EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

PH III-75/5
14 February 1975

PHYSICS III COMMITTEE

DRAFT MINUTES OF THE MEETING OF THE PHYSICS III COMMITTEE

held on

6 December 1974 at 14.30 h

P R E S E N T

ALLARDYCE B.W., CERN
BAARLI J., CERN
BASSALLECK B., Karlsruhe
BEGER H., CERN
BERGSTROM I., Stockholm
BERTIN A., Bologna
BLASER J.P., SIN
BLOMQUIST J., CERN
BRESSANI T., Turin
CARETTO A., CERN
CERNIGOI C., Trieste
CHIAVASSA E., Turin
COSTA S., Turin
DAVIES J.D., Birmingham
DEUTSCH J., Louvain
DOMINGO J., SIN
EKSTROM C., CERN
ERICSON T.E.O., CERN
ERIKSON T., Stockholm
GORINI G., CERN
GREENIAUS G., Geneva
GRUTER J.W., CERN
HANSEN P.G., CERN
HAMBRO L., CERN
HERZ A.J., CERN (Secretary)
HESS R., Geneva
IGO-KEMENES P., Heidelberg
JONSON B., CERN
JOSEPH C., Lausanne
KOFOED-HANSEN O., CERN
LECHANOINE C., Geneva
LE DALLIC G., CERN
LEWIS C.W., Karlsruhe
MICHAELIS E.G., CERN
MOHR R., CERN
MUKHOPADHYAY N.O., CERN
NIELSEN O.B., Copenhagen
NILSSON A., Stockholm
NORLIN L.O., Uppsala
RAVN H., CERN
ROBERTSON X., RHEL
SANNINO M., Geneva
SCHECK F., SIN
SCHMITT H., Munich
SIMONS L., CERN
TAKEUTCHI F., Karlsruhe
TANNER N.W., Oxford
ULLRICH H., Karlsruhe
VITALE A., Bologna
WAPSTRA A.H., Amsterdam
WEDDIGEN CH., Karlsruhe
WERREN D.W., Geneva
WESTGAARD L., CERN
WILKINSON D.H., Oxford (Chairman)

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

The Draft Minutes (PH.III-74/54) were approved.

2. SC COORDINATOR

Wilkinson announced that the Director General had appointed Zavattini to be the SC Coordinator.

3. DISCUSSION: SHOULD PROPOSALS AND LETTERS OF INTENTION BE COMMUNICATED AUTOMATICALLY TO OTHER LABORATORIES?

The background to this discussion was given by Wilkinson. The main reason was, he said, that from time to time requests were received from other laboratories to be put on the mailing list for Physics III proposals. Wilkinson suggested that the Committee agree to exchange approved proposals with those laboratories which agreed to enter into a mutual arrangement. Deutsch asked whether this would really be a reciprocal arrangement and whether it was proposed to distribute the proposals received from elsewhere to the Physics III mailing list. Wilkinson replied that he thought one should send one copy of every approved proposal to each of the institutions with whom an agreement had been made, and that they would send one copy of their approved proposals to CERN. These copies would be placed in the respective libraries. Further dissemination would be allowed but he had not contemplated that Physics III should do this automatically. He added that the first such request to be considered was a long-standing one from Los Alamos.

After some further discussion in which Wilkinson pointed out that his suggestion, if accepted, would make approved proposals public property, the Committee agreed that arrangement may be made with other laboratories to exchange approved proposals on a mutual basis.

4. REPORT ON IRRADIATIONS AT THE PS

Ravn reported the following irradiations:

Summary of PS Irradiations in the period 2.10-6.12, 1974

Code	Experiment	Team	Time used	
			Prime PS time (h)	Parasitic protons
P18	Cross-sections for Astrophys.	Orsay Raisbeck Yiou	-	2×10^{16}
Coord.	Termination of earlier nucl.react. work	Darmstadt Bächmann Neidhart	-	8×10^{16}

He added that the exposure for experiment P18 had been useless as delays in transporting the target to the laboratory had been such as to allow the nuclides of interest to decay too much.

In reply to a question from O'Ceallaigh, Ravn said that therefore an additional irradiation would be carried out for Experiment P18.

5. REPORT ON THE STATUS OF THE SC IMPROVEMENT PROGRAMME

Michaelis presented the status report PH III-74/60.

Deutsch asked what would be the time structure of the beam. Michaelis replied that at the time of the meeting there was a 30-μs burst every 40 ms; in January he expected about 800 μs every 40 ms. Following the installation of the CEE in February there would be a long burst with a duty cycle of about 30%.

6. PROJECTS AND PLANS ASSOCIATED WITH THE SC

Michaelis briefly discussed the situation concerning the acceleration of heavy ions. He reminded the Committee that in the context in which he was speaking "heavy" meant such ions as $C^{(+4)}$ or $N^{(+5)}$ or similar, and that the beam intensity contemplated was about 1.4×10^{10} s^{-1}. Such a project, he said, was likely to extend over four to five years.

