

PH III-72/48
 19 June 1972

PHYSICS III COMMITTEE

DRAFT MINUTES OF THE MEETING OF THE
PHYSICS III COMMITTEE

CERN LIBRARIES, GENEVA



CM-P00046024

HELD ON

14 June 1972 AT 2.30 p.m.

PRESENT

Alard, J.P.	Clermont-Ferrand	Joseph, C.	Lausanne
Baarli, J.	CERN	Kilian, K.	Heidelberg
Backenstoss, G.	Karlsruhe	Kofoed-Hansen, O.	CERN
Bailey, J.M.	Nina, Daresbury	Kulikov, A.V.	Gatchina
Baldit, A.	Clermont	Le Dallic, G.L.D.	CERN
Barbier, M.	CERN	Lewis, C.W.	Karlsruhe
Bergström, I.	Stockholm/CERN	Lynen, U.	Heidelberg
Binon, F.G.	IISN Belgique	Michaelis, E.G.	CERN
Blaser, J.P.	SIN	Munday, G.	CERN
Boschitz, E.T.	Karlsruhe	Otten, E.	Mainz
Bressani, T.	Torino	Pasinetti, A.S.L.	Milan
Cernigoi, C.	Trieste	Pedroni, E.	SIN
Cordaillat, A.	Clermont-Ferrand	Petitjean, C.	SIN
Cox, C.R.	CERN	Pfeiffer, E.	TU-Munich!
Domingo, J.J.	CERN	Povh, B.	Heidelberg
Egger, J.E.	SIN	Prieels, R.	Louvain
Engelhardt, H.D.	Karlsruhe	Querrou, M.	Clermont-Ferrand
Faessler, M.A.	Heidelberg	Ritter, H.G.	Heidelberg
Favart, D.	Louvain	Rohlin, J.	Göteborg
Fischer, W.	SIN	Scheck, F.	SIN
Gabathuler, K.	ETH Zurich	Schopper, H.	CERN
Gentner, W.	M.P.J. Heidelberg	Schött, W.	CERN
Haase, E.L.	Karlsruhe	Schwaller, P.S.	SIN
Haenny, C.B.	Lausanne	Schwitzer, A.	SIN
Hagebö, E.	Oslo/CERN	Stroot, J.P.	IISN
Hahn, B.	Berne	Ullrich, H.	Karlsruhe
Hampton, G.	CERN	Vaucher, B.	Lausanne
Hess, R.	Genève	Von Egidy, T.	TU-Munich
Herz, A.J.	CERN (Secretary)	Westgaard, L.	CERN
Hilscher, H.	Munich	Wilkinson, D.H.	Oxford (Chairman)
Jentschke, W.	CERN	Weyren, D.	Genève
		Zupancić, C.	UNI Munich

Table 1

STATUS OF PHYSICS III PROGRAMME AT THE PS

Code	Group	Description of experiment; documents	NPRC approval	Status on 14.6.72	Beam	Time allocation (weeks)	Weeks remaining	Remarks
P 7	Karlsruhe-Stockholm (Backenstoss et al.)	X rays from exotic atoms (67/32, 69/15, 70/35, 71/53, 71/54, 72/14)	4. 6.69 3.11.71	Testing	k_{17}	6 in 1971	No allocation at present	Allocation to be recommended on basis of tests on beam k_{17}
P 8	CERN-Heidelberg-Warsaw (Povh et al.)	Hypernuclear spectroscopy (n spectra, stopping K^-) (70/19)	4. 6.71	in preparation	k_{12a}	2 following SLO9	2	
P 9	Torino (Bressani et al.)	Hypernuclear spectroscopy (n spectra, K^- in flight) (70/5, 70/23, 70/39, 71/19, 72/6)	4. 6.71	in preparation	t_1 k_{12a}	4 after 71/12 shutdown 2 PS periods after August 72	1 2 periods	
P11	Heidelberg (Povh, Soergel et al.)	High-resolution hypernuclear spectroscopy (71/23, 72/1)	Pending	-	k_{17}	-	-	Time allocation to be recommended when properties of k_{17} are known and details of layout have been settled
P12	CERN-DIAS-Dublin-Warsaw (Herz et al.)	Energetic heavy fragments from heavy nuclei (71/15)	4. 6.71	in preparation	e_6	Parasitic	-	To run in September
P13	Darmstadt (Bächmann et al.)	Production of $Z > 30$ in Cu targets (71/16, 72/3)	4. 6.71	in progress	e_6	-	-	Analysis of Cu targets from PS
P14	Berne (Hahn, v. Gunten et al.)	Search for superheavy elements (71/17)	4. 6.71	in progress	e_9	-	-	Analysis of heavy-element targets from PS
P15	Darmstadt-Warburg (Bächmann, Braudt et al.)	Search for superheavy elements (71/D, 71/E, 71/20, 72/4, 72/10)	4. 6.71	in progress	e_9	-	-	Analysis of heavy-element targets from PS
P16	RHEI-Manchester-Risley (Batty et al.)	Search for superheavy elements	see remarks	in progress	e_9	-	-	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 Fréhan, Querrou et al.)	p ^4He coherent scattering (observation of ^4He recoil) (71/40)	12.10.71	in progress	e_9	Parasitic (see remarks)	-	Expected to run for 1 year to about April 1973 to
P18	Orsay (Yiou et al.)	Fragmentation cross-sections for astrophysics (72/15)	2. 2.72	-	int.	5 hours	5 hours	Cannot be done before internal-irradiation facility reinstalled

