

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

APPROVED EXPERIMENTS CERN PROTON SYNCHROTRON

FEBRUARY 1970.

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PS Co-ordinator

PS COUNTER EXPERIMENTS APPROVED BY THE NPRC

Table 1A

Area Tgt.	Expt. Code	B e a m		Description of experiment	Authors	Date of Approval by NPRC	Conditions of Approval/ time alloc.	Status (Appr.wks. remaining)
		Code	Description					
Target 8 South Hall	S81	π^+	Separated K^+ < 2 GeV/c \bar{p} < 4 GeV/c π^- < 5 GeV/c (Separated version of q_8)	K^+p , $K^+\bar{p}$, $\bar{p}p$ forward and backward scattering, annihilation of $\bar{p}p$ in 2 π 's or 2 K 's at small angles. 2 C magnets, on-line wire chambers, gas Cerenkov counter. IBM 1800	CERN-Ec.Poly., PARIS-ORSAY (Acc.Lin.)-STOCKHOLM: Lundby, Mukhin, Baglin, Briandet, Fleury; Davier, Gracco, Lehmann, Morand, Treille; Carlson, Englund, Johansson	4.6.69	8 weeks	In Prod. (4 wks.)
	S86	π^+	Separated K^+ < 2 GeV/c \bar{p} < 4 GeV/c π^- < 5 GeV/c (Separated version of q_8)	$\bar{p}p \rightarrow \pi^+\pi^-$ at 4 GeV/c. Differential cross section at small values of t and u . Magnet, scintillators, wire spark chambers, Cerenkov counter	PADOVA: Calvelli, Centro, Cittolin, Gasparini, Limentani, Mittner, Peranzoni, Ventura, Voci	11.12.68	Time not yet allocated	Not before completion S 91
	S76	q_7	Unseparated π , K , p < 3.5 GeV/c	K^+ , \bar{p} scattering on polarized protons. Polarized target and counters. IBM 1800	CERN-FOM: Anderson, Erné, Dauw, Lagnaux, Sens, Udo	3.4.68 12.2.69 24.9.69	5 weeks + 12 wks + 12 wks	In Prod. (8 wks)
Target 1 South Hall	S84	d_{29}	Unseparated π^+ , K^+ , p^+ < 12 GeV/c	Neutral mesonic resonances in π^+p at high energies and their neutral decay modes. Liq. H_2 target with localization of interaction. γ rays, spark chambers, neutron spectrometer. TR 86	PISA-KARLSRUHE: Bertolucci, Mannelli, Pierazzini, Scribano, Sergiapietri, Vincelli; Abel, Müller, D. Schmitt, Sigurdsson, Staudenmaier	6.11.68 11.12.68 24.9.69	8 weeks	Start Feb.1970
	S95	d_{29a}	Unseparated π^+ , K^+ , p^+ < 12 GeV/c	Test of He^4 target for coherent interaction. Detection of recoiling alpha particles • ETH magnet	CERN-ETH-UPPSALA: Asberg, Beusch, Dahlgren, Dorell, Ekelöf, Herz, Hoistad, Kullander, Tyrén	4.7.69 5.11.69	4 weeks Parasitic + 2 wks.	Testing (2 wks.para- sitic + 2 wks.)
	S102	d_{29a}	Unseparated π^+ , K^+ , p^+ < 12 GeV/c	K^+p charge exchange, at 8 GeV/c on polarized target in the range $0 < -t < 0.8 \text{ GeV}^2$, and at 5 GeV/c and 8 GeV/c on hydrogen in the range $0.5 < -t < 1.5 \text{ GeV}^2$. Spark chambers • ETH magnet.	CERN-ETH-Imperial College-SACLAY: Astbury, Beusch, Freudenreich, Gentit, Guisan, Harckham, Michelini, Mühlemann, Websdale, Wetzel	4.2.70	Time not yet allocated	Not before Oct.1970

PS COUNTER EXPERIMENTS APPROVED BY THE NPRC
Table 1A (cont'd.)