Plans had been prepared, he said, to carry out an initial study with the SC centre-region model in collaboration with GANIL. They could not proceed with such a project until it had been approved by CERN. However, before proposing it he would like a study made to see whether the final result of such a programme would really be useful when it is ready. O'Ceallaigh added that a study was particularly important in view of the time scale mentioned by Michaelis.

Wilkinson said that, ideally, one should have two parallel studies: one from the point of view of the machine experts, the other from the point of view of the users. The two should overlap and address themselves to the problems of cost as well as to those of

Z charge,
E energy,
I intensity and
T time needed.

Mukhopadhyay asked what was the physics interest. Wilkinson replied that beyond about 30 MeV/nucleon shockwaves were expected to develop as the velocity of sound in nuclear matter corresponded to approximately 30 MeV/nucleon. There would thus be very high local densities and new phenomena should be found. He asked whether the SC project could include the possibility of having variable energy.

Michaelis replied that this could not be done easily, and Bergström added that he felt one should not overburden the machine group with new problems.

Ericson spoke in favour of a broad study leading to the possibility of rapid action in case it became likely that one of the new theories on the behaviour of nuclear matter at high pressures was correct.

P.G. Hansen said that ISOLDE and others might be interested if the intensity were greater than 1.4×10^{10} s^{-1}. Wilkinson added that the acceleration of ^{3}H, ^{3}He and ^{4}He was a separate matter, being considered independently -- P.G. Hansen was expressing interest in the possibilities of intense beams of heavier nuclei.

Michaelis said that the discussion suggested a study should start soon -- he felt it would not require too much effort on the side of MSC if it were done in collaboration with GANIL. Kofoed-Hansen believed four years was a minimum period to allow for the completion of such a project: one year for study, one year for delays (approval, finance etc.) and two years to make the new parts for the machine. O'Ceallaigh added that the investigation of the charge spectrum of heavy cosmic-ray primaries, of great importance to astrophysics, depended on calibrations done with the aid of accelerators. However, if the time scale was

really four to five years he was doubtful whether the machine would be needed for such work when it is ready.

Cernigoi asked for a comparison with UNILAC. Wilkinson replied that UNILAC produced about 10 MeV/nucleon all over the periodic table; the SC should be capable of roughly 100 MeV/nucleon for a restricted range of atomic numbers.

The Committee agreed that Wilkinson should discuss the setting-up of a study, and that he should make a proposal at the next meeting. Wilkinson asked all those who have comments or are interested in participating in the study to write to him, Michaelis or Herz.

7. PROPOSALS AND LETTERS OF INTENTION FOR EXPERIMENTS AT THE SC. RECOMMENDATIONS.

PH.III-74/56 : Spallation studies and tests for fast separations (Darmstadt; Bächmann).

The proposers were not represented at the meeting. Wilkinson suggested, and the Committee agreed, that they be asked to make contact with the MSC Division concerning the technical aspect of their plans. A more complete proposal should be written if their project impinges seriously on the SC programme. The Committee agreed also not to recommend the allocation of PS time to this project.

PH. III-74/59 : Letter of Intention: Local magnetic fields in ferromagnetics studied by positive muon precession (Uppsala; Karlsson, Hartmann, Norlin).

Norlin presented the Letter of Intention. In the discussion it was pointed out that the studies by means of μ^+ precession are complementary to those in which e^+ annihilation is used. Ericson asked whether such an experiment can really be done by only three people and Norlin replied that they were hoping to find some collaborators but that such work had already been done in Uppsala by groups of only two physicists. Deutsch asked what was the precision with which fields can be measured and Norlin gave an estimate of $\pm\lesssim 1\%$ for 10^6 good events.

Wilkinson summarized the feeling of the Committee in encouraging the group to continue contacts with the MSC Division and others at CERN, and to prepare a proposal which should be quite specific. He also reminded them that it might be useful to establish or strengthen cooperation with other European groups in the field.

PH.III-74/57 : A proposal for a large acceptance magnetic spectrometer for use at the synchro-cyclotron (Turin-Oxford-Grenoble-CERN-Birmingham-Amsterdam; Spokesmen: Bressani, Tanner, Allardyce)

Wilkinson prefaced the presentation by reminding the Committee that the proposal was the outcome of many discussions and had been preceded by a number of documents. He asked the Committee to consider whether the physics programme should be recommended for approval, and to leave the technical details to be discussed further between the Working Party and the CERN authorities. Tanner then presented the proposal.

In the discussion that followed, Ericson said that the list of experiments looked like a programme for three or four years and one would have to establish priorities; Wilkinson thought that priorities should be set at the time at which one has to start to set-up experiments; Zavattini felt it was more important to look at the number of groups interested in doing experiments; Kofoed-Hansen suggested it would be useful to have a users' group, rather like the ISOLDE Committee; and Wilkinson commented that the organization should be such as not to prevent groups from outside from using the facility.

Wilkinson concluded from the discussion that the Committee approved of the proposal on the grounds of physics; the Committee agreed.

