

Professor Münzenberg a new honorary doctor of JyU



Professor Gottfried Münzenberg from GSI Darmstadt has been awarded the degree of honorary doctor by the University of Jyväskylä and the Faculty of Mathematics and Science. For a long period of time, Prof. Münzenberg has contributed significantly to research work and education in the JYFL Accelerator Laboratory. He has served as a member of the Academy Follow-up Committee and the Program Advisory Committee as well as an opponent in a doctoral dissertation. His considerable expertise in designing and running various world class recoil separators has strongly benefited the work of the JYFL research groups.

Pelletron group strengthened by a new senior member



In June 2013 Dr. Kai Arstila started as senior researcher at JYFL. His background is in basic ion-matter interaction studies and ion beam analysis, but before coming to Jyväskylä he specialized in optical and electrical measurements of thin films and nanostructures at Imec in Leuven.

Volker Sonnenschein has won the 2013 LA³NET prize



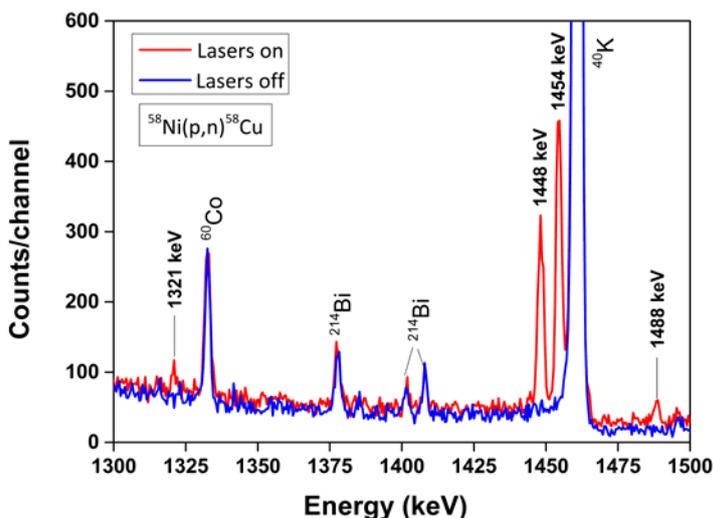
LA³NET is an FP7 Marie Curie Initial Training Network (ITN) aiming to develop beyond the state-of-the-art techniques

and technologies through a joint inter-sectoral training programme for early stage researchers in the areas of the exploitation

of Lasers for Applications at Accelerator facilities. Each year a prize of 1000€ is awarded to a young scientist judged to have made an outstanding contribution to research into the application of lasers at accelerator facilities. A number of strong applications were submitted for the 2013 prize and we are very pleased that Volker Sonnenschein of the IGISOL group is to receive the award. Volker has made a number of important developments related to solid state laser technology applicable to both radioactive ion beam production and spectroscopy. He has also supported the transfer of these technologies via collaborative work with other leading groups, to facilities including ISOLDE (CERN), GANIL, Mainz, Leuven and RIKEN.

First resonant photo-ionization of radioactive ions at IGISOL-4

Resonance photo-ionization with high power pulsed lasers provides in principle isotopically and isomerically pure beams, using the unique atomic fingerprint to selectively excite and ionize the atom of interest. In the past year the IGISOL-4 facility has been undergoing an intense period of re-commissioning. In an important milestone for the laser ion source, the first on-line test has been performed using the dual-chamber gas cell and a $^{58}\text{Ni}(p,n)^{58}\text{Cu}$ reaction to produce ^{58}Cu ($t_{1/2}=3.2$ s). Resonant photo-ions were produced in a two-step ionization scheme. The figure compares the resulting gamma ray spectrum measured just after the focal plane of the mass separator comparing the effect of having lasers “on” with lasers “off”. The ion guide was operated with argon rather than helium to encourage neutralization of the reaction products.



Gamma-ray spectra obtained just after the IGISOL focal plane when the mass separator was tuned to $A/Q=58$. Lasers are tuned for resonance ionization of copper (red) and with lasers off (blue). The characteristic γ peaks from the β decay of ^{58}Cu are indicated. Data was accumulated for one hour for both spectra.

The 11th IGISOL Workshop (SMI-13)

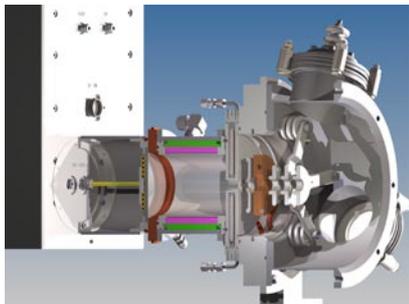
The IGISOL Workshop (or Conference on Stopping and Manipulation of Ions) series originally started in Konnevesi, Finland, in 1986. The 11th Workshop in the series was organized in Jyväskylä 11-13 June 2013 in the premises of Department of Physics, a half day excursion to the accelerator laboratory and the renovated IGISOL 4 facility being an essential part of this “homecoming” workshop.

The scope of IGISOL Workshops has been in the techniques related to the stopping of energetic ions in noble gases and the use of noble gases to manipulate ions and atoms. Altogether 22 presentations concentrated mostly on statuses of different facilities and development of techniques. Essentially all the presentations were followed by very vivid discussions among the 25 international and about 20 local

participants, which certainly made this workshop a meeting to remember.

The next workshop will be organized in Lanzhou, China, in 2 or 3 years (2015 or 2016, respectively). In case of force majeure, Texas A&M will take the responsibility of the 12th IGISOL Workshop.

