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PH.III-74/54
12 November 1974

PHYSICS III COMMITTEE

DRAFT MINUTES OF THE MEETING OF THE
PHYSICS III COMMITTEE

held on

2 October 1974 at 14.30 h

P R E S E N T

ALLARDYCE B.W., CERN	KLUGE J., Mainz
AULD E.G., Daresbury	KOCH H., Karlsruhe
BAARLI J., CERN	LECHANOINE C., Geneva
BAILEY J., Daresbury	LEWIS C.W., Karlsruhe
BARJON R., Grenoble	MACQ P., Louvain
BASSALLECK B., Karlsruhe	MCMAHON T., Birmingham
BEGER H., CERN	MDEMAND-PETERSSON P., Aarhus
BERNABEU J., CERN	MICHAELIS E.G., CERN
BERTIN A., Bologna	MOHR R., CERN
BLOMQUIST J., CERN	MUKHOPADHYAY N.C., CERN
BONN J., CERN	NIELSEN K.O., Aarhus
BRESSANI T., Turin	NIELSEN O.B., Copenhagen
CARBONI G., CERN	NILSSON A., Stockholm
CARETTO A., CERN	PASINETTI A., Milano
CARRAZ L.C., CERN	RAVN H., CERN
CERNIGOI C., Trieste	RITTER H.G., Heidelberg
DUCLOS J., Saclay	SCHMITT H., München
EKSTROM C., CERN	SCHUTL O., Jülich
ENGELHARDT H.D., Karlsruhe	SERRE C., CERN
FAESSLER M.A., Heidelberg	STRONG J.A., Westfield
GERBER H.J., SIN	SUNDELL S., CERN
GJØTTERUD K., Oslo	TAKEUTCHI F., Karlsruhe
GORINI G., Pisa	TANNER N.W., Oxford
GREENIAUS G., Geneva	TAUSCHER L., Karlsruhe
GRUNER J.W., CERN	TINOL P., Zürich
GUSAKOW M., Lyon	ULLRICH H., Karlsruhe
HAASE E.L., Karlsruhe	WANNBERG G., Uppsala
HALDORSEN J., CERN	WEILHAMMER P., CERN
HANSEN P.G., CERN	WERREN D., Geneva
HERZ A.J., CERN	WESTGAARD L., CERN
HESS R., Geneva	WILKIN C., CERN
HORNHOJ P., Aarhus	WILKINSON D.H., Oxford
INGELMAN S., Uppsala	YIOU F., Orsay
JONSON B., CERN	ZAVATTINI E., CERN
JOSEPH C., Lausanne	ZUPANCIC C., München
KLAPISCH, Orsay	

1. SC PROGRESS

In his Introductory Remarks Wilkinson announced that the SC, like Phoenix, had arisen on flaming wings. When it was switched on its performance had been such that it was virtually clear the design goals would be reached. He congratulated Michaelis and the MSC team on this success.

2. MINUTES OF THE MEETING OF 2 OCTOBER 1974
MATTERS ARISING

As requested by Deutsch, the Committee agreed to amend the Remarks concerning Experiment SC60 in Table 2 to read as follows:

"25 shifts approved in principle. Further time allocation to be discussed after report on studies of possible backgrounds."

As a matter arising from the Minutes the Committee agreed to take note of the memorandum PH.III-74/52 by the Louvain Group preparing Experiment SC60 in which they discussed backgrounds and proposed to extend the experiment to the investigation of the reaction $\pi^- + p \rightarrow n + 2\gamma$ if the initial work with a ${}^6\text{Li}$ target is successful. Wilkinson proposed that if there were any objections to the contents of this memorandum they should be raised at the next meeting.

3. REPORT ON DECISIONS MADE BY THE NPRC

Wilkinson reported that the NPRC had accepted the recommendations made at the previous meeting (see PH.III-74/43), including the one that the Nuclear-Chemistry Coordinator be empowered to authorize a few minor and urgent irradiations.

4. REPORT ON IRRADIATIONS AT THE PS

Ravn presented the information shown in Table 1. He added that the pumping time needed per internal irradiation had now been reduced to approximately half an hour per irradiation.

5. REPORT ON THE STATUS OF THE SC IMPROVEMENT PROGRAMME

Michaelis thanked Wilkinson for his kind remarks and the announcement of the start of the meeting. He showed a list of his collaborators bearing primary responsibility for the programme, and reported that protons had been accelerated to the full radius of the machine, equivalent to full design energy. During this test the RF system had been operated for one pulse in sixteen and the radiation monitors had shown the same responses as during operation of the old (1-uA) version of the machine. This indicated that at the full repetition rate the current would be of the order of the design current.

