

PHYSICS III COMMITTEE

DRAFT MINUTES OF THE MEETING OF THEPHYSICS III COMMITTEE

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CM-P00046043

held on

3 October 1972 at 2.30 p.m.

PRESENT

Alard, J.P.	Clermont-Ferrand	Knapp, E.	CERN
Backenstoss, G.	Karlsruhe	Knipper, A.C.	Strasbourg
Barbier, G.	CERN	Koch, H.	Karlsruhe
Beger, H.	CERN	Kugler, E.	CERN
Bergström, I.	AFI Stockholm	Kullander, S.	CERN
Binon, F.	IISN Belgium	Le Dallic, G.	CERN
Blaser, J.P.	SIN	Lewis, C.W.	Karlsruhe
Blomqvist, J.	AFI Stockholm	Lynen, U.	Heidelberg
Blythe, F.	CERN	Michaelis, E.G.	CERN
Bonn, J.	Heidelberg,	Michaelsen, R.	Berlin
Boschitz, E.T.	Karlsruhe	Munday, G.	CERN
Bressani, T.	Torino	Neri, G.N.	Pisa
Cernigoi, C.	Trieste	Nielsen, K.O.	Aarhus
Chiavassa, E.	Torino	Nielsen, O.B.	Copenhagen
Cordiallat, A.	Clermont-Ferrand/CERN	Otten, E.	Mainz
Cox, C.	CERN	Pfeiffer, H.P.	Munich
Darriulat, P.	CERN	Pietrzyk, B.	CERN
Deutsch, J.	Louvain	Pniewski, J.	Warsaw
Domingo, J.	CERN	Price, R.H.	Karlsruhe
Ekspong, G.	Stockholm	Pugh, H.G.	CERN
Egidy, T. von	Munich/CERN	Querrou, M.	Clermont-Ferrand
Engelhardt, H.D.	Karlsruhe	Raisbeck, G.	Orsay
Engfer, R.	CERN/ETH	Ravn, H.	CERN
Ericson, T.E.O.	CERN	Rinaudo, G.	Torino
Fainberg, A.	CERN/Torino	Rohlin, J.	Göteborg
Fiebig, A.	CERN	Rudstam, G.	Studsvik
Foucher, R.	Orsay	Rufer, C.	CERN
Gabrielli, S.	Trieste	Schopper, H.	CERN
Gastaldi, H.	Pisa	Schmid, C.	CERN/ETH
Gentner, W.	MPJ Heidelberg	Seiler, P.	Berne
Glauber, R.	CERN	Serre, C.	IN ₂ P ₃
Gottfried, K.	CERN	Spighel, M.	IPN-Orsay
Greeniaus, L.G.	CERN	Spinney, G.	CERN
Gregory, B.P.	CERN	Springer, R.	Munich
Hagelberg, R.	Karlsruhe	Steinberger, J.	CERN
Hahn, B.	Berne	Stroot, J.P.	IISN, Brussels.
Hansen, P.G.	CERN	Tanner, N.W.	Oxford
Herr, R.	Köln	Tauscher, L.	Karlsruhe
Herz, A.J.	CERN (Secretary)	Torelli, T.	Pisa/CERN
Hilscher, H.	Munich	Ullrich, H.	Karlsruhe
Hirt, W.	SIN	Warren, J.B.	Triumpf-CERN
Hofer, H.	CERN	Watson, H.	CERN
Jansen, J.	CERN	Wilkin, C.	CERN
Jentschke, W.	CERN	Wilkinson, D.H.	Oxford (Chairman)
Jonson, B.	CERN	Yiou, F.	Orsay
Joseph, C.	Lausanne	Yoccoz, J.	IN ₂ P ₃
Keaton, P.W.	CERN	Zavattini, E.	CERN
Killian, K.	Heidelberg	Zupančič, Č.	Munich
Klapisch, R.	Orsay		

1. The Committee resolved to send its best wishes to Kofoed-Hansen for a speedy recovery from his illness.

2. MINUTES OF THE MEETING OF 14 JUNE 1972 (PH III-72/48). MATTERS ARISING

The Minutes were approved without comments or corrections.

