Contribution ID: **63** Type: **Invited Presentation**

Recent Technical Developments and New Scientific Endeavors at IGISOL

Thursday, 1 June 2017 14:00 (15 minutes)

Since the successful commissioning of the IGISOL-4 facility, Jyväskylä, throughout 2012-2014 [1], we have moved towards full operation. The gradual evolution of the ion guide method for a universal production of both volatile and non-volatile elements has been driven by the pursuit of physics research on both sides of the valley of beta stability. The on-going development of new ion (and atom) manipulation techniques as well as new production methods at IGISOL-4 has been driven by the needs of the evolving scientific program.
This contribution will provide an overview of the current status of developments as well as highlighting new themes of research. In collaboration with Uppsala University we have been simulating the fission process to understand the stopping and extraction efficiency of the ion guide used for proton-induced fission [2]. Importantly, this also supports and guides our experimental progress towards neutron-induced fission. The latter has seen the characterization of neutron energies and intensities at different angles using neutron activation and time-of-flight methods [3]. In December 2016 we successfully extracted stopped fission fragments products using neutron-induced fission for the first time.
In order to provide a variety of stable beams of elements required for laser spectroscopy as well as mass spectrometry, an off-line ion source which combines discharge-, surface ionization and (in the future) laser ablation, has been commissioned.
A core theme of the facility is the program of optical spectroscopy and laser developments. I will summarize the current status of our expansion of the solid state laser infrastructure for use in collinear laser spectroscopy. Exciting new programs include laser ionization of long-lived actinide isotopes coupled with high-resolution spectroscopy [4,5], as well as a new research theme in cold atom physics. This latter theme, led by University College London, has seen the installation of a new atom trap with the goal of achieving coherent gamma-ray emission via a Bose-Einstein Condensate of 135mCs isomers.
References:
[1] I.D. Moore et al., Nucl. Instrum and Meth. In Phys. Res. B 317 (2013) 208.
[2] A. Aladili et al., Eur. Phys. J. A 51 (2015) 59.
[3] D. Gorelov et al., Nucl. Instrum and Meth. In Phys. Res. B 376 (2016) 46.
[4] I. Pohjalainen I.D. Moore et al., Nucl. Instrum and Meth. In Phys. Res. B 376 (2016) 233.
[5] A. Voss, I.D. Moore et al., submitted to PRA (2016).

Primary author: Prof. MOORE, Iain (University of Jyväskylä)

Co-authors: Dr VOSS, Annika (University of Jyväskylä); Dr KANKAINEN, Anu (University of Jyväskylä); Prof. JOKINEN, Ari (University of Jyväskylä); Dr NESTERENKO, Dmitrii (University of Jyväskylä); Dr PENTTILÄ, Heikki (University of Jyväskylä); Mr POHJALAINEN, Ilkka (University of Jyväskylä); Ms CANETE, Laetitia (University of Jyväskylä); Dr REPONEN, Mikael (University of Jyväskylä); Dr RINTA-ANTILA, Sami (University of Jyväskylä); Ms GELDHOF, Sarina (University of Jyväskylä); Dr ERONEN, Tommi (University of Jyväskylä)

Presenter: Prof. MOORE, Iain (University of Jyväskylä)

Session Classification: Breakout 1