8. DATE OF NEXT MEETING

It was decided to hold the next meeting in early March 1975.
(The date was subsequently fixed as 6 March 1975.)

A.J. Herz

Table 1

Programme of Physics III irradiations at the PS
Status as of 6 December 1974

Code	Beam	Experiment	Team	Documents	NPRC approval	Approved irradiation time	Time used		Remaining time		Remarks
							Parasitic	Prime	Parasitic	Prime	
P18	Internal (stand-by), some external	Fragmentation cross-sections of cosmic-ray interest	Orsay: Yiou, Raisbeck	72/15, 74/28 74/35	17.7.74	To be arranged with Nuclear Chemistry Co-ordinator	2×10^{16} protons	-	-	-	Special request to be submitted whenever prime PS time is required - progress reports to be submitted about every six months
P22	Some internal; mainly external	Production cross-sections and recoil properties of rare-gas nuclei produced in various target elements	IN$_2$P$_3$ Bordeaux-Gradignan: Regnier, Simonoff-Lagarde, Simonoff	73/12 rev.	17.4.74	To be arranged - see remarks	3×10^{17} protons	-	Three exposures	-	Must not use prime PS time
P23	Internal	Angular and energy distributions of heavy fragments from bombardment of uranium and gold	Marburg-Oslo: Habbestad, Alstad, Glomset, Hagebø, Haldersen, Johansen, Methasiri, Pappas, Esterlund, Patzelt	74/14, 74/21(I)	17.4.74	9 × 1 hour - see remarks	-	2 × 1.3 h (3.5 h total*)	-	6 × 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: Neidhart et al.	-	17.4.74	Minor irradiations arranged with Nuclear Chemistry Coordinator (see remarks)	8×10^{16} protons	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 6 December 1974

Code	Experiment	Team	Documents	NPRC Approval	Conditions concerning running time	Remarks
SC21	2S-2P 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: Yiou, Raisbeck, Fontes, Ferron	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-Giessen: Brandt, Jungclas, Molzahn, Patzelt, Westmeier, Wilhelm, Wollnik, Kornahl, Wagner, Walcher	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 Pb by 600 MeV protons	Marburg-Oslo: Habbestad, Alstad, Glomset, Hagebø, Haldorsen, Johansen, Pappas, Methasiri	74/21 (III)	17.4.74	4 × 2 hours internal plus two long parasitic runs in external beam	To run in 1975. Cannot run downstream of ISOLDE target
SC53	Study of products of binary fission in disintegration of U, Pb, Pr, Ag, Sr and Cu by 600 MeV protons	Lund-Oslo: Andersson, Areskoug, Gustafsson, Hyltén, Schrøder, Hagebø	74/12	17.4.74	No undertaking as to rate at which programme will be implemented	To start in 1975
SC54	Calibration of neutron detectors used in PS experiment S112	Birmingham-RHEL-London (Westfield): Strong, McMahon et al.	73/5 74/1	17.4.74	Must not absorb more than one month of physics time with beam 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 π^- in ^{16}O	Karlsruhe-Trieste: Bassalleck, Engelhardt, Haase, Lewis, Takeutchi, Ullrich, Cernigoi, Pauli, Moschini	71/22 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: Hess 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 595 MeV neutrons	CERN Health Physics: Baarli, Bianchi, Nordell, Sullivan	74/11	17.4.74	About 18 shifts at dose rates similar to those obtained in SC1. See remarks.	Cannot run before SC2 operation has become stable and reliable. Experiments require advance notice for preparation of material.
SC58	$U(p,X)^{24}Na$ reactions with protons between 170 and 600 MeV	Marburg-Oslo: Habbestad, Alstad, Glomset, Hagebø, Haldorsen, Johansen, Methasiri, Pappas	74/21 (II)	17.4.74	6 × 1 hour internal plus two parasitic runs in external beam	Cannot run downstream of ISOLDE target
SC59	Tests for partial μ capture rate $^6Li \rightarrow {}^8He_{g.s}$	Louvain: Deutsch et al.	74/9 74/36	17.7.74	Up to 25 shifts	To be scheduled when uncertainty concerning population of hyperfine levels resolved
SC60	Search for $\pi^- + A \rightarrow B + 2\gamma$	Louvain: Deutsch, Favart 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-Basel: Backenstoss, Fetscher, Hagelberg, Koch, Pavlopoulos, Poth, Simons, Tauscher	74/39	17.7.74	See remarks	Scheduling to be decided later
SC62	Tests of equipment for SPS experiment (Proposal P9)	CERN-Genova-Orsay-U.C. London: Gracco et al.	74/47	9.10.74	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 p and D	Bologna: Bertin, Massa, Vannini, Vitale	74/50	9.10.74		Request for scheduling and time allocation to be submitted when adequate beam available
I	ISOLDE programme	ISOLDE Collaboration (Chairman: O.B. Nielsen)	73/15 74/16 74/49	17.4.74	12 shifts per month (less initially)	