Ion source development



The H-/D- ion source delivered with the MCC30/15 cyclotron is a conventional filament-driven multicusp arc discharge source. The ion source is capable of continuous operation at 1 mA H⁻ output for

about 130 hours before filament failure. This is unacceptably low as the filament renewal takes significant time because access to the cyclotron vault where the ion source is located is restricted after activation.

A project to develop a 13.56 MHz radiofrequency ion source, RADIS, for the cyclotron was initiated in March 2011. The main purpose of the upgrade is to increase the maintenance interval of the ion source by eliminating the filament cathodes. After initial troubles with RF leakage were solved, the ion source has demonstrated production of 1 mA H⁻ beam, which is the beam intensity goal set for the project. The development continues with beam transport studies and reliability measurements.

SAB-CoE Meeting

The meeting of the Science Advisory Board of the Finnish Centre of Excellence (CoE) in Nuclear and Accelerator based physics (2012-2017) was held on 7th of May, 2013. The ordinary members of the SAB are professor Witold Nazarewicz from the University of Tennessee, USA and Head of the Science Division at TRIUMF Reiner Krücken, Canada.

The observer members are Professor Pekka Koskela and Dr. Sirkka-Liisa Korppi-Tommola from JyU, Professor Jukka Pekola and science adviser Jari Liimatainen representing the Academy of Finland. On the basis of what SAB read and heard they could assure the Academy of Finland that the CoE is successful, judged by the highest international standards.

Shipment of the MARA deflector to JYFL is approaching

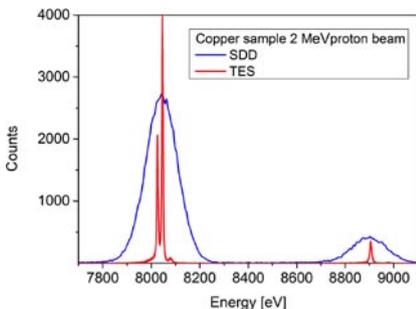
All the deflector parts including a vacuum tank, electrodes, support structures and high voltage (250 kV) feedthroughs are manufactured and the assembly of the parts is in progress in Danfysik. The vacuum tank having a volume of about 4 m³ has been tested and a vacuum level of 10⁻⁸ mbar has been reached with a single turbo pump. During the next days the deflector will be moved into the vacuum tank and the alignment of all parts including the HV feedthrough are to be checked. After the final vacuum and full high voltage tests the deflector will be transported to Jyväskylä.



Right: Juha Uusitalo is visually checking the alignment of the MARA deflector plates.

Recent activities at Pelletron

PIXE measurements with superior energy resolution at JYFL



In May 2013 the first particle induced X-ray emission (PIXE) spectra were collected at Pelletron using the transition edge sensor (TES) and in close collaboration with Prof.

Ilari Maasilta's group from the Nanoscience Centre. The instrumental resolution of 3.06 eV at 5.9 keV will allow to determine both chemical and elemental information from, for instance, ALD thin films.

TOF-E telescope to be delivered to Imec

A Time-of-Flight - Energy telescope for heavy ion elastic recoil detection analysis (HI-ERDA) will be delivered to Imec in Belgium by the end of year 2013. This detector is developed at JYFL Accelerator laboratory and this commercial delivery demonstrates the state-of-the-art level of the detector technology at the Pelletron group and further strengthens the collaboration between Imec and Accelerator laboratory in the field of ion beam analysis.

POTKU software developed for HI-ERDA analysis

An important part in unleashing the full capability of the HI-ERDA technique is access to a powerful and user-friendly analysis software. To achieve this goal a collaborative project was carried out during spring 2013 between IT department of JyU and the Pelletron group. The resulting open source POTKU software was thoroughly tested and further developed during summer 2013, and it will be internationally reported in ECAART-11 conference in Namur, Belgium, on September.

High participation in the JSS course Elemental Depth Profiling of nm Thick Films

In August 2013 a Jyväskylä Summer School course organized by the Accelerator Laboratory had more than 30 participants. The lecturers of the course were Jari Malm, Kai Arstila and Timo Sajavaara. In addition to class lectures, the course included a lab exercise in which 10 nm thick atomic layer deposited (ALD) Al₂O₃ film was depth profiled, and also an excursion to Mecania Automation in Jyväskylä, where the JYFL ALD tool was under construction.



Next Call for Proposals

Deadline: September 15, 2013

The next deadline for submission of proposals and letters of intent is September 15, 2013. **Proposals should include an abstract/summary.** A justification of the beam time requested, based on cross-sections, detector efficiencies, etc. should be given. If a proposal is the continuation of an existing experimental program at the JYFL Accelerator Laboratory, a summary of the status of the project should be included. Proposals and letters of intent should be sent (preferably as a postscript or pdf file) to the Program Advisory Committee secretary Mikael Sandzelius (address: see below)

and include the Proposal Summary Sheet mailed with this Newsletter. This form is also available from the JYFL WWW-pages. You are encouraged to contact anyone in the Contact List at the end of this Newsletter for more information.

From 1st September 2010, the JYFL Accelerator Laboratory is one of the EU-FP7-IA-ENSAR-Infrastructures offering a certain amount of supported access to the users from the EU and associated countries.

Requests for such support (travel and living expenses during experiments) should

be attached to the scientific proposal.

All publications resulting from work done at the Accelerator Laboratory should also contain the following acknowledgement:

This work has been supported by the EU 7th framework programme "Integrating Activities - Transnational Access", project number: 262010 (ENSAR) and by the Academy of Finland under the Finnish Centre of Excellence Programme 2012-2017 (Nuclear and Accelerator Based Physics Research at JYFL).

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