3. REPORT ON DECISIONS MADE BY THE NPRC

Wilkinson reported on the meetings of the Nuclear Physics Research Committee held on 5 July and 13 August 1972. At the former, approval had been given of the continuation up to the 1972 shut-down of testing and evaluation of the k_{17} beam by the Karlsruhe-Stockholm group (Experiment P7), and the recommendations regarding the SC programme had been accepted (PH III-72/48). At the latter, the NPRC had approved the modifications needed to change the k_{17} beam into k_{18} (which was expected to yield a higher intensity).

4. REPORTS ON APPROVED EXPERIMENTS AT THE PS.
MACHINE-TIME REQUESTS. RECOMMENDATIONS.

Munday summarized the situation (Table 1). In particular he mentioned:

- P7 X rays from K-mesic, antiprotonic and Σ^- -hyperonic atoms. (Karlsruhe-Stockholm; Backenstoss et al.: PH III-67/32, 69/15, 70/35, 71/53, 71/54, 72/14, 72/53, 72/55, 72/56).

Tests of the k_{17} beam (PH III-72/55) had shown that the antiproton flux was somewhat higher than expected, but the K^- yield had been only about half the calculated value. The k_{18} beam would have roughly double the intensity of k_{17} because it had twice its acceptance.

- P9 Hypernuclear spectroscopy via pion spectra from capture in nuclei of K^- in flight. (Torino-CERN; Bonazzola, Bressani et al.: PH III-70/5, 70/23, 70/39, 71/25, 72/6).

The group had had difficulties because the properties of the k_{12a} beam had been found to be different from what had been assumed in the planning of the experiment, and the intensity was lower. An additional two PS periods were requested.

The Committee took note of the problems and decided to recommend the allocation of an additional two PS periods immediately following the 1972 shut-down.

- P12 Search for very energetic heavy fragments and recoils produced by proton bombardment of heavy nuclei. (CERN-DIAS Dublin-Warsaw; Herz et al.: PH III-71/15).

A series of parasitic exposures in beam e_6 had been completed.

- P17 $p-^4\text{He}$ coherent scattering (Observation of ^4He recoil). (Clermont Ferrand-Strasbourg; Combe, Fridman, Querrou et al.: PH III-71/40, 72/65).

The status report (PH III-72/65) showed that the background problems were being overcome.

The Committee took note of the status report and decided to recommend that the running time of this parasitic experiment be extended, as requested, by two PS periods beyond March 1973.

P18 Fragmentation cross-sections of astrophysical interest. (Orsay; Yiou et al.: PH III-72/15).

The exposure in the internal beam had been carried out.

5. PROPOSALS AND LETTERS OF INTENTION
FOR EXPERIMENTS AT THE PS

P7 X rays from K-mesic, antiprotonic and Σ^- -hyperonic atoms. (Karlsruhe-Stockholm; Backenstoss et al.: PH III-67/32, 69/15, 70/35, 71/53, 71/54, 72/14, 72/53, 72/55, 72/56).

P11 High-resolution hypernuclear spectroscopy. (Heidelberg; Povh, Lynen et al.: PH III-71/23, 72/1, 72/49, 72/53, 72/58).

The Committee took note of the documents PH III-72/55, 72/56 and 72/58 concerning the programme proposed for these two experiments and the beam (k_{17} , to be converted into k_{18}) to be used.

Wilkinson asked whether the Committee intended to maintain its recommendation for Experiment P11. The Committee decided to reiterate its support for this work.

Starting the discussion of the programme, Wilkinson said that he thought that the proposals should go forward to the NPRC together. An obvious problem was that the programme proposed for P7 needed more than one year on the PS floor and that the NPRC had been reluctant in the past to commit beams for more than a year ahead. He suggested that the Committee might recommend approval of 9 PS weeks for P7 and 6 PS weeks for P11 during 1973 and leave consideration of the 1974 programme until later.

Backenstoss pointed out that they had not asked for a single block of time. It had already been agreed in principle between the groups that they would use the beam alternately. Lynen added that they would agree to a change-over every three or six weeks. Munday commented that it might be found necessary to move a large amount of shielding in addition to two quadrupoles, in which case longer intervals would be preferable.

Ericson emphasized the importance of measuring K^- -nucleon and \bar{p} -nucleon scattering lengths and agreed with the proposers that first priority should go to this part of the programme although it also carried the highest risk. Next in order of priority, he said, should be the determination of the polarizability of hadrons. Wilkinson felt that the first year of running P7 in k_{18} should include measurements sure to produce results, and his priorities were thus those given in the proposal. After some further discussion the Committee agreed with the priorities for P7 put forward by the group.

