

CERN/INTC 2000-019
INTC 3
10 March 2000

ISOLDE AND NEUTRON TIME-OF-FLIGHT EXPERIMENTS COMMITTEE (INTC)

Minutes of the third meeting on
Monday 28th February 2000

OPEN SESSION

After a few words of welcome the Chairman asked M. Lindroos, the PS division Technical Coordinator now responsible for ISOLDE to describe the organisation and responsibilities of the PS-ISOLDE team. M. Lindroos explained that ISOLDE operations will, from 1 April 2000, be integrated into the structure of the PS "expert groups", which are concerned with the various facilities operated by the division. The PS-ISOLDE group will from that date take care of the operation of the ISOLDE facility, ensure its long-term future, participate in the development of new radioactive beams and provide technical support for ISOLDE users. To these ends, the general PS personnel and workshop resources will be made available when necessary.

Thomas Nilsson the ISOLDE coordinator, presented a brief summary of the 1999 performance and the proposed 2000 schedule. In 1999 195 radioactive ion shifts had been delivered with very stable GPS and proton beam operation. Of 36 experiments with a total request of 401 shifts, 19 were fully and 15 partially scheduled. In 2000, with 52 experiments requesting a total of 572 shifts, it is expected that 390 shifts will be delivered, of which 100 should be with the high resolution separator (HRS).

H. Ravn then presented a short report on the HRS, recalling its historical origins at the time of the old SC-ISOLDE, its progress to date at the PSB-ISOLDE, the remaining technical challenges to be solved, and its performance characteristics at the expected startup date in May 2000.

The Chairman then invited E. Radermacher to present the Neutron TOF Facility Technical Design Report (PS213). This was described under the general headings of the PS beam, the lead target zone and the 200 m flight tube. Simulation studies of neutron fluxes and of charged and electromagnetic backgrounds and radiation doses at various locations were also described, and the expected installation schedule was outlined.

Presentations were then made of the following proposals and progress reports:

P123: Determination of the neutron fluence, the beam characteristics, and the backgrounds at the CERN-PS TOF Facility.

P115: Diffusion Mechanisms and Lattice Locations of Thermal-Equilibrium Defects in Si-Ge Alloys.

P116: Isospin mixing in $N \approx Z$ Nuclei.

P117: Investigation of the impact of the $^{39}\text{Ar}(n, \alpha)^{36}\text{S}$ reaction on the nucleosynthesis of the rare isotope ^{36}S .

P85 Add. 1: Investigations of Deep-Level Fe-centres in Si by Mössbauer Spectroscopy.

P119: Laser Spectroscopy Studies in the Neutron-Rich Sn Region.

P121: Precision study of the beta decay of ^{74}Rb .

P64 Add. 3: Test of a high power target.

CLOSED SESSION

Present: B.W. Allardyce, J. Aystö, G. Bauer (invited), C. Détraz, J.-P. Delahaye, J.-P. Duraud, J. Eades (Secretary), H. Flocard (Chairman), P. Van Isacker, K-L. Kratz, M. Lindroos, E. Migneco, T. Nilsson, H. Ravn, C. Rossi-Alvares, J.-P. Riunaud, B. Rubio, W. Scobel, R. Voss (for G. Goggi), P. Walker.

Apologies: W. David, K.P. Lieb.

H. Flocard first welcomed the new ex-officio members of the INTC, J.-P. Delahaye (new leader of PS division), J.-P. Riunaud (who will represent PS division in future at the INTC Committee's meetings) and M. Lindroos, the PS technical coordinator of ISOLDE. H. Ravn will remain in the Committee for his invaluable expertise in the domain of targets and the general scientific life of ISOLDE. The Chairman also introduced G. Bauer of PSI, who has been invited to evaluate the Technical Design Report of the nTOF facility.

The minutes of the third meeting were then approved without change.

The Committee thanked H. Ravn and T. Nilsson for the technical report on the HRS and on the ISOLDE performance and schedule for 2000, respectively. It was noted that the HRS is expected to function initially in low-resolution mode.

The first item for discussion in the closed meeting was the nTOF Technical Design Report (TDR). In presenting his evaluation of this, G. Bauer reported that while the scientific case for the nTOF facility was well documented, several questions and points of criticism could be raised concerning the TDR itself. These included the basic conflict between optimising the nTOF design simultaneously for both the epithermal and high energy neutron energy regions, an apparent overestimation of the neutron source strength, the risk of burning out the lead target by a single proton bunch, and some questions about the use of water as the target coolant. The Committee therefore asked G. Bauer to summarise his evaluation in the form of a complete written list of questions to which the nTOF community is invited to reply. It may then be asked to prepare a revised version of the TDR.