Area Tgt.	Expt. Code	B e a m		Description of experiment	Authors	Date of Approval by NPRC	Conditions of Approval/ time alloc.	Status (Appr.wks. remaining)
		Code	Description					
South Hall Target 1	S74	a_{7a}	Separated counter beam π , K, \bar{p} ; $K < 2.2$ GeV/c $\bar{p} < 3$ GeV/c	High precision measurement on $\Delta S/\Delta Q$ rule. Measurements on $K^0 \rightarrow \pi^+ \pi^- \pi^0$ Counters and wire chambers. Varian 620 i.	CERN-ORSAY-VIENNA: Aubert, Bartl, de Bouard, Lepeltier, Massonnet, Kiebergall, Pessard, Regler, Steuer, Vivargent, Willits, Winter, Stier, Yvert	3.4.69 24.9.69 5.11.69	8 wks. (Test) +8 weeks +6 weeks	In Prod. (10 wks.)
	S83	q_9	Unseparated π , K, p < 3.5 GeV/c	Study of neutral resonances decaying into neutral modes in low mass region. A_2^0 splitting. Neutral missing mass spectrum, spark ch. and scintil. shower detectors, neutron detectors	CERN-BOLOGNA: Bollini, Dalpiaz, Frabetti, Navach, Massam, Navarra, Schneegans, Zichichi	6.11.68 24.9.69 5.11.69	8 weeks + 1 week + 8 weeks	In Prod. (6 wks)
	S89	t_1	Unseparated π , K, p fast counter beam < 1 GeV/c	Strangeness + 1 missing mass in $\pi^- p \rightarrow \Lambda^0$ + M. Scintillators, spark chambers, water Cerenkov counter. Tests of apparatus + logics.	University of Rome: Bizzari, Dore, Guidoni, Laakso, Marini, Martellotti, Marsa, Pistilli	12.2.69	Tests	Testing
	S99		Low energy separated beam, to produce high flux of \bar{p} , between 0.6 and 2.0 GeV/c	Differential cross-sections for: $\bar{p}p \rightarrow \bar{p}p, \pi^+ \pi^-, K^+ K^-$ between 0.6 and 2.0 GeV/c Wire chambers, counters, AEG magnet.	RHEL-Queen Mary College-DNPL-Liverpool: Astbury, Jones, Parsons, Kalmus, Gibson, Eisenhandler, Williams, Kemp, Woulds, Carroll, Range.	5.11.69	Time not yet allocated	Not before shutdown 1970.
	S100		Separated counter beam, π , K, \bar{p} ; $K < 2.2$ GeV/c $\bar{p} < 3$ GeV/c	Differential cross-sections for $K^- n$ elastic scattering between 1 and 2 GeV/c. Charpak chambers, neutron detector, C-magnet.	CERN-CAEN-I.I.S.N. (Bruxelles): Ferro-Luzzi, Perreau, Ypsilantis, Bizard, Déclais, Duchon, Séguinot, Bricman	5.11.69	Time not yet allocated	Not before shutdown 1970
East Hall	S92	s_5	High energy spectrometer line derived from e_7 the experiment's target being in the e_7	High energy p-p two-body reactions. 60 m long magnetic spectrometer. Scintillation counters. HP 2116A	Allaby, Awaldi, Biencastelli, Bosio, Diddens, Dobinson, Klovning, Matthiae, Rochester, Schlipmann, Wetherell	4.6.69	10 weeks	In Prod. (8 wks.)

PS COUNTER EXPERIMENTS APPROVED BY THE NPRC
Table 1A (cont'd.)

