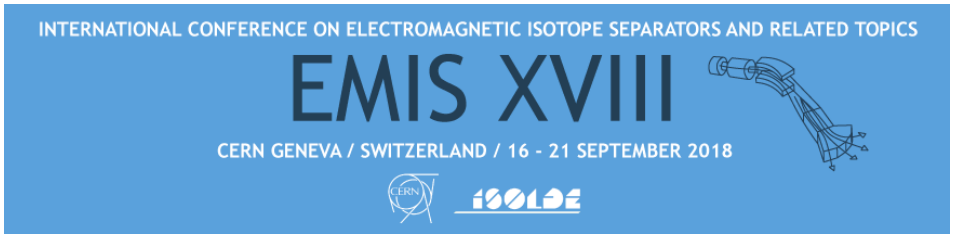

Contribution ID: **39** Type: **Invited**

Re-acceleration of Rare Isotope Beams at Heavy-Ion Fragmentation Facilities

Thursday, 20 September 2018 11:00 (30 minutes)

Heavy-ion fragmentation facilities provide a wide range of rare isotope beams of most chemical elements, as the in-flight production is fast and chemistry independent. Rare isotopes are delivered at half the speed of light are used for a wide set of nuclear science experiments. In order to leverage the advantages of the production mechanism for experiments that require lower energies and high-quality beams, beam stopping and reacceleration needs to be employed. The first re-acceleration system at a heavy-ion fragmentation facility in the world is ReA3 at the National Superconducting Cyclotron Laboratory (NSCL) at Michigan State University. Beams of rare isotopes are produced and separated in-flight in NSCL's Coupled Cyclotron Facility (CCF) at energies of typically 100 MeV/U and subsequently stopped in a gas cell. The rare isotopes are then continuously extracted as 1+ ions and transported into a beam cooler and buncher, followed by a charge breeder based on an Electron Beam Ion Trap (EBIT). In the charge breeder, the ions are ionized to a charge state suitable for acceleration in a superconducting radiofrequency (SRF) linac and then extracted in a pulsed mode and mass analyzed. The extracted beam is bunched to 80.5 MHz and then accelerated to energies ranging from 300 keV/u up to 6 MeV/u, depending on their charge-to-mass ratio. This contribution will present the state of art of this technique, advantages and disadvantages, results obtained so far and discuss developments.

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