Michaelis then discussed those portions of his status report PH III - 74/51 which had not been overtaken by the latest developments. In particular he pointed out that activation of the machine would have to be kept to the absolute minimum until the repair of the DEE in February 1975 so that it would be impossible until then to make internal irradiations or to use internal targets for the production of beams of appreciable intensity. He expected that by March or April 1975 the SC2 would be in full scheduled operation.

Zavattini added that the intensity would be satisfactory also in the special mode of operation required for Experiment SC21.

Ericson said that it looked as if the proton intensity might become embarrassingly high -- what, he asked, was the acceptable upper limit? Michaelis replied that up to 10 μ A could be allowed to be lost inside the machine: with the ejection efficiency expected the maximum acceptable circulating beam was thus about 35 μ A. One would probably trade off excess current for beam quality. Ericson commented that with only a tiny bit of luck the SC2 would be within meson-factory specifications.

6. PROGRESS REPORT ON STUDIES AND PLANS FOR
THE ACCELERATION OF HEAVY IONS IN THE SC2

Michaelis presented the report PH III - 74/53 concerning the possibilities for the acceleration of ^{14}N . He said it would be possible to obtain an accelerated beam of about 1.4×10^{10} ions per second with an energy around 180 MeV per nucleon. However, he emphasized that in order to achieve this one would need to improve the machine vacuum by a factor four and one would have to double the repetition rate. To make studies it is proposed to modify the r.f. system of the SC centre-region model, a programme which would take about two years.

Ericson asked how useful a flux of the order of 10^{10} nitrogen ions per second was likely to be. P.G. Hansen replied that it should be the idea to be first in the field in the energy range in question, in which case 10^{10} per second would be plenty. Klapisch added that one would really have to be first, and asked what it was that was limiting the intensity. Michaelis replied that the main problem was the vacuum: one would have to introduce cryopumps. Wilkinson commented that lower energies might be more interesting, and Michaelis said that the prospects were even better for that, though transmission losses might be greater for lower charge states.

7. REPORT ON THE STATE OF DISCUSSIONS CONCERNING
THE OMICRON SPECTROMETER

Tanner reported very briefly that the Collaboration considered itself to be viable, that they had set up a temporary informal self-appointed management committee consisting of Allardyce, Bressani and himself, and that they proposed to hold a meeting at CERN on 14 and 15 November. According to present ideas, he said, the spectrometer would be set up in the Proton Hall, beginning to occupy the space there in about one year, and be completed approximately one year after that.

8. PROPOSALS, LETTERS OF INTENTION AND REQUESTS FOR
MACHINE TIME AT THE SC. RECOMMENDATIONS

PH.III-74/47 Tests of equipment at the SC (CERN-Genova-Orsay-Oslo-UC London: Gracco et al.).

Macri presented the proposal. In the discussion Ericson suggested that one should keep in mind the possibilities of doing useful experiments when carrying out development testing of apparatus. Allardyce pointed out that the neutron room would not be in full operation for some time, but Michaelis commented that as a high instantaneous rate, not a high total flux, was required, it was conceivable to do this test with about 1% of the circulating beam and a very short burst. Several speakers doubted that as high a rate as requested could be obtained. Wilkinson drew attention to the likelihood that the test would be a significant user of the machine until the PS restarts in April 1975, and Ericson wondered about compatibility with other operations and experiments considering the amount of machine time asked for.

After further discussion the Committee decided to recommend that this series of tests be approved, subject to the conditions that not more than five days of prime (main-user) SC time will be used in total, and that it will be finished by 1 April 1975. Any extension beyond these limits will require a continuation proposal. The Experiment Code will be SC62.

PH.III-74/50 Measurement of the cross-sections for the elastic scattering of μp and μd muonic atoms against protons and deuterons (Bologna: Bertin, Massa, Vannini, Vitale).

The proposal was presented by Bertin. After a discussion of the physics in which Ericson, in particular, underlined the importance of the measurements proposed, Wilkinson suggested, and the Committee

agreed, to recommend approval in principle. A scheduling request is to be submitted, and a time allocation will be recommended, when a beam of sufficient intensity is available. The Experiment Code will be SC63.

SC21 2S-2P energy separation in muonic helium (laser technique). (CERN-Pisa: Zavattini et al., PH.III-74/47, 74/48.

The Committee agreed to recommend that the preparatory work for the continuation of this experiment be carried out as requested in PH.III-74/48.

I ISOLDE programme (ISOLDE Collaboration, PH.III-73/15, 74/16, 74/49).

