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CM-P00043119

PHYSICS III COMMITTEE

DRAFT MINUTES OF THE MEETING OF THE
PHYSICS III COMMITTEE

HELD ON

26 JANUARY 1972 AT 2.30 P.M.

PRESENT

C.A. Amsler	ETH Zürich	H.J. Leisi	ETH Zürich
J. Baarli	CERN	U. Lynen	Heidelberg
G. Backenstoss	Karlsruhe	E.G. Michaelis	CERN
J. Bailey	Nina-Daresbury	R. Michaelsen	H.M.I. Berlin
M. Barbier	CERN	G.L. Munday	CERN
I. Bergström	CERN	C. O'Ceallaigh	DIAS Dublin
F.G. Binon	IISN Belgique	H.J. Pfeiffer	CERN
F.H. Boehm	CERN	J. Pniewski	Warsaw
J. Bonn	CERN	B. Povh	Heidelberg
E. Boschitz	Karlsruhe	M. Querrou	Clermont-Ferrand
R. Brandt	Marburg	G.R. Raisbeck	Orsay
T.B. Bressani	Torino	E. Roedel	CERN
C.C. Cernigoi	Trieste	G. Röscher	H.M.I. Berlin
E. Chiavassa	Torino	L. Schellenberg	Fribourg
H.D. Engelhardt	Karlsruhe	W. Schött	CERN
R. Engfer	SIN/CERN	P. Schwaller	SIN/CERN
W.E. Fischer	SIN Zürich	A. Schwitter	ETH Zürich
R.F. Foucher	Orsay	W.U. Schröder	Darmstadt
H.-J. Gerber	SIN Zürich	C. Serre	Grenoble
P.G. Hansen	CERN	M. Spighel	Orsay
C.B. Haenny	Lausanne	L. Tauscher	CERN
A.J. Herz	CERN (Secretary)	G. Torelli	Pisa
R. Hess	Genève	B. Vaucher	Lausanne
B. Jonson	CERN	H.Ch. Walter	SIN Zürich
C. Joseph	Lausanne	D.W. Warren	Genève
R. Klapisch	Orsay	L. Westgaard	CERN
H.J. Klüge	CERN	D.H. Wilkinson	Oxford (Chairman)
D. Kofoed-Hansen	CERN	F. Yiou	Orsay
S. Kullander	CERN	T. Yoccoz	Paris
G.L. LeDallie	CERN	E. Zavattini	CERN
		C. Zupančič	Munich

1. INTRODUCTORY REMARKS

The Chairman (Wilkinson) expressed the gratitude of the Committee to Kofoed-Hansen, his predecessor in the Chair who, he said, had taken the best possible care of the affairs of the Committee, always keeping the collective interests in mind.

2. MINUTES OF THE MEETING OF 29 SEPTEMBER 1971

Herz apologized for the fact that report PH III-71/55 by Michaelis (Status of the SC Improvement Programme) had not been distributed with the Draft Minutes as had been intended.

The Draft Minutes (PH III-71/60) were approved without further comment.

3. REPORT ON DECISIONS MADE BY THE NPRC

Wilkinson reported that the Nuclear Physics Research Committee, at its meeting of 12 October 1971, had accepted the recommendations of the Physics III Committee made on 29 September 1971.

In addition, the NPRC, at its meeting of 3 November 1971 had approved an allocation of two PS periods for testing of beam k_{17} to Experiment P7 on the basis of the programme set out in PH III-71/54. However, the NPRC had postponed a final decision pending the submission of a more specific proposal by the Karlsruhe-Stockholm group (Backenstoss et al.) taking account of the results of these tests.

On the suggestion of Wilkinson the Committee decided to transmit the following to the NPRC:

"The Committee notes with satisfaction that the slow- K^- -beam k_{17} needed by Experiment P7 is being installed. The Committee wishes to reiterate its support for this experiment and expects to be able to recommend a firm programme as soon as tests of k_{17} have been completed".

Wilkinson reported also that the NPRC showed considerable interest in the future of the Physics III programme, and that he would make an appropriate presentation to the NPRC after the extended Physics III meeting in March.

4. PLANS FOR THE MARCH MEETING ON THE LONG-TERM PHYSICS III PROGRAMME

Herz reported on the status of the preparations for the meeting (see also PH III-71/62). He listed the invited speakers who had already accepted at the time; in particular A.S. Goldhaber and A. Kerman who had agreed to summarize their impressions at the end of the meeting.

P.G. Hansen asked why it was that the summary speakers were almost always theoreticians. Wilkinson replied that an additional "summarizer" was still to be invited and he asked for suggestions. In the subsequent discussion the Committee expressed strong support for the idea that an experimentalist be invited.

