1) BEING A RESONANCE (2) HAVING JP = 5/2+.

----------------- 46  Y*1(1915) MASS (MEV)  -----------------------------

M   *    1942.0     9.0              BOCK     65 HBC     PBAR P 5.7 BEV/C
M        1915.0    20.0              COOL     66 CNTR C- K-P, D TOTAL
M        1905.0     5.0              DAVIES   66 CNTR    K-P, D TOTAL    11/66
M        . . . . . . . . . .
M   AVG  1905.5882  4.8507   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

----------------- 46  Y*1(1915) WIDTH (MEV)  ----------------------------

W   *      36.0    20.0     36.0     BOCK     65 HBC
W          65.0                      COOL     66 CNTR C-
W          60.0    20.0              DAVIES   66 CNTR                    11/66
W   C      50.0    20.0              ARMENTER1 67 HBC   OK-P EL. +CH.EXC. 11/67
W   C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67

----------------- 46  Y*1(1915) PARTIAL DECAY MODES  --------------------

P1        Y*1(1915) INTO KBAR N                        S11S17
P2        Y*1(1915) INTO LAMBDA PI                     S18S 8
P3        Y*1(1915) INTO SIGMA PI                      S20S 8

----------------- 46  Y*1(1915) BRANCHING RATIOS  -----------------------

R1        Y*1(1915) INTO (KBAR N)/TOTAL                (P1)/TOTAL
R1            0.103                  COOL     66 CNTR   ASSUMING J=5/2
R1            0.09                   KYCIA    67 CNTR   TOTAL CROSS-SEC.  8/67
R1  *         0.1                    DAVIES   66 CNTR   ASSUMING J=5/2   11/66
R1  C         0.12     .01           ARMENTER1 67 HBC  0 K-P EL. +CH.EXC. 11/67
R1  C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67

R2     Y*1(1915) INTO (LAMBDA PI)*(KBAR N)/TOTAL**2     (P1*P2)/TOTAL**2
R2  C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
R2            0.012    .006          SMART    66 HBC  C K-P TO LAM.PI    11/67
R2  C         0.006                  ARMENTER1 67 HBC   OK-P TO LAM.PI   11/67

R3     Y*1(1915) INTO (SIGMA PI)*(KBAR N)/TOTAL**2      (P1*P3)/TOTAL**2
R3  C         0.00     0.01          ARMENTERO 67 HBC    K-P TO SIG+-PI-+ 11/67
R3  C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67

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                        REFERENCES -- Y*1(1915)

BOCK     65 PL 17 166          +COOPER,FRENCH,KINSON, +     //CERN,SACLAY  I
COOL     66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
SMART    66 PRL 17 556         W M SMART,A KERNAN,G E KALMUS,R P ELY//LRL IJP
ARMENTER 67 PL 24B 198         ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
ARMENTE1 67 CERN TO 67-17      ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
DAVIES   67 PRL 18 62          +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH I
KYCIA    67 PRIVATE COMM.      T F KYCIA                            //BNL  I

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Σ(2030)

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47  Y*1(2030, JP=7/2+) I=1

47  Y*1(2030) MASS (MEV)  ----------------------------

M   *    2022.0    20.0              BLANPIED 65 CNTR C  GAMMA P TO K+ Y*
M   *    2030.0    20.0              WOHL     66 HBC  C  K-P TO LAM PIO
M        2026.0    19.0              KYCIA    67 CNTR    K-P, D TOTAL     8/67

----------------- 47  Y*1(2030) WIDTH (MEV)  ----------------------------

W   *     120.0    20.0              BLANPIED 65 CNTR C
W   *     170.0                      WOHL     66 HBC  C
W         120.0    10.0              KYCIA    67 CNTR                     8/67

----------------- 47  Y*1(2030) PARTIAL DECAY MODES  --------------------

P1        Y*1(2030) INTO KBAR N                        S11S17
P2        Y*1(2030) INTO LAMBDA PI                     S18S 9
P3        Y*1(2030) INTO SIGMA PI                      S20S 8
P4        Y*1(2030) INTO XI K                          S22S11