1. MINUTES OF THE MEETING OF 15 MARCH 1972 (PH III-72/39). MATTERS ARISING.

The Minutes were approved without comments or corrections.

2. REPORT ON DECISIONS MADE BY THE NPRC

Wilkinson reported that the Nuclear Physics Research Committee had decided to approve the installation of Experiment P9 (see Table 1) in beam k_{12a} in August 1972 immediately following Experiment P8, and to allocate running time for it up to the 1972-1973 shut-down.

The NPRC also approved the programme for the 5C as recommended by the Physics III Committee at its meeting of 15 March 1972 (see PH III-72/39).

3. REPORT ON EXPERIMENTS AT THE P5. MACHINE-TIME REQUESTS. RECOMMENDATIONS.

Munday gave a brief report on the status of the approved Physics III experiments at the P5 (see Table 1). Specifically 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).

The k_{17} beam was being tested. As yet there were no results because of troubles with the alignment of the beam elements which had now been corrected.

P8 Hypernuclear spectroscopy via pion spectra from capture of stopping K^- in nuclei (CERN-Heidelberg-Warsaw; Povh, Soergel et al.: PH III-70/19, 71/19).

This experiment was to run next in beam k_{12a} , following completion of the runs for Experiment S 109.

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)

The scattering chamber was to be installed soon for parasitic runs in September.

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

This parasitic experiment had now started. No special difficulties were experienced.

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

It was expected that the new apparatus for internal irradiations in the P5 will be ready for use by the end of August. The exposures for the experiment could then be made.

Wilkinson then reminded the Committee that the NPRC had deferred a decision concerning the recommended Experiment P 11 (high resolution hypernuclear spectroscopy via pion spectra) by the Heidelberg group until the performance of the k_{17} beam is known and it is clear that there is an agreed layout for beam and spectrometer which makes Experiments P7 and P 11 compatible. Wilkinson said he expected the required technical information to become available before the next

meeting of the Physics III Committee, and he suggested that he should continue to be empowered to make a recommendation to the NPRC without waiting for the Physics III meeting. The Committee agreed.

LETTER OF INTENTION FOR AN EXPERIMENT AT THE PS.

PH III-72/47 : Lettre d'intention concernant la mesure des sections efficaces d'éjection de nucléides légers dans l'interaction de protons de haute énergie avec les noyaux.
(Clermont-Ferrand - Milan, Alard et al.:)

Alard presented the Letter of Intention. Querrou asked where it was intended to install the experiment, all the space in e_g being needed by Experiment P17. Alard said that technical discussions had taken place, but a conclusion had not been reached yet. In any case, he added, the experiment would not be ready before the beginning of 1973. Querrou pointed out that P17 had been approved for running until April 1973 and that he and his collaborators would shortly present a proposal for continuation with deuterium instead of helium as the target gas. Bressani asked why the two experiments could not run alternately, and Querrou replied that the limitations on access caused by the need to run parasitically were such as to exclude frequent adjustments. If one were to introduce continual change-overs of apparatus the situation would become far too complicated. Alard then emphasized that his proposed experiment was not expected to need very much running time and that, in any case, they were trying to find an alternative to the e_g beam.