Schult gave a talk on the proposed studies of the charge distribution in excited nuclei from observations of shifts in K-electronic X-ray lines.

Westgaard then introduced the Letter of Intention PH.III-74/49 concerning a possible extension of the ISOLDE facility by the installation of a second isotope separator inside the synchro-cyclotron hall. In the discussion Michaelis pointed out that there were major technical problems. The Committee decided to take note of this document without expressing an opinion.

9. THE PROGRAMME OF EXPERIMENTS AT THE SC2

It was decided to recommend that, for the time being, beams and running time should be made available to suitable experiments whenever the work of bringing the SC2 into full operation makes this possible. The situation is to be reviewed at the next meeting of the Physics III Committee.

The programme of experiments is summarized in Table 2.

10. DATE OF NEXT MEETING

It was proposed to hold the next meeting on Friday, 29 November 1974.

[Secretary's note: the date of the meeting will now be Friday, 6 December.]

11. ANY OTHER BUSINESS

The Committee applauded the suggestion by Wilkinson to send felicitations to SIN on the occasion of their Opening Ceremony.

Mukhopadhyay suggested one should hold seminars on topics appropriate to the Physics III programme on the mornings of the days on which there is a meeting of

the Committee in the afternoon. P.G. Hansen commented that such seminars might conflict with meetings of collaborations and groups for which these times are very convenient also. Wilkinson suggested that one should have a further look into the matter in order to see what implications there would be.

A.J. Herz

Table 1
 Programme of Physics III irradiations at the PS
 Status as of 2 October 1974

Code	Beam	Experiment	Team	Documents	NPRC approval	Approved irradiation time	Time used		Remaining time		Remarks
							Parasitic	Prime	Parasitic	Prime	
P1B	Internal (stand-by), some external	Fragmentation cross-sections of cosmic-ray interest	Orsay: <u>Yiou</u> , <u>Raisbeck</u>	72/15, 74/28 74/35	17.7.74	To be arranged with Nuclear Chemistry Coordinator	-	-	-	-	Special request to be submitted whenever prime PS time is required - progress reports to be submitted about every six months
P2Z	Some internal, mainly external	Production cross-sections and recoil properties of rare gas nuclei produced in various target elements	INP, Bordeaux- Gradignan: <u>Regnier</u> , <u>Simonoff-Lagarde</u> , <u>Simonoff</u>	73/12 rev.	17.4.74	To be arranged - see remarks	3 x 10 ¹⁷ protons	3 exposures	-	-	Must not use prime PS time
P23	Internal	Angular and energy distributions of heavy fragments from bombardment of uranium and gold	Marburg-Oslo: <u>Habbeard</u> , <u>Alstad</u> , <u>Glomsaet</u> , <u>Hagebøl</u> , <u>Haldersten</u> , <u>Johansen</u> , <u>Methasiri</u> , <u>Peppas</u> , <u>Esterlund</u> , <u>Patzelt</u>	74/14, 74/21(I)	17.4.74	9 x 1 hour - see remarks	-	2x 1.3 hours (3.5 h total*)	-	6x 1 h	Group has been asked to try to find a way of reducing the load on the PS
NC Coord	Internal	Termination of earlier work. Test of fast chemical separation	Darmstadt: <u>Meidhart et al.</u>	-	17.4.74	Minor irradiations arranged with Nuclear Chemistry Coordinator (see remarks)	-	2.5 h total*	-	-	The time available to the NC Coordinator must not be used for full experiments