----------------- 47  Y*1(2030) BRANCHING RATIOS  -----------------------

R1        Y*1(2030) INTO (KBAR N)/TOTAL                (P1)/TOTAL
R1  *         0.25                   WOHL     66 HBC  0  K-P CH EX
R1            0.105    0.005         KYCIA    67 CNTR                     8/67

R2     Y*1(2030) INTO (LAMBDA PI)*(KBAR N)/TOTAL**2     (P2)*(P1)/TOTAL**2
R2            0.040                  WOHL     66 HBC     K-P TO LAM PIO

R3     Y*1(2030) INTO (SIGMA PI)*(KBAR N)/TOTAL**2      (P3)*(P1)/TOTAL**2
R3            0.0096                 GALTIERI 67 HBC     K-P TO SIG PI    8/67

R4     Y*1(2030) INTO (XI K)*(KBAR N)/TOTAL**2          (P4)*(P1)/TOTAL**2
R4            0.00256   OR LESS      TRIPP    67 RVUE                     8/67

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                        REFERENCES -- Y*1(2030)

BLANPIED 65 PRL 14 741         +GREENBERG,HUGHES,KITCHING,LU,+//YALE(CEA)
WOHL     66 PRL 17 107         C G WOHL, F T SOLMITZ, M L STEVENSON //LRL IJP
KYCIA    67 PRIVATE COMM.      T F KYCIA                           //BNL  I
TRIPP    67 NP B3 10           + LEITH, +   //LRL,SLAC,CERN,HEIDEL,SACLAY
GALTIERI 67 PRIVATE COMM       L BARBARO-GALTIERI                  //LRL

                   PAPERS NOT REFERRED TO IN DATA CARDS.

COOL     66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
    --  REPLACED BY KYCIA 67.

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Σ(2250)

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48  Y*1(2250, JP=     ) I=1

----------------- 48  Y*1(2250) MASS (MEV)  -----------------------------
M   *    2245.0                      BLANPIED 65 CNTR    GAMMA P TO K+ Y*
M   *    2299.0     6.0              BOCK     65 HBC     PBAR P 5.7 BEV/C
M        2252.0    10.0              KYCIA    67 CNTR    K-P, D TOTAL     8/67

----------------- 48  Y*1(2250) WIDTH (MEV)  ----------------------------

W   *     150.0                      BLANPIED 65 CNTR
W   *      21.0    17.0     21.0     BOCK     65 HBC
W         200.0    20.0              KYCIA    67 CNTR                     8/67

----------------- 48  Y*1(2250) PARTIAL DECAY MODES  --------------------

P1        Y*1(2250) INTO KBAR N                        S11S17
P2        Y*1(2250) INTO KBAR N PI                     S11S17S 8

----------------- 48  Y*1(2250) BRANCHING RATIOS  -----------------------

R1        Y*1(2250) INTO (KBAR N)/TOTAL                (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1            0.31     0.02          KYCIA    67 CNTR                     8/67

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                        REFERENCES -- Y*1(2250)

BLANPIED 65 PRL 14 741         +GREENBERG,HUGHES,KITCHING, +  //YALE(CEA)
BOCK     65 PL 17 166          +COOPER,FRENCH,KINSON, +     //CERN,SACLAY
KYCIA    67 PRIVATE COMM.      T F KYCIA                            //BNL  I

                   PAPERS NOT REFERRED TO IN DATA CARDS.

DAUBER   66 PL 23 154          +SCHLEIN, SLATER, STORK, TICHO //UCLA(LRL)  J
     --  SUGGESTS J=9/2 RESONANT BEHAVIOR IN SIGMA- PI+, BUT APPEARS
         INCONSISTENT WITH PARAMETERS OF ABRAMS 67.
COOL     66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
     --  REPLACED BY KYCIA 67.

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Σ(2455)

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53  Y*1(2455, JP=     ) I=1

ONE OF TWO NEW SMALL BUMPS IN THE I=1 TOTAL CROSS
SECTION (SEE THE Y*1(2595)). IT IS REASONABLE TO
INTERPRET THEM AS RESONANCES, THOUGH THAT IS NOT
CERTAIN.  THERE IS ALSO LESSER EVIDENCE FOR NEW STRUCTURE IN THE I=0
CROSS SECTION -- SEE ABRAMS 67.