CPS/EXP/17
16.2.1970

Area Tgt.	Expt. Code	Beam		Description of experiment	Authors	Date of Approval by NPRC	Conditions of Approval/ time alloc.	Status (Appr. wks. remaining)
		Code	Description					
Slow Ejection 62 - East Hall	S93		Short neutral beam of the b_{13} type derived from e_7 with a vertical septum	$\Phi\eta^{\pm}$ measurement, by time dependence of $K^0 \rightarrow \pi^+ \pi^-$ and of the charge asymmetry in leptonic decay. Charnak chambers, wide gap magnet, large H_2 Cerenkov	CERN-HEIDELBERG: Kleinknecht, Steffen, Steinberger; Filthuth, Luth, Mockry, Vannucci, Tripper, Wahl, Zech	4.6.69	Provided satisfactory beam + layout is found	Start Autumn 1970
	S90	p ₅	Unseparated $\pi^{\pm}, K^{\pm}, p^{\pm} < 18$ GeV/c, produced from slow eject. proton beam e_7	Magnetic boson spectrometer for masses from 4-8 GeV. Wide gap magnet and wire chambers. IBM 1800. Tests for a Serpukhov experiment.	CERN-GENEVA-MUNICH UNIVERSITY: Baud, Benz, Blumenfeld, Botterill, Damgaard, Haf, Focacci, Kienzle, Klanner, Lechanoine, Martin, Lecompte, Roinischvili, Weitsch	23.4.69	4 weeks	Testing (2 wks.)
	S94	p ₅	Unseparated $\pi^{\pm}, K^{\pm}, p^{\pm} < 18$ GeV/c, produced from slow ej. proton beam e_7	$\pi^- p \rightarrow \pi^+ \pi^- n, K^+ K^- n$, effective mass measurement. Large magnet, wire chambers, PDP9 computer	CERN-MUNICH: Blum, Dietl, Hyams, Koch, Lorenz, Lütjens, Männer, Mittner, Stierlin, Weilhammer	24.9.69	8 weeks	After completion S90
	S59	p ₄	Unseparated $\pi^{\pm}, K^{\pm}, p^{\pm} < 18$ GeV/c, produced from slow ej. proton beam e_7	Measurement on the parameter P_0 in $\pi^{\pm} p, K^{\pm} p, p^{\pm} p$ scattering, using a transversally polarized target and counter hodoscopes, IBM360-44	CERN-ORSAY-PISA: Borghini, Dick, di Lella, Navarro, Olivier, Reibel; Coignet, Grégoire, Foulet, Cronenberger, Sillou, Michalowics, Kuroda; Bellettini, Braccini, Del Prete, Foà, Valdata, Sanguinetti	8.12.66 3.4.68 23.4.69 24.9.69	8 weeks + 6 weeks + 6 weeks	In Prod. (4 wks.)
	S82	b ₁₇	Neutral beam derived from e_7	Accurate determination of ratio $\eta_{00}^0 / \eta_{+-}^0$. Wire spark chambers and lead glass Cerenkov counters. IBM 1800	CERN-AACHEN-TORINO: Darriulat, Deutsch, Ferrero, Grosso, Holder, Pilcher, Rubbia, Sciré, Staudé, Radermacher, Tittel	6.11.68 4.6.69 24.9.69	3 weeks (tests) + 8 weeks	In Prod. (6 wks.)

PS COUNTER EXPERIMENTS APPROVED BY NPRC
Table 1A (cont'd.)

Area Tgt.	Expt. Code	Beam		Description of experiment	Authors	Date of Approval by NPRC	Conditions of Approval/ time alloc.	Status (Appr.wks. remaining)
		Code	Description					
East Hall - Slow Ejection 62	P6	K_{12}	Low energy K meson beam with energy loss separation derived from slow ej. beam e_7	Investigation of hypernuclear gamma rays	CERN-HEIDELBERG-WARSAW: Bamberger, Lynen, Piekarz, Piekarz, Pniewski, Povh, Ritter, Sepp, V. Soergel	4.6.69 4.2.70	14 weeks (shared equally between P6 and P7)	Start Feb. 1970 (14 wks.)
	P7			Study of K mesic atoms	CERN-KARLSRUHE-HEIDELBERG: Backenstoss, Bunaciu, Charalambus, Egger, Hamilton, Koch, Povel, Schmitt, Springer	4.6.69 4.2.70		
	S103		Hyperon beam, produced from slow ej. proton beam e_7	Setting-up and study of a hyperon beam	Badier, Benaksas, Chollet, Gaillard, Lefrançois, Meunier, Repellin, Sauvage, Vanderhagen.	4.2.70	4 weeks	Starting date not yet decided
	S97		μ beam produced from fast ejected protons	Test of QED by precise measurement of g-2. Large muon storage ring with electrostatic focusing	Bailey, Bassompierre, Borer, Farley, Hattersley, Combley, Petrucci, Picasso, Wickens	24.9.69		Start 1973
	S101		Inside PS ring	Further background measurements at the PS, study of the ISR background problems. Scintillators, optical spark chamber	Agoritsas, Bott-Bodenhausen, Hyams, Potter	5.11.69	6 hrs/month to end of 1970	In Prod.