5. REPORTS ON EXPERIMENTS AT THE PS. MACHINE-TIME REQUESTS FOR EXPERIMENTS IN PROGRESS

Munday reported briefly on the status of the programme at the PS.

Experiments discussed or reported were:

P 7 X rays from exotic atoms. (Karlsruhe-Stockholm; Backenstoss et al.).

Munday reported that the new beam k_{17} would be ready for testing by Easter.

P 9 Hypernuclear spectroscopy (π spectra, K^- in flight). (Torino; Bressani et al.).

The Committee discussed the time request and decided to reiterate its support as follows:

"The Committee recommends that this experiment be scheduled for running in the k_{12a} beam immediately following experiment P8, subject to satisfactory results being obtained from the already-scheduled tests in beam t_1 . The total recommended running time in k_{12a} is 7 PS weeks".

P 10 Exotic nuclei with an on-line mass spectrometer at the PS. (Orsay; Klapisch et al.).

This experiment had completed its runs at the PS.

In addition the Committee took note of the following status reports:

- PH III-72/2 : Memo from Povh et al. re P 6.
- PH III-72/3 : Memo from Bächmann et al. re P 13.
- PH III-72/4 : Memo from Bächmann, Brandt et al. re P 15.
- PH III-72/10: Memo from Bächmann, Brandt et al. re P 15.
- PH III-72/8 : Memo from Batty et al. re P 16.

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

- PH III-72/1 : Addendum to proposal PH III-71/23 "High resolution spectroscopy of hypernuclei". (Heidelberg; Povh et al.).

After a brief discussion the Committee decided to signify the continuation of its support for this project as follows:

"The Committee recommends that this experiment be approved and that the spectrometer requested be set up for running in the k_{17} beam. The Committee will make a recommendation on scheduling when the properties of k_{17} are known and details of the layout and time scale for installation have been decided upon".

- PH III-72/15: Proposal for studying fragmentation cross-sections of astrophysical interest. (Orsay; Yiou et al.).

Wilkinson prefaced the brief discussion by reporting that in the course of planning technical improvements to the PS the question had arisen whether the facility for irradiating nuclear-chemistry targets in the internal beam should be removed or replaced by a new one allowing a better vacuum to be maintained. After an enquiry among the groups interested in internal irradiations it had been decided to install a new system which was expected to become available around July.

The Committee decided to recommend as follows:

"The Committee recommends approval and the allocation of 5 hours of internal beam time as soon as the internal-irradiation facility has been reinstalled. The experiment code will be P 18".

- PH III-72/17: Letter of Intention: "A study of the excited states of light hypernuclei by means of γ spectroscopy". (Warsaw; Pniewski et al.).

The Committee took note of this letter of Intention.

Recommended programme of experiments at the PS

The status of the Physics III experiments at the PS is summarized in Table 1. Included in the Table are the experiments P 11 and P 18 which are recommended but not yet approved by the NPRC.

7. REPORT ON STATUS OF THE SC IMPROVEMENT PROGRAMME

The following report was presented by Michaelis:

Date of the RF Test and Shutdown

In the report PH III-71/55 of 4th October, 1971, the reasons for postponing the shutdown date from 1.1.72 to 1.4.72 at the earliest were explained - the principal reason for this delay being the CERN decision to await the outcome of a significant test of the rotary capacitor in operation at full voltage.

Meanwhile the mechanical assembly of this very complex device has been performed and tests have been carried out at various stages. This work has been slowed up by some technical difficulties, but so far there has been no major setback.

An element which has given unexpected trouble is the assembly of two copper cones which connect the rotor to the dee and which carry various control and trimming elements. These cones have not been manufactured and are being machined, but they have delayed the project by several weeks. This delay would have been worse but for the help of the CERN Central Workshop who have provided coppersmiths and mechanics to permit three-shift working.

The present stage of assembly of the entire equipment is so critical that more time can be lost by precipitate or careless actions than by going slowly. Rather than ask for work at all possible speed we have, therefore, urged AEG to strengthen its control and supervision and they have taken measures to this effect.

During a discussion, held on 21st January, 1971, CERN was told that no information enabling us to decide on a shutdown can be obtained before 5th June.

In this uncertain situation it seems inadvisable to fix a shutdown date. It is, therefore, proposed that - at any time after 5th June - this date be decided with a minimum of four weeks' notice. However, if it becomes evident before the next meeting that the present installation will have to operate beyond the beginning of the summer of this year, we would ask for a week's shutdown, probably linked to the Easter Holiday, to perform urgent maintenance on some of the electrical power equipment.