53  Y*1(2455) MASS (MEV)  -----------------------------

M          2455.0    10.0             ABRAMS   67 CNTR   K-P, D TOTAL    11/67

----------------- 53  Y*1(2455) WIDTH (MEV)  ----------------------------

W           140.0  APPROXIMATELY      ABRAMS   67 CNTR                   11/67

----------------- 53  Y*1(2455) PARTIAL DECAY MODES  --------------------

P1        Y*1(2455) INTO KBAR N                        S11S17

----------------- 53  Y*1(2455) BRANCHING RATIOS  -----------------------

R1        Y*1(2455) INTO (KBAR N)/TOTAL                (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1            0.26                 .  ABRAMS   67 CNTR                   11/67

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                        REFERENCES -- Y*1(2455)

ABRAMS   67 PRL 19 678        +COOL,GIACOMELLI,KYCIA,LEONTIC,LI, + //BNL

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Σ(2595)

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54  Y*1(2595, JP=     ) I=1

SEE NOTE UNDER THE Y*1(2455).

54  Y*1(2595) MASS (MEV)  -----------------------------

M          2595.0    10.0             ABRAMS   67 CNTR   K-P, D TOTAL    11/67

----------------- 54  Y*1(2595) WIDTH (MEV)  ----------------------------

W           140.0  APPROXIMATELY      ABRAMS   67 CNTR                   11/67

----------------- 54  Y*1(2595) PARTIAL DECAY MODES  --------------------

P1        Y*1(2595) INTO KBAR N                        S11S17

----------------- 54  Y*1(2595) BRANCHING RATIOS  -----------------------

R1        Y*1(2595) INTO (KBAR N)/TOTAL                (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1            0.26                 .  ABRAMS   67 CNTR                   11/67

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                        REFERENCES -- Y*1(2595)

ABRAMS   67 PRL 19 678        +COOL,GIACOMELLI,KYCIA,LEONTIC,LI, + //BNL

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Σ(3000)

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59  Y*1(3000, JP=     ) I=1

ENHANCEMENT IN LAMBDA PI AND KBAR N INVARIANT MASS
SPECTRA AND IN MISSING MASS OF NEUTRALS RECOILING
AGAINST KO.  EVIDENCE NOT CONCLUSIVE.  OMITTED FROM
TABLE.

----------------- 59  Y*1(3000) MASS (MEV)  -----------------------------

M          3000.0                      EHRLICH  66 HBC  C  PI-P 7.91 BEV/C

----------------- 59  Y*1(3000) PARTIAL DECAY MODES  --------------------

P1        Y*1(3000) INTO KBAR N                        S11S17
P2        Y*1(3000) INTO LAMBDA PI                     S18S 8

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                        REFERENCES -- Y*1(3000)

EHRLICH  66 PR 152 1194        R EHRLICH, W SELOVE, H YUTA    //PENN(BNL)  I

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Ξ⁻

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22  XI -    (1321,JP=1/2 )  I=1/2

SEE LISTINGS OF STABLE PARTICLES

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Ξ^0

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23  XI 0    (1314, JP=1/2 )  I=1/2
SEE LISTINGS OF STABLE PARTICLES

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Ξ (1530)

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49  XI*1/2(1530, JP=3/2+) I=1/2

                 49  XI*1/2(1530) MASS (MEV)     --------------------------

M    *     1529.0      5.0            PJERROU   62 HBC  0- K-P 1.8 BEV/C
M    *     1532.0      2.0            BADIER    64 HBC  C- K-P 3 BEV/C
M-         1535.7      3.2            LONDON    66 HBC  -  K-P 2.24 BEV/C
MO         1528.7      1.1            LONDON    66 HBC  C

----------------- 49  XI*(-)-XI*(0) MASS DIFFERENCE (MEV)  ---------------

D             5.7      3.0            PJERROU   65 HBC  C- K-P 1.8-1.95 B/C
D    R        7.0      4.0            LONDON    66 HBC  C
D    R     REDUNDANT WITH DATA IN MASS LISTING.
D             2.0      3.2            MERRILL   66 HBC  C- K-P 1.7-2.7 BE/C
D          . . . . . . . . . .
D    AVG      3.9692   2.1866   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