PS COUNTER EXPERIMENTS APPROVED BY NPRC

Table 1B

EXPERIMENTS FINISHED IN THE PERIOD 27.11.1969 (END OF SHUT-DOWN) TO 16.2.1970

Expt. Code	Beam Code	Beam Description	Description of experiment	Authors	Date of Approval	Date of Completion	Total Nr. of wks.	Status
S72*	b ₁₆	Neutral beam at 0°	Elastic np charge exchange scattering above 6 GeV/c. Wire spark chambers and counters. CDC 1700	CERN-KARLSRUHE: Engler, Horn, Münnig, Runge, Schüdecker, Schmidt-Parzefall, Schopper, Siebers, Ullrich	3.4.68 23.4.69 5.11.69	Feb.1970	14 + 4	Analysis
S96	d ₂₉	Unseparated π^+ , K^+ , p^+ < 12 GeV/c	π^- p charge exchange on polarized Butanol target. Spark chamber	SACLAY-DESY: Bonamy, Borgeaud, Crozon, Guillaud, Olivier, Guisan, Ledu, Sonderegger; Bienlein, Dinter, Mango, Paul	24.9.69	Feb.1970	4	Analysis
S98	d _{29a}	Unseparated π^+ , K^+ , p^+ < 12 GeV/c	Differential cross-section for $\bar{p}p \rightarrow \bar{n}n$	CERN-ETH-IMPERIAL COLLEGE: Astbury, Beusch, Freudenreich, Frosch, Gentit, Harckham, Lee, Polgar, Websdale	5.11.69	Feb.1970	4	Analysis

* The experiment S72 was listed as finished in the previous summary (CPS/EXP/16), but later the group requested and obtained an extension of 4 weeks.

BUBBLE CHAMBER EXPERIMENTS APPROVED BY NPRC
Table 2
AND EXPOSURES MADE IN THE PERIOD 27.11.1969 TO 16.2.1970

Expt. Code	Beam and Chamber	Expt. beam	Summary	Groups	Approved Date kpx	Taken before 27.11.69	Additional approval Date kpx	Taken in period kpx
T155	k ₈ Electrostat. separated beam K [±] 1.1 - 2 GeV/c, HBC 200, H ₂	K ⁺ , 1.2-1.8 GeV/c	Prod. of 300.000 K ⁰ of well-known momentum to study ΔQ/ΔS, using lept. decay; K ₁ ⁰ → π ⁺ π ⁻ /K ₁ ⁰ → π ⁰ π ⁰ ; K ⁰ lifetime; secondary interact. of K ₁ ⁰ ; the 3-body reaction K ⁺ p → K ⁰ pπ ⁺ (100.000 events) and the decay of K ⁺ → π ⁺ π ⁺ π ⁻ (100.000 events)	CERN, SACLAY	6.12.67 500	428 (70 bad)	5.11.69 + 400 (this includes the residual from the 500 kpx already approved)	0
T130		K ⁻ , 1.4-1.7 GeV/c	K ⁻ p formation experiment to search for fine structure in the Y* (2040) region	CERN, Heidelberg	8.11.67 100	247	5.11.69 + 100	0
T173		π ⁻ , 1.5-2.0 GeV/c	Formation experiment to study the properties of the U (2380) meson, and also to fill a gap in the existing knowledge of pp annihilations.	Glasgow, Liverpool, IPN Paris, Lausanne, Neuchâtel	5.11.69 380	0		0
T178		K ⁻ , 1.1-1.5 GeV/c	Proposal to study K ⁻ p interactions between 1.0 and 1.5 GeV/c with the purpose of carrying out phase-shift analysis on K ⁻ p interactions to establish the existence and properties of S=-1 hyperon states.	RHEL	5.11.69 350	0		0
T174	k ₈ Electrostat. separated beam K [±] 1.1 - 2 GeV/c HBC 200, D ₂	K ⁻ , 1.15-1.75 GeV/c	An experiment to study K ⁻ -neutron interactions in the CMS energy range from 1.8 to 2.25 GeV. The principal purpose is to do a partial wave analysis of the reactions K ⁻ n → π ⁻ Λ ⁰ and K ⁻ n → π ⁰ Σ ⁰ but 3 and 4 body final states will also be studied.	Birmingham, Edinburgh	5.11.69 300	0		0