It was decided to recommend that the spectrometer for P11 be installed, and that P7 and P11 should share the use of k_{18} about equally during the PS year 1973. Change-overs between P7 and P11 are to be arranged by agreement between the groups and the PS Coordinator.

PH III-72/59 : Proposal for the study of exotic nuclei with an on-line mass spectrometer at the PS. (Orsay; Klapisch et al.)

The Committee decided to recommend approval and the allocation of a total of three weeks running time in FE 74 at a rate of 1 pulse every 10 sec approximately (about 1 pulse in 5) after the shut-down. If possible, there should be two or three separate runs spaced in a way to be agreed between the group, the other users of the beam and the PS Coordinator. The experiment code will be P19.

PH III-72/54 : A study of the excited states of ${}^4_{\Lambda}\text{H}$ and ${}^4_{\Lambda}\text{He}$ hypernuclei. (Warsaw; Filipkowski et al.)

Wilkinson noted that the document was presented as a detailed Letter of Intention rather than a Proposal because the numerical strength of the Warsaw group at CERN would be inadequate to mount the experiment. They were looking for collaborators before submitting a final proposal. Pniewski added that almost all the equipment needed had already been prepared, and that he would welcome approaches from groups or individuals interested in joining in.

6. PROPOSALS FOR EXPERIMENTS AT THE SC

PH III-72/52 : Spallation and neutron-capture reactions in a thick target of lunar regolith composition. (Köln; Kaiser et al.)

The Committee noted that the group had already carried out some tests. It recommends approval and the allocation of two shifts. The Experiment Code will be SC 43.

PH III-72/61 : Calibration of detectors for an ISR experiment. (Aachen-CERN-Munich; Pugh, Darriulat et al.)

The Committee recommends approval and the allocation of 24 shifts. The experiment Code will be SC 44.

PH III-72/62 : Request for beam at the CERN SC to improve the trigger system of a K^+ detector. (CERN-Imperial College Group; Jafar et al.)

This request was withdrawn as a suitable beam is available at the PS.

PH III-72/64 : Measurement of the neutretto mass. (Louvain; Deutsch et al.)

Deutsch presented the proposal. In response to a question from Hofer, Deutsch explained that the dependence of m_{ν}^2 on m_{π}^2 in the proposed experiment was different from that in the experiment planned by the Berne group to be carried out at SIN. Combining the results from both experiments would thus lead to a reduction in the error due to the uncertainty in the value of m_{π} .

The Committee decided to recommend approval and the allocation of 30 shifts in 1973. The Experiment Code will be SC 45.

PH III-72/66 : Mesic X rays and the Coulomb capture of muons and π mesons. (Munich; Daniel et al.)

The Committee decided to recommend approval and the allocation of 6 shifts per month up to the SC shut-down. The Experiment Code will be SC 46.

7. REPORTS ON APPROVED EXPERIMENTS AT THE SC.

MACHINE TIME REQUESTS FOR EXPERIMENTS IN PROGRESS.
RECOMMENDATIONS.

Engfer, the SC Coordinator, proposed that the Committee recommend a programme up to the end of January 1973 as the date of the SC shut-down was still unknown. He then outlined briefly the status of the SC programme as well as his proposed time allocations for the periods 1.10.72 to 24.10.72. This information is summarized in Table 2.

The Committee agreed to recommend the programme set out in Table 2; the allocations are, as usual, subject to adjustment by the SC Coordinator.

8. REPORT ON THE STATUS OF THE SC IMPROVEMENT PROGRAMME

Michaelis presented his report PH III-72/63.

9. DEBATE ON THE FUTURE OF THE CERN SC
AND THE SC IMPROVEMENT PROGRAMME

In his letter of 17 July 1972 (PH III-72/50) the Chairman, Wilkinson, invited written opinions and replies to a number of questions concerning the future of the SC and of intermediate-energy physics at CERN. The replies (collected in PH III-72/68) formed the basis of the debate which is summarized in PH III-72/69.