Kofoed-Hansen asked why it should be necessary to run at very high energies at the PS when there were already existing data on fragments produced by 5-GeV protons. Alard replied that the statistics were still inadequate for high-energy fragments and, in response to a question from Michaelis, he added that they hoped to be able to measure protons up to 200 MeV and α particles up to 300 MeV.

Kofoed-Hansen then said that he felt the results of the experiment just completed (SC33) should be presented to the Committee before further discussion takes place, and he suggested that a Physics III Seminar be given when the group is ready to do so.

On the suggestion of Wilkinson the Committee then decided not to take any action concerning this project until the results of Experiment SC33 have been presented and discussed in a Physics III Seminar in October and a full proposal is submitted.

5. REPORT ON THE STATUS OF THE SC IMPROVEMENT PROGRAMME.

Michaelis presented the following report :

"All major components are either completed or in the final stages of manufacture. Several large elements are on the CERN site, e.g. the completed main field coils in hall E2 on the West Site, the 12-m-high test rig for the ion-source movement in hall I1 of the ISR, the Cee System in ER6 and the extraction channel mounted on a trolley with its power supply in the new ER9. The first electronic units of the new radio-frequency system have been installed in ER6.

"The radio-frequency system and, in particular, the assembly of the first of the two rotary condensers has made progress but still continues to fall behind schedule.

"Since March 1972 the stator-blade assembly has been completed and a large part of the apparatus has been mounted and successfully vacuum-tested. A final vacuum test of the complete rotary condenser is the next goal, which will complete the manufacture. After a further seven weeks the full-power test can start.

" Since 15 March the earliest date of this test has slipped by eight weeks to week 39/72, and we cannot hope for decisive information before week 41, i.e the end of September.

" Past experience suggests that the earliest date is unlikely to be met, especially since the major work of the coming weeks will be the vacuum testing. Despite careful checking of all components before mounting this is an unpredictable process.

" The full-power test which then follows constitutes the last hurdle. If I have in the past insisted much on its critical nature for the project I may not have stressed the fact that it is a test of workmanship rather than design. Lessons of this test learnt from the first condenser can therefore be applied in the assembly of the second.

" In conclusion I regret that I am still unable to give a definite date for the SCIP shut-down. I therefore ask that the present arrangement, providing for four weeks notice of any major shut-down, may be continued."

DISCUSSION FOLLOWING MICHAELIS'S REPORT

Wilkinson said that the news given by Michaelis about the manufacturer's continuing difficulties with the rotary condenser was most depressing, and he felt that he should apologize on behalf of CERN for the almost intolerable uncertainty to which the SC users were being exposed. Through no fault on the side of CERN the delay was now such that it was clear that the SC could not be shut down before November. The continuing delays and uncertainties were bound to raise the question of the wisdom of continuing the SC Improvement Programme, and it was the job of the Physics III community to express their views on this point. As many of the people concerned were not present at the meeting it was not right to try to arrive at conclusions now, he said, but he proposed to send out a letter asking for written statements of opinions.

Schopper asked what would be the properties of the SC if the rotary condenser is not installed but other improvements are made. Michaelis replied that one could arrive at an increase of a factor three in the extracted beam by means of improvements to be carried out in a series of fairly short shut-downs. Stroot enquired whether it would be possible to finish the rotary condenser at CERN if the test fails or the contract is cancelled. Michaelis said that this is certainly possible and he would advocate that it be done if and when such an action became advisable. Hofer added that he felt the worst one could do was to wait and that he felt that the contract should be cancelled immediately and that the work should be completed by CERN.

Zupančič mentioned that for some of the groups the delay in the shut-down was not a catastrophe as it allowed them to obtain more data for their experiments.