BUBBLE CHAMBER EXPERIMENTS APPROVED BY NPRC
Table 2 (cont'd)
AND EXPOSURES MADE IN THE PERIOD 27.11.1969 TO 16.2.1970

Expt. Code	Beam and Chamber	Expt. beam	Summary	Groups	Approved Date kpx	Taken before 27.11.69	Additional approval Date kpx	Taken in period kpx
T152	u ₅ RF separated beam K ⁺ > 8 GeV/c, DBC 200, D ₂	π^- , 9 GeV/c	The main purpose is to study the $\pi^- d \rightarrow pp \pi^- \pi^- \pi^0$ reaction in order to confirm the recently published enhancement in $p \pi^- \pi^-$ around 1.3 GeV and to study it in greater detail.	Bari, Bologna, Florence Paris	4.2.70 300	0		0
T179		π^+ , 4 GeV/c	Study of neutral meson resonances which contain a single neutral decay product and are unfittable in the charge symmetric π -p interactions.	Birmingham, RHEI, Durham	4.2.70 <400	0		0
T182		K ⁺ , 5.6 GeV/c	The main objectives are a detailed study of the K [*] (1400) and the "Q" enhancement in (K $\pi\pi$).	Oxford	4.2.70 250	0		0
T159		\bar{p} , 9 GeV/c	Exploratory experiment to obtain information on energy dependence of the various produced channels. Coherent production on deuterium.	Strasbourg	4.2.70 150	0		0
T162		p, 20 GeV/c	Investigation of proton-neutron interactions at 20 GeV/c.	Alma-Ata	4.2.70 <75	0		0
T180	u ₅ RF separated beam K ⁺ > 8 GeV/c, HBC 200, H ₂	π^- , 9 GeV/c	G = ± 1 resonances; decay properties, branching ratios and production mechanisms in pion-nucleon collisions, with high statistics	Bologna, Florence, Genova, Milan	4.2.70 250	0		0

BUBBLE CHAMBER EXPERIMENTS APPROVED BY NPRC
Table 2 (cont'd)
AND EXPOSURES MADE IN THE PERIOD 27.11.1969 TO 16.2.1970

Expt. Code	Beam and Chamber	Expt. beam	Summary	Groups	Approved Date kpx	Total before 27.11.69	Additional approval Date kpx	Taken in period kpx
T170	k ₁₃ Electrostatic separated beam $\geq .6$ GeV/c HBC 81	\bar{p} .7 GeV/c	Analysis of the properties of $A_2 \rightarrow K \bar{K}$ (splitting) F_1 (1540), S^* (1050), and other $K\bar{K}$ threshold effects. D_0^+ (1285) in the process $\bar{p}p \rightarrow Dp$, E (1420) in the process $\bar{p}p \rightarrow E_0 \pi$	CERN, Collège de France	24.9.69 1500	520		206
T175		K ⁻ .6 - .8 GeV/c	K ⁻ p and K ⁻ n interactions between 600 and 800 MeV/c incident momentum. With these two complementary experiments the strange hyperon resonances in the mass region between 1600 and 1700 MeV will be studied with a significant increase in the statistical precision.	CERN-Heidelberg	24.9.69 800	0		0
T176	k ₁₃ Electrostatic separated beam $\geq .6$ GeV/c DBC 81				24.9.69 800	0		0
T171		K ⁺ .65 - .8 GeV/c	Formation experiment to investigate a new structure in the total cross section of the K ⁺ N interaction in the state of l-spin zero.	Bologna, Glasgow, Rome, Trieste	24.9.69 160	0		0
T133	k ₁₁ Electrostatic separated beam K ⁺ 0.8 - 1.2 GeV/c HLBC 120	K ⁻ , 0.8 - 1.2 GeV/c	Systematic research of Y_0^* using $\Sigma^0 \pi^0$ and $\Lambda^0 \pi^0 \pi^0$ channels. Study of $\Lambda^0 \eta^0$ and $\Sigma^0 \eta^0$ systems. Study of radiative decay of $Y^* \rightarrow \Lambda^0 \gamma$	CERN, Bergen, Ec.Poly., Orsay, Turin	5.6.68 625	743	5.11.69 330 (+190 if poss. without delaying ≈ 10)	603
T134		K ⁺ , stopped	Precise study of the K_{e3} branching ratio and energy dependence of the form factor f^+ in the K_{e3} decay mode. Furthermore, additional data will be obtained on the $K^+ \mu_3$ mode.	Aachen, Bari, Brussels, CERN	3.7.68 500	463	5.11.69 150	198