Present Status

In the meantime most of the work on the remaining components of SCIP has gone ahead smoothly.

- the RF oscillator and modulator have been tested at full power over the entire frequency range;
- the dee, dummy dee and pump manifold have been completed;
- the machining of the new vacuum chamber for the SC is in progress;
- studies of beams, targets, cables and cooling are complete. The characteristics of the future beams are available in the form of a preliminary report by Cox, Domingo and Skarek;
- despite a mishap to one of the pancakes the new SC coils will be completed in March, 72;
- several major elements manufactured by CERN, e.g. the target extraction mechanism and the electromagnet extraction channel, are ready and can be inspected in the SC workshop.

In the discussion which followed, Michaelis emphasized that the MSC Division would ask for a one-week shutdown for urgent maintenance work, should the long shut-down for the improvement programme be delayed beyond June.

Spighel raised the question of where the main effort in physics should be put at the Improved SC, given the very high energy resolution at Los Alamos. Wilkinson replied that this was the kind of subject for which the extended meeting of 16 and 17 March was being planned, and he proposed that the discussion be postponed until then.

Domingo presented a preliminary version of the report on beams at the Improved SC (PH III-72/21).

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

The Committee took note of the following documents.

- PH III-71/59: Memorandum from Yiou et al. re SC 4a.
- PH III-72/11: Status report on experiment SC 11.
- PH III-72/13: Status report on experiment SC 16.
- PH III-72/9: Memorandum from Bailey et al. re SC 37.
- PH III-71/46: Experimental programme for the period 1.1.72 until SC shutdown (ISOLDE).

Engfer reported on the operation of the SC during the preceding few months, pointing out that due to efficient operation, sharing and parasiting the utilization efficiency had been 180%.

He then presented his proposals for machine-time allocations which were approved by the Committee. They are incorporated in Table 2.

9.. PROPOSALS AND LETTERS OF INTENTION FOR EXPERIMENTS AT THE UNIMPROVED SC; RECOMMENDATIONS

- PH III-72/5: Proposal to measure the strong-interaction quadrupole effect in pionic atoms. (ETH + SIN Zürich-Darmstadt-Fribourg; Engfer et al.).

Leisi presented the proposal. The Committee resolved:

"The Committee recommends that the measurement on ¹⁷⁵Lu be approved with a time allocation of 10 main-user shifts before the SC shut-down. The experiment code will be SC 41".

- PH III-72/12: Letter of Intention: A measurement of the neutretto mass. (Louvain; Deutseh et al.)

The Committee took note of this document and recommends that the allocation of the parasitic testing time the group intends to request be made at the discretion of the SC Coordinator.

The above recommendations are incorporated in Table 2 which gives the complete Physics III programme at the SC as recommended to the NPRC.

Wilkinson emphasized that the requests made for machine time from May 1972 onwards would be listed in the Recommendations, but that the question whether or not they could be satisfied would depend on the date of the SC shut-down.

10. DATE OF NEXT MEETING

It was decided to hold a business meeting to discuss the programme for the unimproved SC on 15 March 1972.

A.J. Herz.

Table I

STATUS OF PHYSICS III PROGRAMME AT THE PS

Code	Group	Description of experiment, documents	NPRC approval	Status on 26.3.72	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	Interrupted	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 (π spectra, stopping K ⁻) (70/19)	4. 6.71	in preparation	k _{12a}	2 following S109	2	
P 9	Torino (Bressani et al.)	Hypernuclear spectroscopy (π 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 see remarks	4 +	7 PS weeks in k _{12a} (following P 8) recommended
PI1	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
PI2	CERN-DIAS-Dublin-Warsaw (Herz et al.)	Energetic heavy fragments from heavy nuclei (71/15)	4. 6.71	in preparation	e ₆	Parasitic	-	
PI3	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
PI4	Berne (Hahn, v. Gunten et al.)	Search for superheavy elements (71/17)	4. 6.71	in progress	e ₉ e ₉	-	-	Analysis of heavy-element targets from PS
PI5	Darmstadt-Marburg (Bächmann, Brandt et al.)	Search for superheavy elements (71/18, 71/E, 71/20, 72/4, 72/10)	4. 6.71	in progress	e ₉	-	-	Analysis of heavy-element targets from PS
PI6	RHEL-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)
PI7	Clermont-Ferrand Strasbourg (Combe Frédmann, Querrou et al.)	⁴ He coherent scattering (observation of He recoil) (71/40)	12.10.71	in preparation	e ₉	Parasitic (see remarks)	-	Expected to run for 1 year from about April 1972
PI8	Orsay (Yiou et al.)	Fragmentation cross-sections for astrophysics (72/15)	Pending	-	int.	5 hours	5 hours	Cannot be done before internal-irradiation facility reinstalled