TABLE 2
Summary of the SC Coordinator's report

Experiment code	1.1.72 to 30.6.72		1. 7. 72 to 30.9.72	From 1.10.72
	Recommended	Scheduled or obtained	Requested	Requested
SC 2a	42	43.7	12 (N)	Finished
SC 4a	17	17.4	5	-
SC 9	-	-	8	8
SC 11	56	55.9	39 (N)	20 (N)
SC 19 b	105	106.7	50 (N)	20 (N)
SC 21 a	49	42.6	45 (N)	-
SC 22	14	13.7	-	-
SC 28	-	-	-	-
SC 30	51	54.6	45 (N)	30 (N)
SC 32	51	62.7	Finished	-
SC 33	13	12.9	Finished	-
SC 35	9	8.8	Finished	-
SC 37	71	67.9	30	-
SC 38	15	14.8	40 (N)	40 (N)
SC 39	32	33.6	Finished	-
SC 40	60	34.1	50 (P)	30 (P)
SC 41	10	13.9	15 (N)	15 (N)
SC 42	12	11.5	20 (P)	-
I	56	50.8	36	12/month
K	4	3.3	2	1/month

Boschitz and Otten both spoke of the very bad effects of the continuing uncertainty on groups and projects waiting for the Improved SC or, like ISOLDE, rebuilding their installation in preparation for it. Boschitz felt that one should set a final target date for delivery and prepare an alternative programme for the case that this date is not met.

Kofoed-Hansen asked whether there was anything the members of the Committee could do to impress their dissatisfaction on the company, and Domingo wondered whether there was any method by which more pressure could be brought to bear on it.

Hampton said that he and Michaelis were to have a meeting with the firm on the following Monday, and he added that he was most surprised by the fact that in earlier negotiations the company had shown itself utterly impervious to all threats, legal or commercial. However, he felt that the delivery date could not possibly slip much more as the amount of work which remained to be done was not very great.

Wilkinson suggested that what those assembled could do was to give immediate expression to the indignation of the Physics III community. Bergström said he believed that a very strong letter should be sent.

Wilkinson summarized the view of the Physics III Committee as being that the situation was intolerable and that there was a strong prima-facie case for cancellation of the contract. He repeated that he would send a letter to the members of the Committee asking them for their views, and he proposed that at the next meeting in October the Committee should decide on a definite recommendation to the Director-General concerning the policy to be pursued.

The Committee expressed their agreement.

6. REPORTS ON EXPERIENCES AT THE SC. MACHINE-TIME REQUESTS FOR EXPERIMENTS IN PROGRESS.
RECOMMENDATIONS.

Engfer, the SC Coordinator, reported on the status of the experiments running at the SC giving, in particular, the amounts of machine time used by them during the first half of 1972 and the requests the groups had made for the period 1 July to 30 September 1972. He also listed the indications the groups had given of the time allocations they would like to receive if the SC continues to run after September. This information is summarized in Table 2.

The Committee decided to approve the request for machine time for Experiment SC 9 (PH III-72/46).

After a brief discussion the Committee agreed to recommend the programme up to the end of September set out in Table 3, subject to the usual reservation that the SC Coordinator is free to make minor changes if and when necessary.

For the period starting 1 October 1972 it was decided to recommend that the Coordinator be empowered to arrange a schedule for the month of October, and that the programme be reviewed at the October meeting of the Committee.

7. PROPOSALS FOR EXPERIMENTS AT THE SC.

PH III-72/44 : Use of Improved SC for experiment SC4a
(Orsay, Yiou et al.)

The Committee took note of the proposal but deferred discussion until such time as the experimental programme for the Improved SC is considered.

8. DATE OF NEXT MEETING.

The Committee decided provisionally to hold the next meeting on Tuesday, 3 October 1972. It was agreed that at that meeting the Committee would discuss recommendations on the policies to be adopted in connection with the SC Improvement Programme.

9. OTHER BUSINESS.

Wilkinson said that Dr. J.D. Davies (University of Birmingham) had sent an enquiry to Michaelis concerning a possible search for $\pi^0 \rightarrow e^+e^-$. Davies was looking for collaborators and anyone interested should contact Michaelis for details.

Michaelis announced that recent tests carried out on the request of the CERN-Pisa group had shown that it was possible to store a number of SC machine pulses in the machine before directing them onto an internal target. It had been found that the instantaneous intensity could be raised by a factor up to six in this way.

