

ISOLDE AND NEUTRON TIME-OF-FLIGHT
EXPERIMENTS COMMITTEE

Minutes of the fifteenth meeting
on February 24th 2003

OPEN SESSION

Juha Äystö, the newly appointed Chairman, opened the meeting by referring to the exciting times to come. The development of REX-ISOLDE is impressive as well as other ISOLDE and nTOF experiments. He then announced the agenda.

Mats Lindroos, the ISOLDE Technical Coordinator, described the ongoing shutdown and consolidation work. A major effort is being invested in understanding and developing the ion optics of the facility, such as emittance measurements of the ISOLDE ion sources and beam transport systems, and the development and construction of related instrumentation. Furthermore, the plans for a laboratory for handling of highly radioactive targets, an extended laboratory for the Solid State Physics community and an extension of the ISOLDE experimental hall were presented.

The ISOLDE Scientific Coordinator, Thomas Nilsson, updated the community on the status of hall 275 which has been refurbished for the purpose of ISOLDE off-line experiments. He then presented the parameters for the scheduling of radioactive beams where the planned upgrade of REX-ISOLDE to 3.1 MeV/u and the availability of RILIS expertise were the most severe limitations. Out of the requested 450 RIB shifts, an attempt had been made to schedule more than 350 shifts by extended use of push-pull and parallel operation.

P. Pavlopoulos, the nTOF collaboration Chairman, listed the measurements performed during 2002 and presented a planning for 2003. A range of capture experiments using $7 \cdot 10^{18}$ protons are to be performed, followed by two fission experiments on Th-cycle and transuranium isotopes respectively, where a proposal covering the latter is still to be submitted. A proposal is in preparation for the measurements in 2004 when a 4π calorimeter will be installed.

The following proposals were then presented:

1. Decay study for the very neutron-rich Sn nuclides, $^{135-140}\text{Sn}$ separated by selective laser ionisation; INTC 2003-004/P P113 Add. 2: Bill Walters.
2. Measurement of the $^8\text{Li}(\alpha, n)^{11}\text{B}$ Reaction; INTC 2003-005/P165: Michael Hass.

3. Magnetic Moments of Coulomb Excited 2^+_1 States for Radioactive Beams of ^{132, 134, 136}Te Isotopes at REX-ISOLDE; INTC 2003-003/P166: Karl-Heinz Speidel.
4. Production of rare earth isotope beams for radiotracer-DLTS on SIC; INTC 2003-006/P167: Gunnar Pasold.
5. Delayed particle study of neutron rich lithium isotopes; INTC 2003-009/P169: Olof Tengblad.
6. Coulomb excitation of neutron deficient Sn-isotopes using REX-ISOLDE; INTC 2003-010/P170: Joakim Cederkall.

CLOSED SESSION

Present: J. Äystö (Chairman), P. Butler, P. Cennini, E. Chiaveri, C. Détraz, K. -H. Langanke, M. Lewitowicz, K. -P. Lieb, M. Lindroos, T. Nilsson (Secretary), H. Ravn, J. -P. Riunaud, B. Rubio, D. Schinzel, J. Suhonen, D. Warner

Apologies: J. -P. Duraud, M. Hauschild, H. -J. Kluge, E. Migneco, E. Radermacher, W. Scobel

1. INTRODUCTION

The Chairman opened the session by reporting back on the 162nd meeting of the Research Board concerning INTC matters. The Research Board had pointed out that in the case of P160 (IS413), a progress report after the first year of this programme would be required.

The minutes of the fourteenth meeting were discussed and approved after the addition of the phrase “The Committee expects a progress report after the first year’s measuring campaign.” in the paragraph on proposal P160.

2. DISCUSSION ON THE DELIVERED SCIENTIFIC AND TECHNICAL REPORTS FOLLOWED:

ISOLDE Technical and Scientific report

The Committee took note of the progress of the ISOLDE shutdown and consolidation work. On a question whether higher order corrections could be applied to obtain high mass resolution of the HRS, Mats Lindroos replied that this was probably not feasible using the current hardware but that much progress had been made to routinely obtain medium resolution conditions. The progress of the planned upgrade of REX-ISOLDE to deliver beams at 3.1 MeV/u was discussed in the context of ISOLDE scheduling. Thomas Nilsson pointed out that the current schedule allowed for performing the upgrade but left flexibility to also execute a full physics programme using REX-ISOLDE at the current energy 2.2 MeV/u in case of delays. In view of the foreseen increase of submitted proposals for experiments at REX-ISOLDE, the Chairman reminded the Committee that the backlog of approved experiments had to be continuously monitored.

Concerning REX-ISOLDE, the Chairman reported on the reception of the position document discussed in the fourteenth meeting of the Research Board. Claude Détraz, who had been requested to follow up the proposed actions and subsequently inform the Research Board and the INTC, gave a report on the current status. The Committee **reiterated its commitment** to REX-ISOLDE becoming a long-term CERN facility.

nTOF Scientific report

The performance document describing the nTOF facility had undergone modifications according to what had been requested in the fourteenth meeting. The referees were satisfied with the document in its current state and the Chairman repeated its importance for considering forthcoming proposals. The Committee **took note** with pleasure of its existence. Concerning the beam-time planning proposed in the open session, the Committee found this virtually identical to the planning shown in the fourteenth meeting. Updated information provided by the SPS/PS coordinator indicated that the number of protons available for nTOF during 2003 will be compatible with this planning. Claude Détraz mentioned that the next SPC meeting would hold a first discussion on the future of the CERN fixed target physics. In this context, the long-term future role of nTOF would have to be clarified, i.e. whether it would remain limited in scope or evolve into a general neutron facility of high scientific standards. He stressed the importance of the input from the INTC on these matters. The Chairman stated that the Committee was **looking forward** to an inflow of interesting proposals.

