Contribution ID: **53** Type: **Poster**

Characterization and Diagnostic Tools for the RFQ-based Low Energy Beamline of the FRS Ion Catcher

Tuesday, 9 June 2015 18:30 (1h 30m)

At the FRS ion catcher facility, in-flight separated exotic ions are produced by projectile fragmentation or fission, thermalized in a cryogenic stopping cell (CSC), extracted by using DC and RF fields and transported though a versatile RFQ beamline to a multiple-reflection time-of-flight mass spectrometer (MR-TOF-MS) where mass measurements and isobar or isomer separation for mass selective decay spectroscopy can be performed.

In the vicinity of gas-filled stopping cells, pressures are typically too high for efficient ion transport using an electrostatic beamline. A compact (~1 m length) RFQ-based beamline enables efficient ion transport, identification, mass separation, cooling, bunching, beam mixing and beam splitting. The beamline can easily be divided in two independent vacuum domains by using a gate valve and a movable platform where RFQs are mounted. The resolving power of an RFQ mass filter included in the beamline is as high as > 100 at a pressure of up to 10-2 mbar allowing a mass-dependent characterization of the extraction efficiency of the CSC. A novel component in the beamline is an RFQ-based switchyard, which allows beam splitting into five different directions, for example, splitting thermalized ions from the CSC to two different detectors for simultaneous α-spectroscopy and mass spectrometry, as well as mixing five different beams into one direction, for example, mixing thermalized ions from the CSC with calibrant ions for high accuracy mass measurements in the MR-TOF-MS.

Examples of the use of the characterization and diagnostic tools will be presented.

Primary author: Mr AYET SAN ANDRES, Samuel (GSI, Darmstadt)

Co-authors: Ms RINK, Ann-Kathrin (JLU, Gießen); Ms HORNUNG, Christine (JLU, Gießen); Prof. SCHEIDENBERGER, Christoph (GSI, Darmstadt); Dr HAETTNER, Emma (GSI, Darmstadt); Mr GREINER, Florian (JLU, Gießen); Prof. GEISSEL, Hans (GSI, Darmstadt); Mr MISKUN, Ivan (Tomsk Polytechnic University); Mr REITER, Moritz Pascal (JLU, Gießen); Dr PURUSHOTHAMAN, Sivaji (GSI, Darmstadt); Dr DICKEL, Timo (GSI, Darmstadt); Dr PLAß, Wolfgang (GSI, Darmstadt)

Presenter: Mr AYET SAN ANDRES, Samuel (GSI, Darmstadt)

Session Classification: Poster session

Track Classification: Instrumentation