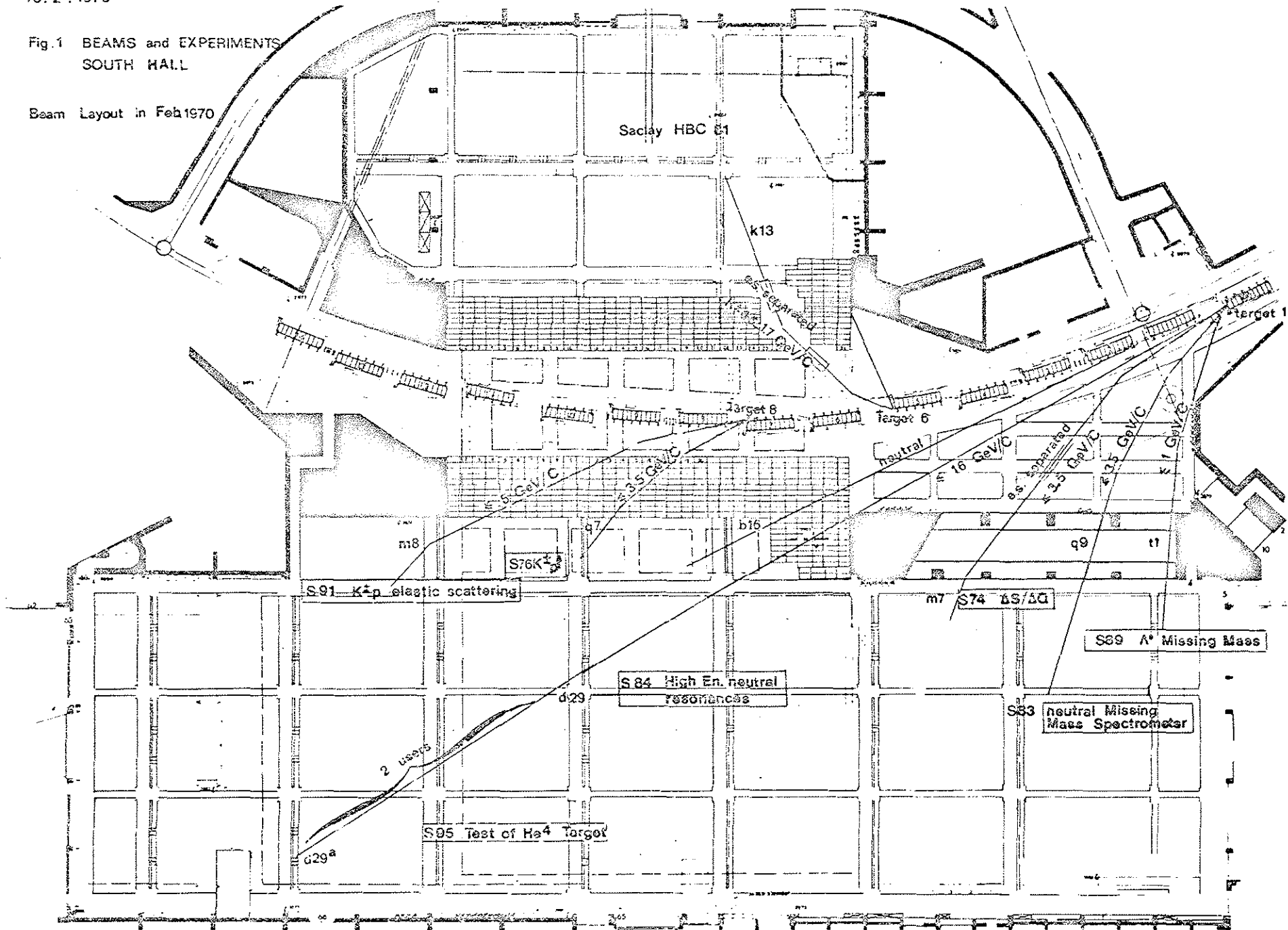
CPS/EXP/17
16.2.1970

BUBBLE CHAMBER EXPERIMENTS APPROVED BY NPRC
Table 2 (cont'd)
AND EXPOSURES MADE IN THE PERIOD 27.11.1969 TO 16.2.1970

Expt. Code	Beam and Chamber	Expt. beam	Summary	Groups	Approved Date kpx	Total before 27.11.69	Additional approval Date kpx	Taken in period kpx
T167	*10 Electrostatic separated beam $\pi^+ < 3.5 \text{ GeV/c}$ HLBC 120	π^+ , 3.5 GeV/c	Study of the $\pi\pi$ phase shift δ_0 from 370 MeV to 900 MeV by extrapolation from the reaction $\pi^+ p \rightarrow \pi^0 \pi^0 N^{*++}$ at 3.5 GeV/c	Bergen, Ec.Poly., Madrid, Orsay, Strasbourg	5.11.69 500	0		0

