PROPERTIES OF OTHER MESONIC STATES

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Summary of the papers submitted to this sub-session:

Particle	Paper	Reaction	Comment
$\eta'(958)$	909	$K^-p \to \Lambda\eta'$ 1.8 GeV/c	J^P
$S^*(993)$	444	$\bar{p}p \to K^o_1 K^o_1 \pi^+\pi^-$ 0.7 GeV/c	$(K\bar{K})_{I=0}$ threshold enhancement
$A_1(1100)$	1086	$\pi^+ d \to \pi^+\pi^+\pi^-\pi^o d$ 11.7 GeV/c	bumps in $m(\pi^+\pi^-\pi^o)$ in A_1, A_3 regions
B(1235)	291	$\pi^+ p \to B^+ p$ 5 GeV/c	J^P, prod mech., final state $\Delta^{++}B^o$?
	942	$\pi^- p \to B^- p$ 3.9-7.5 GeV/c	J^P, D/S, ρ^m_m, (t')
	222	phenom	Study of axial vector meson prod. based on paper 942; predictions for A_1 prod.
	184	phenom	Study of meson prod. and connection to spectroscopy.
	346	method	Analysis of $\omega\pi^o$, $\eta\pi^o$
$f_o(1270)$	292	$\pi^+ p \to \Delta^{++} f_o$ 5 GeV/c	$f_o \to 4\pi$; first time see $f_o \to \pi^+\pi^-\pi^o\pi^o$

Particle	Paper	Reaction	Comment
$A_2(1310)$	134	$\pi^- p \to p K^o K^-$ 23 GeV/c	Simple BW shape; also in t' ε(0.2, 0.29) GeV^2
	345	$\pi^+ p \to \Delta^{++} A_2^o$ $p\ A_2^+$ 5 GeV/c	$A_2 \to \omega\pi\pi$
$F_1(1540)$	Prague $N\bar{N}$ Conf	$\bar{p}p \to \pi^+\pi^- K_1^o K^o$ 0.75 GeV/c	not seen
	104	$\pi^+ d \to K^+ K^- \pi^+ d$ 6 GeV/c	bump in $m(K^+K^-\pi^+)$ with (M, Γ) = (1575, 119)
g(1680) region	557	$\pi^+ p \to$ 13 GeV/c	$p4\pi$ $p\pi^+\pi^o$ $\Delta^{++}\pi^+\pi^-$ $\Delta^{++}4\pi$ investigation of the R-region
ρ"(1600) region	205	$\pi^+ n \to p\pi^+\pi^+\pi^-\pi^-$ 6 GeV/c	bump in $m(4\pi)$ with (M,Γ) = (1640,500); possibly consists of two bumps
S(1930) region	445	$\bar{p}p \to K_1^o K_2^o$ 0.7, 0.75 GeV/c	no evidence for $S(1970) \to K_1^o K_2^o$
T-U region (2.1-2.4 GeV)	731	$\bar{p}p \to \bar{n}n$	T and U bumps consistent with $\sigma_{TOT}^{\bar{p}p}$
	732	$\bar{p}p \to n\bar{n}$ (backward)	σ comparable with $\sigma_{\bar{p}p \to p\bar{p}}$ (backw.)
	712	$\bar{p}p \to \bar{p}p$	study of distribution cos (θ), discussion of extrapolation to ±1
	386	fit to the $\bar{p}p \to K^+K^-$ data	evidence for a reson. with J=3, M=2130

Particle	Paper	Reaction	Comment
	1094	$\bar{p}p \to \pi^o\pi^o, \pi^o\eta^o$ 1.752 GeV/c	angular distrib; also for $\bar{p}p \to (\pi\pi)_{I=1}$ using $\bar{p}p \to \pi^+\pi^-$
		$\pi^- p \to (\bar{p}n)p$ 12 GeV/c	first time study $\bar{p}n$; see no bumps; compat. with OPE
K*(890)	446	$\bar{p}p \to \bar{K}K^*$ 0.7 GeV/c	$m(K^{*o}) - m(K^{*+})$
Q region	603	$\pi^- p \to \Lambda X^o$ 6.15 GeV/c	see bump with (M,Γ) = (1227, 46)
exotics	910	review	unambig. evidence for exotic exchanges; no evidence for exotic states
	885	$\pi^- n \to p X^{--}$ (backw.) 1.2 - 1.5 GeV/c	claim a bump in X^{--} with (M,Γ) = (500, <80)
	251	$\pi^+ p \to n X^{++}$ 8.4 GeV/c (backw.)	no evidence for exotic states with M<3 GeV, Γ≲ 100 MeV at 1 μb level