3. DISCUSSION ON THE OPEN SESSION

The presentations of the new proposals made during the open meeting were then discussed.

P166 (CERN/INTC 2003-003): *Magnetic Moments of Coulomb Excited 2^+_{1} States for Radioactive Beams of $^{132, 134, 136}\text{Te}$ Isotopes at REX-ISOLDE*

The proposed g-factor measurements in neutron-rich Te and Xe isotopes were considered timely and highly interesting and the group competent to perform them. Thus, the scientific case was strongly supported and an allocation of 30 shifts will be **recommended** to the Research Board. However, the influence of isobaric contaminants present in the REX-ISOLDE beam is to be clarified within 12 initial shifts of the project using the cases ^{138}Xe and $^{132,134}\text{Te}$, after which a status report is requested.

P167 (CERN/INTC 2003-006): *Production of rare earth isotope beams for radiotracer-DLTS on SiC*

The proposal envisages using the first accelerating part of REX-ISOLDE to implant energetic radioactive ions for Photoluminescence and Deep Level Transient Spectroscopy in the semiconductor SiC. The Committee found the proposed measurements scientifically interesting and highlighted the importance of the additional time information obtained by combining established methods with radioactive decay. Furthermore, it pointed out the world-wide lack of other implanters for radioactive ions in the relevant energy range. Nevertheless, the Committee requested a status report in the form of an addendum after half of the requested shifts have been used. An initial allocation of 8 shifts will thus be **recommended** to the Research Board.

P113 Add. 2 (CERN/INTC 2003-004): *Decay study for the very neutron-rich Sn nuclides,¹³⁵⁻¹⁴⁰ Sn separated by selective laser ionisation*

The addendum requested additional beam time for investigating very neutron-rich Sn isotopes. Since the physics case had been approved earlier, the discussion focussed on the feasibility of the proposed measurements. It was clear to the Committee that the project had approached the limit of exhausting the current technical capabilities of the facility concerning neutron-rich Sn beams and that further progress would be awaiting major developments of tailored target-ion source systems and would necessitate a new proposal. However, the Committee considered it worthwhile to attempt another measurement of the decay of ¹³⁷Sn, using the HRS, and **recommended a final allocation** of 8 shifts.

P165 (CERN/INTC 2003-005): *Measurement of the ⁸Li(α ,n)¹¹B Reaction*

The proposal aimed at studying low-energy (α ,n)-reactions using an accelerated ⁸Li beam from REX-ISOLDE. The Committee found the proposal neither scientifically nor technically convincing. The proposed measurements were considered to be at too high energy to bear any significant interest for the inhomogeneous Big Bang nucleosynthesis and pointed out that the TRIUMF-ISAC facility was better tuned to study astrophysical questions like this. Thus, the proposal was **not approved**. In the following discussion, the scientific potential, both for astrophysics and condensed matter physics, of a possible low-energy facility at ISOLDE was pointed out.

P169 (CERN/INTC 2003-009): *Delayed particle study of neutron rich lithium isotopes*

The proposed decay spectroscopy experiment on ¹¹Li was considered interesting due to the complexity of the many decay channels, but the Committee could not fully appreciate from the presentation what could be learned about the halo structure in the measurements. Nevertheless, it noted that any further information concerning the structure of ¹¹Li, being a benchmark system for halo phenomena, would be worthwhile to gather. The Committee considered the experimental set-up and the proposed measurements to be complicated and ambitious enough to warrant the full requested beam allocation of 30 shifts to be **recommended** to the Research Board.

P170 (CERN/INTC 2003-010): *Coulomb excitation of neutron deficient Sn-isotopes using REX-ISOLDE*

The proposal concerns Coulomb excitation experiments on neutron-deficient ^{108,110}Sn using REX-ISOLDE. Although noting that investigations of even more neutron-deficient Sn-isotopes would be even more interesting, approaching the doubly-magic ¹⁰⁰Sn, the Committee found the scientific case highly recommendable and an important intermediate step until lighter Sn-isotopes become available. Thus, the scientific case and the proposed experimental technique were recommended. Furthermore, the Committee noted with enthusiasm the possible yield increase attainable by the development of a Ce₂S₃-target mentioned in the proposal, although the existing beam intensities were sufficient. Since this development is of general interest for a range of experiments and could eventually enlarge the physics scope of the proposal, the Committee requested the proponents to participate in on-line tests of this target type. **Pending a written report** to the Committee on the conclusions drawn concerning the proposed measurements, the recommendation to the Research Board was **postponed**.

P147 Add. 1 (CERN/INTC 2003-007): *High accuracy mass measurement of the very short-lived halo nuclide ${}^7\text{Li}$*

The addendum requested an additional shift allocation to further ameliorate a mass measurement on ${}^7\text{Li}$ using the MISTRAL spectrometer. The project had started during 2002 and yielded a preliminary result which confirmed earlier data obtained by other methods. The Committee expressed doubt whether a better mass determination was needed, since theoretical calculations were considerably less accurate than the already measured value. Furthermore, the Committee asked for clarification on some technical issues. The proponents were asked to provide answers to the questions before the next meeting; **pending these answers the decision was postponed.**

I-045 *Measurement of nuclear moments of short-lived magnesium isotopes by β -NMR spectroscopy*

The proposed measurements of nuclear moments of short-lived magnesium isotopes were scientifically well justified. Thus, the Committee **took note** of the Letter-of-Intention.

The next meeting is on **Monday May 19, 2003** and the deadline for submission of proposals is **Friday, April 18, 2003.**

The dates of the remaining INTC meetings are:

22-23 September
24-25 November

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