Fig.1 BEAMS and EXPERIMENTS
SOUTH HALL

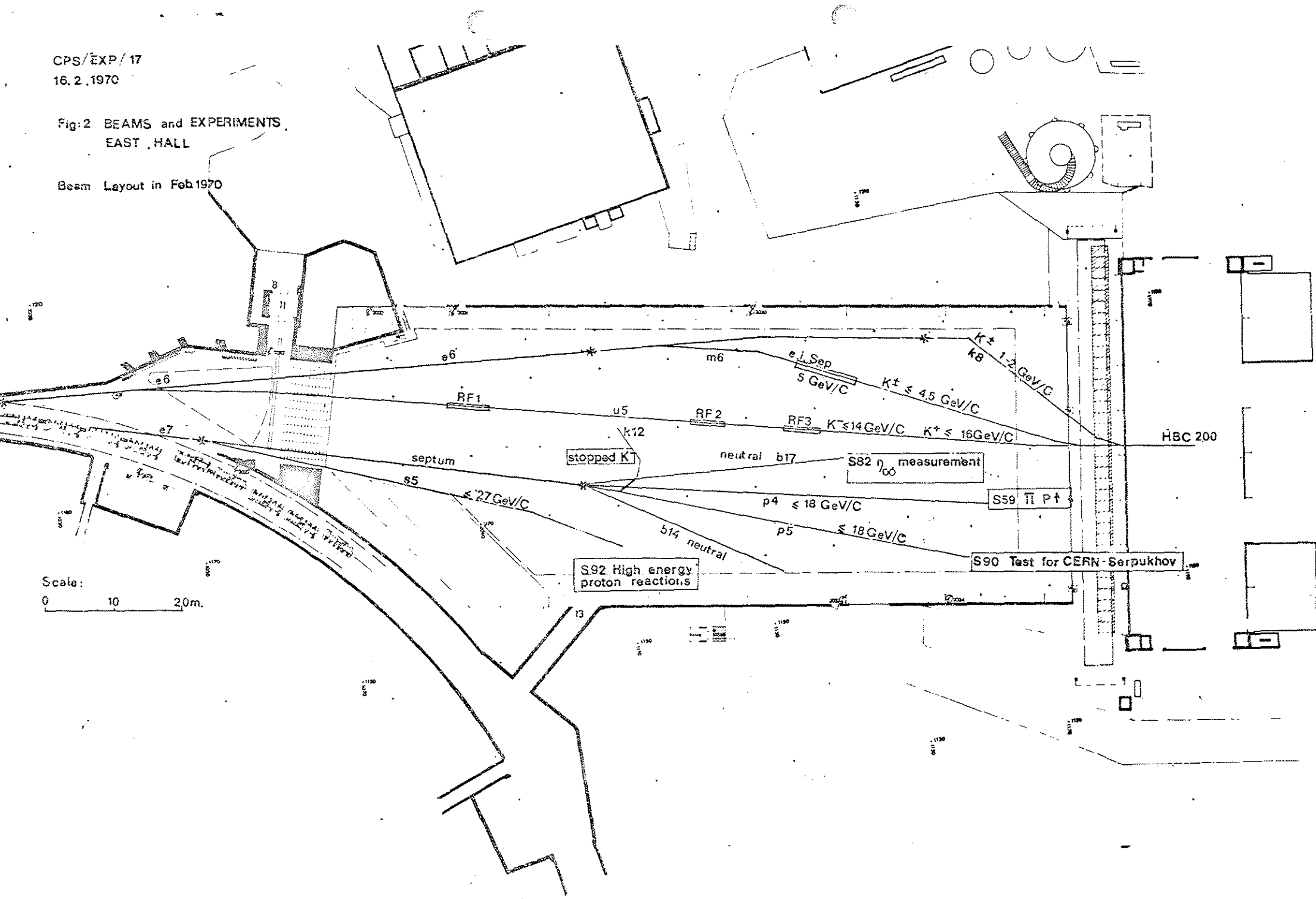
Beam Layout in Feb 1970



CPS/EXP/17
16.2.1970

Fig:2 BEAMS and EXPERIMENTS
EAST HALL

Beam Layout in Feb 1970



Scale:
0 10 20m.

CPS/EXP/17

16.2.1970

Fig.3 BEAMS and EXPERIMENTS

SOUTH - EAST HALL

BEAM LAYOUT in Feb. 1970