Some Comments:

¶ J^P assignment of η' ($J^P = 0^-$ or 2^-) remains open (paper 909). Paper 104 investigates J^P of a Kππ bump with M≈1575 MeV, i.e. near the $F_1(1540)$. This state, seen originally in $\bar{p}p$ at 700 MeV/c, is however not seen in $\bar{p}p$ at 750 MeV/c (paper submitted to the Prague 1974 $N\bar{N}$ Conference).

¶ The problem of the $(K\bar{K})_{I=0}$ threshold enhancement (is it explained in all reactions by the S* pole?) is treated by paper 444; more data is needed.

¶ Mesons sought in the diffraction-like reactions (A_1, Q_A, Q_B, ...) remain to be found; J^P analyses in reactions like

$\pi^- p \to n \quad \pi^+\pi^-\pi^o$
$\pi^+ p \to \Delta^{++} \quad \pi^+\pi^-\pi^o$
$K^- p \to \Lambda \quad \pi^+\pi^-\pi^o$
$\pi^+ n \to p \quad \pi^+\pi^-\pi^o$
$\pi^- p \to \Lambda \quad K\pi\pi$ etc

will probably be essential (the data is becoming available). The evidence for a narrow peak in the Q region (paper 603) and relatively narrow bumps in the A_1 and A_3 region (paper 1086) need more study and statistics.

¶ B-meson has been investigated in detail (papers 291, 942, 222, 184, 346); it is the only established axial vector meson. The detailed determination of the B production properties (paper 942) enabled a study of axial vector

meson production (paper 222), with many predictions of spectroscopic interest ($K^-p \to \Lambda A_1$ etc). B production and its connection to the spectroscopy is, among other reactions, also investigated in paper 184. Phenomenological approaches, outlined in these papers, will certainly become increasingly useful and powerful tools in meson spectroscopy.

¶ Some useful measurements: $f_o \to 4\pi$ (paper 292), $A_2 \to \omega\pi\pi$ (paper 345) and K* mass difference (paper 446). Paper 557 investigates the g("R") region and gives several branching ratios; more high statistics experiments are needed to clear up the situation in this region.

¶ A_2 shape is found to be a simple Breit-Wigner in a high statistics, high resolution experiment with small background ($\pi^-p \to pK^oK^-$, paper 134), even in the "magic" t' interval of (0.2, 0.29) GeV?

¶ Number of papers on S, T and U (mainly s-channel $\bar{N}N$): established effects are the narrow S(1930) and broad T and U seen in $\sigma^{TOT}_{\bar{p}p}$. Their interpretation and possible additional effects need analysis of existing data (e.g. $\bar{p}p \to \pi^o\pi^o, \eta\pi^o$; paper 1094) and new experiments (e.g. polarization in $\bar{p}p \to \pi^+\pi^-$, K^+K^- etc). For more details on this region see Rapporteurs' talk of F. Wagner.

¶ Exotics: Paper 895 with a claim for a bump in $M(X^{--})$ is not detailed enough to enable a critical judgement of the significance of the evidence to be made. Paper 251 puts upper limits on the backward production of exotic states in $\pi^+p \to nX^{++}$ at the 1 μb level.

SPECTROMETERS FOR MESON PHYSICS

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A 90 minute session was held on the more technical aspects of performing meson spectroscopy with spark chambers and magnetic spectrometers. For reasons of lack of space the individual talks are not reproduced here. Instead a list is given with references to the relevant contributed papers and other articles in which the spectrometers are described. The speakers discussed acceptance corrections, resolution, particle identification, backgrounds, sensitivity (events/μb), pattern recognition and computing times per event, and the described experimental programmes for existing spectrometers. Brief descriptions of two spectrometers still under construction, LASS(SLAC) and MPS (Brookhaven) were also given. The talks were as follows:

Speaker	Spectrometer	Ref
W. Blum (Munich)	CERN-Munich Spectrometer	1
L. Mandelli (CERN)	Omega Spectrometer	2