* Total time = irradiation time + pumping time

Table 2

Physics III programme at the SC
Status as of 2 October 1974

Code	Experiment	Team	Documents	PARC Approval	Conditions concerning running time	Remarks
SC21	ZS-ZP energy separation in muonic helium (laser techniques)	CERN-Pisa: Zavattini et al.	74/48	pending	4 weeks parasitic	Preparatory work for continuation at SC 2
SC50	Measurement of nuclear cross-sections of astrophysical interest	Orsay: <u>Yio</u> , <u>Raisbeck</u> , <u>Fortus</u> , <u>Ferron</u>	73/18	17.4.74	About two shifts per month (less initially)	Progress report and continuation request to be submitted at least once a year
SC51	Study of neutron-deficient nuclei between Pb and U, using helium-jet transport technique	Marburg-Diesen: <u>Brandt</u> , <u>Jungblut</u> , <u>Molzahn</u> , <u>Fahrleit</u> , <u>Westmeier</u> , <u>Wolheim</u> , <u>Wolfsch</u> , <u>Kruegel</u> , <u>Wagner</u> , <u>Wolcher</u>	74/15	17.4.74	Must be totally parasitic	Parasitic to ISOLDE
SC52	Measurement of average energies, forward momenta and anisotropies of specific fission products from disintegration of ¹³⁵ I by 600-MeV protons	Marburg-Dela: <u>Habbeslad</u> , <u>Aistad</u> , <u>Blument</u> , <u>Hegazi</u> , <u>Haldorser</u> , <u>Johansen</u> , <u>Pappas</u> , <u>Mathias</u>	74/21 (II)	17.4.74	4 x 2 hours internal plus two long parasitic runs in external beam	To run in 1975. Can't run downstream of ISOLDE target
SC53	Study of products of binary fission in disintegrations of U, Pb, Pr, Ag, Sr and Cs by 600-MeV protons	Lund-Isola: <u>Andersson</u> , <u>Areskog</u> , <u>Gustafsson</u> , <u>Hylén</u> , <u>Schroder</u> , <u>Wegard</u>	74/12	17.4.74	No undertaking as to rate at which programme will be implemented	To start in 1975
SC54	Calibration of neutron detector used in FS experiment S112	Birmingham RUC, London (Westfield): <u>Elving</u> , <u>McNelson</u> et al.	73/8 74/1	17.4.74	Must not absorb more than one month of physics time with team sharing. See remarks	Additional time may be made available in a manner so as not to impede machine development or other experimental programmes
SC55	Study of particle emission in absorption of stopped μ in ¹⁶ O	Karlsruhe-Mieste: <u>Bessolock</u> , <u>Engelhardt</u> , <u>Hesse</u> , <u>Lewis</u> , <u>Takeuchi</u> , <u>Ullrich</u> , <u>Cornight</u> , <u>Pauli</u> , <u>Meschini</u>	74/22 74/6	17.4.74	See remarks	Testing facilities requested as early as possible; very poor beam quality acceptable for tests
SC56	Tests for experiment at SIN	University of Geneva: <u>Hess</u> et al.	74/8	17.4.74		Suitable beam likely to be available early, during first 6 months of operation
SC57	Radio-biological effectiveness, and its dose-rate dependence, of 535-MeV neutrons	CERN Health Physics: <u>Rearl</u> , <u>Starchi</u> , <u>Murdell</u> , <u>Sullivan</u>	74/11	17.4.74	About 10 shifts at dose rates similar to those obtained in SC4. See remarks	Cannot run before SC4 operation has become stable and reliable. Experiments require advance notice for preparatory of material
SC58	U(p,x) ²³⁴ Na reactions with protons between 170 and 300 MeV	Marburg-Dela: <u>Hobbeslag</u> , <u>Aistad</u> , <u>Blument</u> , <u>Hegazi</u> , <u>Haldorser</u> , <u>Johansen</u> , <u>Mathias</u> , <u>Pappas</u>	74/21 (II)	17.4.74	8 x 1 hour internal plus two parasitic runs in external beam	Cannot run downstream of ISOLDE target
SC59	Tests for partial μ capture rate ⁶ Li- ⁴ He μ , s.	Louvain: <u>Deutsch</u> et al.	74/6 74/30	17.7.74	Up to 20 shifts	To be scheduled when uncertainty concerning population of nuclear fire levels resolved
SC60	Search for $\pi^+ + A \rightarrow B + 2\gamma$	Louvain: <u>Deutsch</u> , <u>Favart</u> et al.	74/10 74/37	17.7.74	See remarks	25 shifts approved in principle. Further time allocation to be discussed later
SC61	Tests for experiment on weak neutral currents in μ atoms	CERN-Karlsruhe-Helvi: <u>Beckurts</u> , <u>Fetscher</u> , <u>Hegulberg</u> , <u>Koch</u> , <u>Pavlopoulos</u> , <u>Pott</u> , <u>Silvano</u> , <u>Suscher</u>	74/39	17.7.74	See remarks	Scheduling to be decided later
SC62	Tests of equipment for SPS experiment (Proposal P8)	CERN-Innova-Cmsay-U.C. London: <u>Greene</u> et al.	74/47	pending	Must be finished by 1 April 1975. Must not use more than 5 days prime user time in total	
SC63	Cross-sections for elastic scattering of μp and μD atoms against n and D	Bologna: <u>Bertin</u> , <u>Mazza</u> , <u>Vannini</u> , <u>Vitale</u>	74/50	pending		Request for scheduling and time allocation to be submitted when adequate beam available
I	ISOLDE programme	ISOLDE Collaboration (Chairman: D.B. Nielsen)	74/14 74/16 74/49	17.4.74	12 shifts per month (less initially)	