The conclusion of the debate, transmitted to the NPRC, was:

"Following a detailed discussion the Committee concluded that it is the view of the Physics III Community that the SC Improvement Programme should be carried out as soon as possible unless a catastrophic failure occurs in the course of the remaining preparatory work. The Committee appointed a panel of nine members to advise the Chairman on the date to be recommended for the start of the SC shut-down for the Improvement Programme, and to advise and inform both the Committee and the MSC Division on all matters of interest to intending users of the Improved SC."

The Committee decided that the initial members of the SCIP Advisory Panel should be

G. Backenstoss (Karlsruhe)
E.T. Boschitz (Karlsruhe)
C. Cernigoi (Trieste)
P.G. Hansen (CERN)
H. Hofer (Berne)
O.B. Nielsen (Copenhagen)
N.W. Tanner (Oxford)
E. Zavattini (CERN)
and, part time:
V. Soergel (Heidelberg)

10. DATE OF THE NEXT MEETING

It was decided to hold the next meeting on Thursday, 14 December 1972.

A.J. Herz

Table 1

STATUS OF PHYSICS III PROGRAMME AT THE PS

Code	Group	Description of experiment; documents	MPRC approval	Status on 3.10.72	Beam	Time allocation	Weeks remaining	Remarks
P 7	CERN-Karlsruhe-Stockholm (Backenstoss et al.)	X rays from exotic atoms (67/32, 69/15, 70/35, 71/53, 71/54, 72/14, 72/53, 72/55, 72/56)	4. 6.69 3.11.71 see remarks	Tests finished	k_{10}	~ 1 of available time in k_{10} during 1973	-	MPRC approval requested for 1973 programme
P 8	CERN-Heidelberg-Warsaw (Povh, Soergel et al.)	Hypernuclear spectroscopy (π spectra, stopping K^+) (70/19, 71/19)	4. 6.71	Analysis	k_{12a}	2 weeks	-	
P 9	Torino-CERN (Bonazzola, Bressani et al.)	Hypernuclear spectroscopy (π spectra, K^+ in flight) (70/5, 70/23, 70/39, 71/25, 72/6)	4. 6.71 see remarks	In progress	t_1 k_{12a}	4 after 71/12 shutdown 2 PS periods after August 72	1 1 period	MPRC approval requested for additional 2 periods
P11	Heidelberg (Povh, Lynen et al.)	High-resolution hypernuclear spectroscopy (71/23, 72/1)	Pending	-	k_{10}	~ 1 of available time in k_{10} during 1973	-	
P12	CERN-DIAS-Dublin-Warsaw (Jerz et al.)	Energetic heavy fragments from heavy nuclei (71/15)	4. 6.71	In progress	e_0	Parasitic	-	
P13	Darmstadt (Bächmann, Lieser et al.)	Production of $Z > 50$ in Cu targets (71/16, 72/3)	4. 6.71	Analysis	e_0	-	-	Analysis of Cu targets from PS
P14	Berne (Hahn, v. Gunten et al.)	Search for superheavy elements (71/17)	4. 6.71	Analysis	e_0	-	-	Analysis of heavy-element targets from PS
P15	Darmstadt-Marburg (Bächmann, Brandt et al.)	Search for superheavy elements (71/D, 71/E, 71/20, 72/4, 72/10)	4. 6.71	Analysis	e_0	-	-	Analysis of heavy-element targets from PS
P16	RHEL-Manchester-Risley (Hatty et al.)	Search for superheavy elements (72/8)	See remarks	In progress	e_0	-	-	Priority for receiving heavy-element targets to search for long-lived superheavy elements (Directorate decision endorsed by PH III Committee, see PH III-71/36)
P17	Clermont-Ferrand-Strasbourg (Combe, Fridman, Querrou et al.)	p - ^4He coherent scattering (observation of ^4He recoil) (71/40)	12.10.71 see remarks	In progress	e_0	Parasitic (see remarks)	-	Approved to run for 1 year to about April 1973; approval requested for continuation for an additional 2 periods
P18	Orsay (Yiou et al.)	Fragmentation cross-sections for astrophysics (72/15)	2. 2.72	Analysis	int.	5 hours	-	
P19	Orsay (Klapisch et al.)	Mass-spectrometer study of exotic nuclei (72/59)	Pending	-	FR 74	3 weeks at 1 in 5	3 weeks	

