

***FP7 – RESEARCH INFRASTRUCTURE FOR NUCLEAR PHYSICS***  
***European Nuclear Science and Applications Research (ENSAR)***  
***Transnational Access to ISOLDE***  
**Grant agreement no: 262010**

## **3.2 TRANSNATIONAL ACCESS TO CERN-ISOLDE**

### **3.2.1 PUBLICITY CONCERNING THE OPPORTUNITIES FOR ACCESS UNDER THE GRANT AGREEMENT**

The measures taken to publicise the opportunities for access are:

- a dedicated web site: <http://www.cern.ch/isolde>  
On the web site it is described:
  - Who can apply
  - How to apply
  - Call for Proposals
  - Financial Support
  - Application Form
  - Structure and Services of the research infrastructure
- group leaders of scheduled projects are informed via email
- the user community is informed at the annual user meeting
- international workshops/conferences are used to inform a wider scientific community

### **3.2.2 SELECTION PROCEDURE**

#### **3.2.2.1 Users Selection Panel**

ISOLDE is open to international user groups. A written proposal has to be submitted to apply for access to the experimental facilities. Proposals are reviewed by an international Program Advisory Committee (PAC): the ISOLDE Neutron Time-of-Flight Committee (INTC). After open-session oral presentations by the proponents the INTC evaluates the proposal and presents recommendations to the CERN Research Board which decides whether to approve or reject the proposal.

The INTC presently has 11 members from external institutes or universities. These members are experts in topics related to the physics activities of the facilities (nuclear structure physics, weak interactions, nuclear astrophysics, solid state physics, life sciences). There are also 12 ex-officio members from CERN in the INTC. The CERN research board has 18 members.

After the approval of an experiment the user group can apply for funding from the transnational access program. A specific users selection panel reviews the applications and decides on the subsistence person-days that can be allocated to the experiment in question.

All users have access to the decisions of the INTC via the CERN website. In case a proposal is rejected the proponents are informed about the scientific/technical or other reasons for not

accepting the proposal (e.g. eligibility). Proponents may after considering the comments by the committee submit revised proposals.

Please find in Annex 1 (Database) the list of the Selection Panel members for the reporting period.

### **3.2.2.2 Selection Panel meetings**

In 2010 there was one meeting held at CERN: 30/08/2010

In 2011 there were two meetings held at CERN: 12/04/2011 and 04/08/2011

### **3.2.2.3 Selection criteria**

The Users Selection Panel bases its selection on scientific merit, following the prescriptions of Annex III of the contract, Article III.3.6.

## **3.2.3 TRANSNATIONAL ACCESS ACTIVITY DURING THE REPORTING PERIOD**

During the 1<sup>st</sup> reporting period from September 2010 to February 2012 a total of 51 projects were supported. A total of 3618.4 beams hours were delivered; 213 individual users were paid a total of 1237 subsistence days while at ISOLDE. While the majority of users come from the field of physics, the fields of chemistry and biology are also represented.

Three projects either did not receive the scheduled beam or the beam received was considered as test beam and will be rescheduled during the 2<sup>nd</sup> period of the ENSAR project.

Please find in Annex 2 (Database) the list of user-projects for which costs has been incurred in the reporting period.

Please find in Annex 3 (Database) the list of users in the reporting period.

## **3.2.4 SCIENTIFIC OUTPUT OF THE USERS AT THE FACILITY**

Please find in Annex 4 the list of publications that have appeared in peer-reviewed journals during the reporting period (or peer-reviewed conference proceedings) and resulting from work carried out under the TA activity. The current program started in September 2010. Publications from experiments taking place during this reporting period are thus under preparation. Keeping in mind the time scale of experiments of the kind performed at the facility one may expect that data analysis and publication of the results require typically one to two years.

Below are highlights of important results from the user-projects supported under the grant agreement during the 1<sup>st</sup> reporting period:

The highlights provided by Penning-trap systems were: the first high-statistics run on <sup>35</sup>Ar for the WITCH spectrometer searching for weak-interaction components beyond the Standard Model and the mass and half-life measurement of <sup>82</sup>Zn – relevant for the nuclear shell model, for the composition of neutron stars, and for the models of rapid-neutron

capture for nucleosynthesis – with the ISOLTRAP setup. In addition, ISOLTRAP has identified a new nuclide, namely  $^{233}\text{Fr}$ .

The MINIBALL gamma-ray spectrometer was used for very successful one- and two-neutron transfer reactions on neutron-rich  $^{44}\text{Ar}$ ,  $^{66}\text{Ni}$ ,  $^{72}\text{Zn}$ ,  $^{78}\text{Zn}$ , and  $^{11}\text{Be}$  nuclei, where the latter was delivered with a record intensity for almost a full week. The above studies can reveal the single-particle nature of the involved nuclear states, and can thus contribute to our understanding and improvement of the nuclear shell model. MINIBALL studied also Coulomb excitation of  $^{98}\text{Sr}$ ,  $^{128}\text{Cd}$ , and light Pb isotopes, which will reveal the shapes of these nuclei.

The alpha-decay system, best known for identifying an unexpected fission mode in Hg isotopes, was used to determine beta-delayed fission of light Fr isotopes and charge radii of very neutron-deficient Tl isotopes.

Among laser-based studies, the COLLAPS setup allowed determining the charge radius of very exotic  $^{12}\text{Be}$  relative to that of  $^{11}\text{Be}$ , known to be a “halo” nucleus with the last neutron located very far away from the nucleus centre. It was also used to collect good data on the spins, radii, and moments of light  $^{63-70}\text{Ga}$ , neutron-rich  $^{51}\text{K}$ , and heavy Cd isotopes, all relevant for the nuclear shell model. The laser ionization technique (RILIS) was employed for successful studies of At ionization scheme and the first-time determination of its ionization potential. It also allowed for searches of long-lived isomers in  $^{201-205}\text{Au}$  isotopes, which were laser-ionized for the first time.

The solid state studies covered diffusion in semiconductors and metallic compounds and online emission-channeling studies using  $^{27}\text{Mg}$  and  $^{65}\text{Ni}$  as probes. The perturbed angular correlation technique was used in biophysics studies with  $^{199\text{m}}\text{Hg}$  on proteins and bacteria, for local probing on graphene and fullerenes, and for functionalized nanoparticle applications. Mössbauer spectroscopy on  $^{119}\text{In}$  clarified some conflicting results in the literature and looked at  $^{56}\text{Mn}$  for potential spintronics applications. Finally, Tb isotopes from ISOLDE were used successfully for cancer diagnosis and therapy at the PSI Institute close to Zurich.

### 3.2.5 USERS MEETINGS

During the 1<sup>st</sup> reporting period from September 2010 to February 2012 two users meetings took place at CERN. The first was held 8-10 December 2010 and was attended by 85 people of whom 78 were users (<https://indico.cern.ch/conferenceDisplay.py?confId=107080>). The second was held 5-7 December 2011 and was attended by 104 people of whom 98 were users (<https://indico.cern.ch/conferenceDisplay.py?confId=153820>).

## **ANNEXES**

### **Annex 1 Composition of the Users Selection Panel**

See “Selection Panel” in MS Access Database

### **Annex 2 List of User-Projects**

See “List of User-Projects” in MS Access Database

### **Annex 3 List of Users**

See “List of Users” in MS Access Database

### **Annex 4 List of Publications (from work carried out under the Transnational Access activity)**

See “List of Users’ Publications” in MS Access Database