----------------- 49  XI*1/2(1530) WIDTH (MEV)   --------------------------

W             7.0      2.0            SCHLEIN   63 HBC  C  K-P 1.8-1.95 B/C
W             8.5      3.5            LONDON    66 HBC  C
W             7.0      7.0            BERGE     66 HBC  C  K-P 1.5-1.7 BE/C
W          . . . . . . . . . .
W    AVG      7.3478   1.6854   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

----------------- 49  XI*1/2(1530) PARTIAL DECAY MODES     -----------------

P1         XI*1/2(1530) INTO XI PI                        S22S 8

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                        REFERENCES -- XI*1/2(153C)

PJERROU  62 PRL 9 114          +PROWSE,SCHLEIN,SLATER,STORK,TICHO  //UCLA  I
SCHLEIN  63 PRL 11 167         +CARMONY,PJERROU,SLATER,STORK,TICHO //UCLA IJP
BADIER   64 DUBNA I 593        +CEMOLLIN,GOLDBERG, +    //EP,SACLAY,AMSTR  I
PJERROU  65 PRL 14 275         +SCHLEIN,SLATER,SMITH,STORK,TICHO   //UCLA
LONDON   66 PR 143 1034        +RAU,SAMIOS,YAMAMOTO,GOLCBERG,+ //BNL,SYCR  IJ
BERGE    66 PR 147 945         +EBERHARD,HUBBARC,MERRILL,B-SHAFER,+ //LRL  I
MERRILL  66 UCRL-16455 THESIS D W MERRILL                           //LRL  JP

        QUANTUM NUMBER DETERMINATION NOT REFERRED TO IN DATA CARDS.

SHAFER   66 PR 142 883         BUTTON-SHAFER,LINDSEY,MURRAY,SMITH   //LRL  JP

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Ξ (1705)

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51  XI*1/2(1705, JP=    ) I=1/2
EVIDENCE NOT COMPELLING.  OMITTED FROM TABLE.

                 51  XI*1/2(1705) MASS (MEV)     --------------------------

M          1705.0        APPROX      SMITH     65 HBC  0- K-P 2.1-.7 BEV/C

----------------- 51  XI*1/2(1705) WIDTH (MEV)   --------------------------

W            20.0        APPROX      SMITH     65 HBC  C-

----------------- 51  XI*1/2(1705) PARTIAL DECAY MODES   ------------------

P1         XI*1/2(1705) INTO XI PI                        S22S 8
P2         XI*1/2(1705) INTO LAMBDA KBAR                  S18S11

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                        REFERENCES -- XI*1/2(17C5)

SMITH    65 ATHENS CONF 251   G A SMITH, J S LINDSEY               //LRL  I

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Ξ (1815)

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50  XI*1/2(1815, JP=    ) I=1/2

                 50  XI*1/2(1815) MASS (MEV)     --------------------------

M    *     1770.0                     HALSTEINS 63 FBC  C- K-FR 3.5 BEV/C
M          1817.0      7.0            SMITH 1   65 HBC  C- K-P 2.4-.7 BEV/C
M          1814.0      4.0            BADIER    65 HBC  C  K-P 3 BEV/C
M          . . . . . . . . . .
M    AVG   1814.7385   3.4730   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

----------------- 50  XI*1/2(1815) WIDTH (MEV)   --------------------------

W    *       80.0         OR LESS     HALSTEINS 63 FBC  C-
W            12.0      4.0            BADIER    65 HBC  C
W            30.0      7.0            SMITH 2   65 HBC  C-
W          . . . . . . . . . .
W    AVG     16.4308   7.7538   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.2)

----------------- 50  XI*1/2(1815) PARTIAL DECAY MODES   ------------------

P1         XI*1/2(1815) INTO LAMBDA KBAR                  S18S11
P2         XI*1/2(1815) INTO XI PI                        S22S 8
P3         XI*1/2(1815) INTO SIGMA KBAR                   S20S11
P4         XI*1/2(1815) INTO XI*1/2(1530) PI              U49S 8
P5         XI*(1815) INTO XI PI PI (XI PI NOT XI*(1530)) S22S 8S 8