Table 2
SC Experiments, status and proposed allocations

Code	Group	Description of experiment	NPRC approval	Status as of 3.10.72	Shifts used (1) 1.1.68-30.9.72		Main-user shifts (2) recommended	Main-user shifts (2) recommended	Remarks (3)
					Main user	Paras. (1)			
SC 4a	Orsay (Yiou et al.)	Nuclear reaction cross-sections for cosmic-ray problems (68/6,68/54, 70/27,71/59)	7. 2.68	in progress	55	-	5	2 per month	Continuation planned for Improved SC (PH III-72/15,72/44)
SC 9	CERN/DI-IP (Baarli et al.)	Radiobiology (69/12, 70/40,70/53,72/46)	17. 3.65	in progress	88	9	8	8	Continuation planned for Improved SC (PH III-72/26)
SC 11	CERN-Karlsruhe-Munich-Stockholm (Backenstoss et al.)	Mesic X-rays (NSC 65/12,67/33,68/24,68/39, 68/55,71/29,71/39,72/11, 72/28,72/32)	17.11.65 5. 7.67	in progress	497	228	37(N)	-	
SC 19b	Lausanne-Munich (Joseph et al.)	$\pi^-p + \gamma + n$ and $\pi^- + p + \pi^0 + n$ near (3,3) resonance (71/3, 71/43)	3. 2.71	in progress	227	148	30	-	
SC 21a	CERN/Pisa (Polacco, Zavattini et al.)	2S-2P energy differences in $(\nu \text{He})^+$ (70/47)	3. 2.71	in progress	164	14	65(N)	40(N)	
SC 22	CERN-ETH-Geneva-Grenoble (Hess, Werren et al.)	Nucleon-nucleus cross-sections (68/4,68/26,68/67, 70/6,70/42,71/50,72/29)	8. 5.68	in progress	114	597	- (parasitic)	- (parasitic)	Continuation planned for Improved SC (PH III-72/29)
SC 28	CERN (Chapak et al.)	Development of multiwire proportional chambers for ISR experiments (69/31)	4. 2.70	in progress	9	112	5	-	
SC 30	IISN Belgique-Orsay (Spighe, Stroot et al.)	$\pi^-^4\text{He}$ scattering around the (3/2,3/2) resonance (69/27,70/25,71/26, 71/38)	3. 6.70	in progress	353	74	34	-	
SC 37	CERN-Birmingham-London-Pisa (Bailey et al.)	π -nucleon scattering lengths (71/18,71/37, 72/9)	4. 6.71	in progress	140	33	26	-	
SC 38	Karlsruhe-Trieste (Boschitz et al.)	$^{16}\text{O}(\pi^-, \nu\alpha)$ reactions (71/22,71/47)	4. 6.71	in progress	64	42	30(N)	15 per month(N)	
SC 40	CERN-Oxford-Göteborg-London-SIN (Downing, Tanner, Wilkin et al.)	π^\pm -nucleus total cross-sections (71/49)	12.10.71	in progress	96	3	42(P)	-	
SC 42	Berne (Hofer et al.)	Tests of muonium production in low-pressure gas (72/20)	12. 4.72	in progress	34	15	25(P)	25(P)	
SC 43	Cologne (Kaiser, Herr et al.)	Reactions in targets of lunar-regolith composition (72/52)	-	preparation	1	-	2	-	
SC 44	Aachen-CERN-Munich (Pugh, Darriulat et al.)	Calibration of detectors for ISR experiment (72/61)	-	preparation	-	-	12(N) 12(P)	-	
SC 45	Louvain (Deutsch et al.)	Measurement of neutron mass (72/64)	-	preparation (tests successful)	16	-	-	30(N)	
SC 46	Munich (Daniel et al.)	Coulomb-capture mechanism for μ and π	-	preparation	-	-	-	6 per month	
I	ISOLDE Collaboration	ISOLDE programme (69/1, 70/4,70/48,71/46,72/7)	12. 2.69 3. 2.71	in progress	399	2	24	12 per month	Continuation planned for Improved SC (PH III-72/27)
K	Nuclear Chemistry (Bordeaux-CERN-Darmstadt-Marburg-Oslo)	Nuclear chemistry (70/33,70/36,70/37 70/38)	23. 9.70	in progress	15	-	2	1 per month	

(1) Data supplied by MSC Division. Data on parasitic shifts are incomplete.

(2) Parallel running possible for experiments marked N (neutron side) with experiments marked P (proton side).