A.J. HERZ

Table 3

SC Experiments, status and proposed allocations

Code	Group	Description of experiment	NPRC approval	Status as of 14.6.72	Shifts used (1) 1.1.68-30.6.72		Main-user shifts (2) recommended	Main-user shifts (2,3) requested	Remarks (4)
					Main user	Paras. (1)			
SC 2a	Berlin-Darmstadt-Fribourg-SIN (Engfer, Kankleit et al.)	Nuclear excitation and isomer shifts in muonic atoms (67/1,67/43,68/13,68/30,68/59,70/16)	8.11.67	in progress	519	262	12(N)	-	To finish in July
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	50	-	5	-	Continuation planned for Improved SC (PH III-72/15, 72/44)
SC 9	CERN/DI-HP (Baarli et al.)	Radiobiology (69/12,70/40,70/53,72/46).	17.3.65	in progress	80	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 65/12,67/33,68/24,68/39,68/55,71/29,71/39,72/11,72/52)	17.11.65 5.7.67	in progress	488	216	32(N)	20(N)	
SC 19b	Lausanne-Munich (Joseph et al.)	$\pi^+ p \rightarrow \gamma + n$ and $\pi^+ + p \rightarrow \pi^0 + n$ near (3,3) resonance (71/3,71/43)	3.2.71	in progress	189	101	58(N)	20(N)	
SC 21a	CERN-Pisa (Polacco, Zavattini et al.)	2S-2P energy differences in $(\mu \text{He})^+$, (70/47)	3.2.71	in progress	115	14	45(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)	8.5.68	in progress	114	526	14(P)	-	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	93	-	-	Parasitic running only for time being
SC 30	IISN Belgique-Orsay (Spighe, Stroot et al.)	π^- - ^4He scattering around the (3/2,3/2) resonance (69/27,70/25,71/26,71/38)	3.6.70	in progress	318	74	43(N)	30(N)	
SC 32	Clermont-Ferrand-Lyon-Strasbourg (Combe, Querrou et al.)	Small-angle pp, pd, $p^3\text{He}$ scattering at 600 MeV (70/34,71/41)	28.10.70	in progress	213	-	-	-	To finish in June
SC 33	Clermont-Ferrand-Bordeaux-Milan (Alard, Pasinetti et al.)	Emission of protons and light fragments from p-nucleus collisions (70/41,70/51,71/28,71/52)	28.10.70 4.6.71	finished	72	11	-	-	
SC 35	Heidelberg (Hausser et al.)	Production of radio nuclides by μ^- capture (71/1,71/27)	3.2.71	finished	18	-	-	-	Continuation planned for Improved SC (PH III-72/33)
SC 37	CERN-Birmingham-London-Pisa (Bailey et al.)	π -nucleon scattering lengths (71/18,71/37,72/9)	4.6.71	in progress	111	33	30(N)	-	
SC 38	Karlsruhe-Trieste (Boschitz et al.)	$^{16}\text{O}(\pi^-,n\alpha)$ reactions (Tests) (71/22,71/47)	4.6.71	in progress	15	18	30(N)	40(N)	Main experiment planned for improved SC
SC 39	CERN-Oxford-Göteborg-London-SIN (Domingo, Tanner, Wilkin et al.)	π^+ elastic scattering at 400 MeV/c (71/24,71/48)	4.6.71	in progress	77	-	-	-	To finish in June
SC 40		π^+ nucleus total cross-sections (71/49)	12.10.71	in progress	49	-	44(P)	30(P)	
SC 41	ETH-SIN-Darmstadt-Fribourg (Engfer et al.)	Strong-interaction quadrupole effect in pionic ^{175}Lu (72/5)	2.2.72	in progress	14	-	-	15(N)	
SC 42	Berne (Hofer et al.)	Tests of muonium production in low-pressure gas (72/20)	12.4.72	in progress	12	-	20(P)	-	
I	ISOLDE Collaboration	ISOLDE programme (69/1,70/4,70/48,71/46,72/7)	12.2.69 3.2.71	in progress	374	-	31	12/month	Continuation planned for Improved SC (PH III-72/27)
K	Nuclear Chemistry (Bordeaux-CERN-Darmstadt-Oslo)	Nuclear chemistry (70/33,70/36,70/37,70/38)	23.9.70	in progress	12	-	-	1/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).

(3) Requests made by the groups. A definite recommendation has not yet been made by the Committee concerning these requests; the Coordinator is empowered to allocate machine time for October 1972.

(4) Remarks concerning future work at the Improved SC are based on Letters of Intention. The Committee has not yet made any recommendations for approvals of experiments or time allocations at the Improved SC.