----------------- 50  XI*1/2(1815) BRANCHING RATIOS    --------------------

R1         XI*1/2(1815) INTO (LAMBDA KBAR)/TOTAL          (P1)/TOTAL
R1   *       LARGE                    BADIER    65 HBC
R1   *       LARGE                    SMITH 2   65 HBC

R2         XI*1/2(1815) INTO (XI PI)/(LAMBDA KBAR)        (P2)/(P1)
R2           0.20      0.20           BADIER    65 HBC
R2   *       SMALL                    SMITH 2   65 HBC    IF XI*1933 EXIST

R3         XI*1/2(1815) INTO (SIGMA KBAR)/TOTAL           (P3)/TOTAL
R3           0.02      OR LESS        TRIPP     67 RVUE                    8/67

R4         XI*1/2(1815) INTO (XI*(1530) PI)/(LAM KBAR)    (P4)/(P1)
R4           0.26      0.13           SMITH 1   65 HBC
R4   *       SMALL                    BADIER    65 HBC

R5         XI*1/2(1815) INTO (XI PI PI)/(LAMBDA KBAR)     (P5)/(P1)
R5           0.1       OR MORE        SMITH 1   65 HBC
R5   *       SMALL                    BADIER    65 HBC

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                        REFERENCES -- XI*1/2(1815)

HALSTEIN 63 SIENA CONF 173    HALSTEINSLIC,+//BERGEN,CERN,EP,RTHF,UNICOL  I
SMITH 1  65 PRL 14 25         +LINDSEY,BUTTON-SHAFER,MURRAY        //LRL IJP
BADIER   65 PL 16 171         +CEMOULIN,GOLDBERG, +    //EP,SACLAY,AMSTR  I
SMITH 2  65 ATHENS CONF 251   G A SMITH, J S LINDSEY               //LRL
TRIPP    67 NP 83 10          + LEITH, +   //LRL,SLAC,CERN,HEIDEL,SACLAY
     --  USES DATA OF SMITH 1.

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Ξ (1935)

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52  XI*1/2(1935, JP=    ) I=1/2
SEEN AS AN ENHANCEMENT IN THE XI PI INVARIANT MASS
SPECTRUM.  LITTLE IS KNOWN ABOUT IT, AND EVEN ITS
EXISTENCE IS NOT CERTAIN.

                 52  XI*1/2(1935) MASS (MEV)     --------------------------

M          1933.0     16.0            BADIER    65 HBC  0  K-P 3 BEV/C

----------------- 52  XI*1/2(1935) WIDTH (MEV)   --------------------------

W           140.0     35.0            BADIER    65 HBC  0

----------------- 52  XI*1/2(1935) PARTIAL DECAY MODES   ------------------

P1         XI*1/2(1935) INTO XI PI                        S22S 8

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                        REFERENCES -- XI*1/2(1935)

BADIER   65 PL 16 171         +DEMOULIN,GOLDBERG, +  .  //EP,SACLAY,AMST  I

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Ω^-

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24  OMEGA -  (1675, JP=3/2+)  I=0
SEE LISTINGS OF STABLE PARTICLES

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Appendix I. Partial Rates in K^+ and K^0 Decay

The quantities of interest for making tests of theoretical predictions regarding K decay are usually partial decay rates for single channels or special sums of channels. It is not possible to compute the errors on sums, difference, and ratios of partial decay rates from the information given in Table S because of the presence of off-diagonal terms in the error matrix. For this reason we give some of these quantities below.

Table I.