The Committee then concluded its review of the 700-shift backlog in the ISOLDE programme begun in the second INTC meeting of 29 November 1999. After discussing the replies to the questionnaire sent after the last INTC meeting, it was decided to cancel the outstanding shifts of the first class of experiments (those recommended before 1996). A letter will be sent to each spokesman to this effect, pointing out that updated proposals may nevertheless be resubmitted to the INTC. In the case of the second and third classes (experiments submitted before 1998 with more than 20% of their shifts outstanding, and Tests and LOIs submitted before 1998) it was agreed to take no further action except for IS303 (Tilted-foil polarisation and magnetic moments of mirror nuclei at ISOLDE) and IS356 (Search for physics beyond the standard model via positron polarization measurements with polarized ^{17}F). IS303 should, by the September INTC meeting provide, technical information establishing the state of readiness of the group and its ability to finish its outstanding shifts in 2001. In the case of IS356, the spokesman's own suggestion₁₇ of reducing the number of 34 outstanding shifts to 12 (for ^{118}Sb) and a maximum of 6 (for ^{17}F) will be followed.

The closed meeting continued with a discussion of the proposals and progress reports presented in the open session, as follows:

P123: Determination of the neutron fluence, the beam characteristics, and the backgrounds at the CERN-PS TOF Facility.

The proposal represents a good description of an overall experimental project to check the general performance of the nTOF facility, and the experimental techniques associated with each aspect were considered adequate. The proposed measurements clearly represent a large investment of time and effort and it was felt that the details of these studies as well as their planning and implementation will need to be treated in greater depth than is the case in the present

proposal. The Committee will therefore recommend that the Research Board allocate the requested 7 weeks of test beam, and will also require the collaboration to make a better focused description of the planned programme of tests.

P115: Diffusion Mechanisms and Lattice Locations of Thermal-Equilibrium Defects in Si-Ge Alloys.

This was considered to be an interesting and worthwhile experiment in spite of the difficulty of obtaining dislocation-free alloys. The Committee therefore recommends that the requested 12 shifts be allocated.

P116: Isospin mixing in $N \approx Z$ Nuclei.

The experiment has interesting repercussions for the standard model and the Committee recommends an initial allocation of 10 shifts for the Cu and As experiments with the first (Nb) target. This should be followed by a progress report and a new request.

P117: Investigation of the impact of the $^{39}\text{Ar}(n, \alpha)^{36}\text{S}$ reaction on the nucleosynthesis of the rare isotope ^{36}S .

While ^{36}Ar is not of a primary importance in today's nucleosynthesis scenarios, this small experiment aimed at producing a target to be used in the ILL reactor, was considered worthwhile and the 6-shift request will be recommended to the Research Board.

P85 Add 1: Investigations of Deep-Level Fe-centres in Si by Mössbauer Spectroscopy.

It was considered that the proposed investigations of deep level Fe centres in Si were not of sufficient importance to warrant the requested allocation of shifts. Moreover, the Committee felt that insufficient explanation had been given on why the temperature dependence analysis described in the proposal could answer questions on the nature of the additional spectroscopic line.

P119: Laser Spectroscopy Studies in the Neutron-Rich Sn Region.

The group already has a good record and the physics motivation of the proposal was clearly presented. However, it was somewhat unclear as to where the boundary lies between test shifts and experimental ones. For this reason it was decided to recommend initially 12 shifts for the tests, and to ask the group to present an Addendum on the results of these before the Committee agrees to allocate beamtime for the experimental work.

P121: Precision study of the beta decay of ^{74}Rb .

The precision studies of the beta decay of ^{74}Rb were thought to be interesting. For the moment a 23 shift allocation will be recommended to the Research Board. According to the group's own estimate this will suffice to demonstrate the capacity i) of MISTRAL to significantly reduce the error bar of ^{74}Rb (11 shifts) and ii) of ISOLTRAP to reach an accuracy of 10 keV on the mass of ^{74}Kr (3 shifts). The remaining allocation (9 shifts) corresponds to the correlated analysis of the spectroscopy following beta decay of ^{74}Rb . The collaboration will be expected to present a progress report before the remaining shifts can be attributed.

P64 Add 3: Test of a high power target.

The value to ISOLDE of the proposed continuation of these target tests was recognized, and the full allocation of 15 further shifts will be therefore be supported.

OTHER BUSINESS

The following Proposals, Progress Reports and Letters of Intent have been received by the INTC:

P118: Charge radius measurement of the halo nucleus ^{11}Li .

P91 Add 2: Further Measurements of the $^7\text{Be}(p, \gamma)^8\text{B}$ cross section with an implanted radioactive ^7Be target and its implications for the solar-neutrino "puzzle".

P122: Three-particle breakup of ^{12}C in the beta-decay of ^{12}B .

I31: Letter of Intent: Studies of neutron-rich isotopes of bismuth, lead and thallium by means of a pulsed release element selective method.

The Committee took note of the Letter of Intent (I31) and encourages the collaboration to prepare a proposal on these lines.

The presentation of Proposal P120 (Probing the structure of very neutron-rich nuclei in the sd-pf shell by combined delayed neutron and gamma spectroscopy.), initially scheduled for the present meeting, has been postponed until the next one at the request of the spokesperson.

The next INTC meeting will be held on **15 May 2000**. Please note that the Open Session will exceptionnally start in the morning at **9:00 h.** in the Council Chamber, followed by the Closed session in the 6th floor Conference Room, and **will last all day**.

J. Eades
INTC Secretary, Tel.76 74273
John.Eades@cern.ch

INTC Secretariat: Monique Budel (Bldg. 14/4-022) Tel.76 74270
Monique.Budel@cern.ch