Table 2

SC Experiments, Status and Proposed Allocations to 30 April 1972

Code	Group	Description of experiment	NPRC approval	Status as of 26.1.72	Shifts used (1) 1.1.68-24.12.71		Main-user shifts recommended for period 1.1.72 to 30.4.72	Main-user shifts requested for period 1.5.72 to shutdown	Expected date of completion	Remarks
					Main user	Paras				
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	475	248	30(N)	25(N)	Shutdown 1972	New proposal likely for improved SC
SC 4a	Orsay (Yiou et al.)	Nuclear reaction cross-sections for cosmic-ray problems (68/6,68/54, 71/39,72/11)	7.2.68	in progress	53	-	10	5	+	Continuing project
SC 9	CERN/DI-HP (Raarli et al.)	Radiobiology (69/12, 70/40,70/55,71/25).	17.3.65	in progress	80	9	-	-	+	Continuing project
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).	17.11.65 5.7.67	in progress	432	209	42(N)	23 (N)	Shutdown 1972	
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	82	52	65(N)	40 (N)	Shutdown 1972	
SC 21a	CERN-Pisa (Polacco, Zavattini et al.)	2S-2P energy differences in (μ He), (70/47)	3.2.71	in progress	72	14	44(N)	41(N)	Shutdown 1972	
SC 22	CERN-ETH-Geneva Grenoble (Pepin et al.)	Nucleon-nucleus cross-sections (68/4,68/26,68/67, 70/6,70/42,71/50).	8.5.68	in progress	100	497	20(P)	40(P)	Shutdown 1972	
SC 28	CERN (Charpak et al.)	Development of multiwire proportional chambers for ISR experiments (69/31)	4.2.70	in progress	9	93	10(N)	-	Shutdown 1972	
SC 30	IISN Belgique-Orsay (Spiguel, 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	263	16	40(N)	10(N)	Shutdown 1972	
SC 32	Clermont-Ferrand Lyon, Strasbourg (Combe, Querrou et al.)	Small-angle pp,pd $p^4\text{He}$ scattering at 600 MeV (70/34,71/41)	28.10.70	in progress	150	-	35(P)	-	April 1972	
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	in progress	69	11	15(P)	-	April 1972	Includes time to obtain data for radiation biology (70/51, 71/28)
SC 35	Heidelberg (Heusser et al.)	Production of radio nuclides by μ capture (71/1,71/27)	3.2.71	in progress	9	-	5(N)	-	April 1972	
SC 36	SIN/CERN (Engfer et al.)	Tests for experiment on $\mu + e + \gamma$ (70/52)	3.2.71	Interrupted	1	3	-	-	+	Main experiment planned for improved SC
SC 37	CERN-Birmingham London-Pisa (Bailey et al.)	π -nucleon scattering lengths (71/18,71/37, 72/9)	4.6.71	in progress	43	33	37(N)	23(N)	Shutdown 1972	
SC 38	Karlsruhe-Trieste (Boschitz et al.)	${}^{16}\text{O}(\pi^-,n\alpha)$ reactions (Tests) (71/22,71/47)	4.6.71	in progress	-	18	15(N)	15(N)	Shutdown 1972	Main experiment planned for improved SC
SC 39	CERN-Oxford-Göteborg London-SIN (Domingo, Tanner Wilkin et al.)	$\pi^+ \text{D}$ elastic scattering at 400 MeV/c (71/24,71/48)	4.6.71	in progress	43	-	35 (P)	-	April 1972	
SC 40		π^\pm nucleus total cross-sections (71/49)	12.10.71	in progress	15	-	28 (P)	2 (P)	Shutdown 1972	
SC 41	ETH-SIN-Darmstadt-Fribourg (Engfer et al.)	Strong-interaction quadrupole effect in pionic ${}^{179}\text{Lu}$ (72/5)	Pending	-	-	-	∞ (N)	-	April 1972	
I	ISOLDE Collaboration	ISOLDE programme (69/1, 70/4, 70/48,71/46,72/7)	12.2.69 3.2.71	in progress	323	-	34 (P)	12	+	Continuing project
K	Nuclear Chemistry (Bordeaux, CERN, Darmstadt, Oslo)	Nuclear chemistry (70/33,70/36,70/37, 70/38)	23.9.70	in progress	9	-	3	-	April 1972	

(1) Data supplied by MSC Division.

(2) Main user side with experiments marked P (proton side).