$\Gamma_{K^+_{\ell 3}} = \Gamma_{K^+_{e3}} + \Gamma_{K^+_{\mu 3}}$	$= (6.65\pm.17)\times 10^6\ \mathrm{sec}^{-1}$
$\Gamma_{K^+_{\tau}} - \Gamma_{K^+_{\tau'}}$	$= (3.13\pm.05)\times 10^6\ \mathrm{sec}^{-1}$
$\Gamma_{K^+_{\mu 3}} / \Gamma_{K^+_{e3}}$	$= 0.70\pm.04$
$\Gamma_{K^+_{\tau}} / \Gamma_{K^+_{\tau'}}$	$= 3.28\pm.09$
$\Gamma_{K^0_{\ell 3}} = \Gamma_{K^0_{e3}} + \Gamma_{K^0_{\mu 3}}$	$= (11.77\pm 0.40)\times 10^6\ \mathrm{sec}^{-1}$
$\Gamma_{K^0_{\mu 3}} / \Gamma_{K^0_{e3}}$	$= 0.78\pm 0.05$
$\Gamma_{K^0_{\pi^0\pi^0\pi^0}} / \Gamma_{K^0_{\pi^+\pi^-\pi^0}}$	$= 2.10\pm 0.21$

The $\Gamma_{K_{\ell 3}}$ rates are useful in testing the leptonic $\Delta I = \frac{1}{2}$ rule in the way suggested by Trilling.[1] The predictions are

$$\frac{\Gamma_{K^0_{\ell 3}}}{2\Gamma_{K^+_{\ell 3}}} = 1.04, \text{ a phase space factor,}$$

and

$$\frac{\Gamma_{K^0_{\mu 3}}}{\Gamma_{K^0_{e3}}} = \frac{\Gamma_{K^+_{\mu 3}}}{\Gamma_{K^+_{e3}}}.$$

From Table I,

$$\frac{\Gamma_{K^0_{\ell 3}}}{2\Gamma_{K^+_{\ell 3}}} = 0.89\pm 0.04$$

and

$$\frac{\Gamma_{K^0_{\mu 3}}}{\Gamma_{K^0_{e3}}}\left[\frac{\Gamma_{K^+_{\mu 3}}}{\Gamma_{K^+_{e3}}}\right]^{-1} = 1.11\pm 0.09.$$

The first result seems to show some disagreement with the prediction, but the errors should be regarded with caution, in view of the internal disagreements in the data. (Note the ideograms in the data listing for the charged K meson.)

The three pion ratios may be used in the following tests of the $\Delta I = \frac{1}{2}$ rule:

$$R_1 = \frac{2}{3}\,\frac{\Gamma_{K^0_{\pi^0\pi^0\pi^0}}}{\phi_1}\left[\frac{\Gamma_{K^0_{\pi^+\pi^-\pi^0}}}{\phi_2}\right]^{-1} = 1,$$

$$R_2 = \frac{1}{4}\,\frac{\Gamma_{K^+_{\tau}}}{\phi_3}\left[\frac{\Gamma_{K^+_{\tau'}}}{\phi_4}\right]^{-1} = 1,$$

$$R_3 = \frac{1}{2}\,\frac{\Gamma_{K^0_{\pi^+\pi^-\pi^0}}}{\phi_2}\left[\frac{\Gamma_{K^+_{\tau'}}}{\phi_4}\right]^{-1} = 1,$$

$$R_4 = \frac{\Gamma_{K^0_{\pi^0\pi^0\pi^0}}}{\phi_1}\left[\frac{\Gamma_{K^+_{\tau}}}{\phi_3} - \frac{\Gamma_{K^+_{\tau'}}}{\phi_4}\right]^{-1} = 1,$$

where $\phi_1 = 1.49$, $\phi_2 = 1.22$, $\phi_3 = 1.00$, $\phi_4 = 1.24$ are phase space factors given by Trilling.[1] The values in Table I lead to

$$R_1 = 1.15\pm 0.11, \qquad R_2 = 1.02\pm 0.03,$$

$$R_3 = 0.85\pm 0.04, \qquad R_4 = 0.95\pm 0.09.$$

Here there may be significant disagreements with the predictions. Consideration of the energy dependence of the matrix element does not alter this conclusion.[2]

1. G. Trilling, K-Meson Decays, UCRL-16473 (updated from Argonne Conference Proceedings, 1965, p. 115).
2. T. Devlin and S. Barshay, Phys. Rev. Letters 19, 881 (1967).