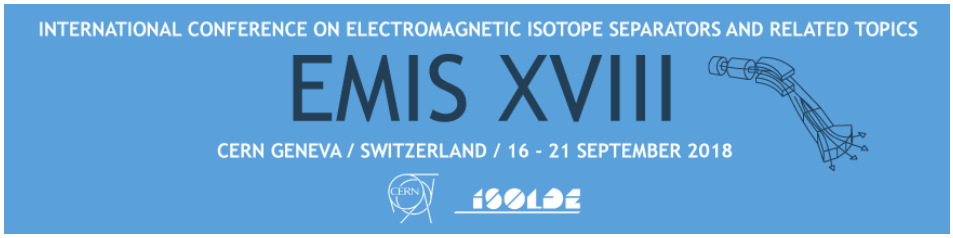

Contribution ID: **7** Type: **Invited**

SPIRAL2/DESIR High Resolution Separator

The DESIR (Désintégration, Excitation et Stockage d'Ions Radioactifs) facility is part of the new equipment necessary for the exploitation of the radioactive beams produced by SPIRAL2. DESIR includes a laboratory equipped with beam lines for low-energy experiments that can receive nuclides from the SPIRAL1, SPIRAL2 and S3 installations at GANIL. DESIR also includes an important instrument for beam purification: a high-resolution mass separator (HRS) for high-intensity beams. A two-stage magnetic dipole mass separator has been designed for 60-keV beams up to mass number 300 (rigidity of 0.61 T-m). The mass dispersion allows a maximal resolving power of m/Δm of 20000 for a 1π-mm-mrad beam emittance, taking into account high order aberrations, misalignment effects and mechanical tolerances. The small emittance is achieved using a buffer-gas-filled, linear quadrupole ion guide called SHIRaC in front of the separator.
The design consists of two 90-degree magnetic dipoles (D) with 36-degree entrance and exit angles, matching quadrupoles (MQ), focusing sextupoles (FS), focusing quadrupoles (FQ), and one multipole (M) with the configuration QQSQDMDQSQQ. Mirror symmetry is imposed with respect to the mid-plane to minimize aberrations. Focusing and corrective elements are all electrostatic and thus settings are independent of mass. Several ion optics codes have been used to verify the coherence of the optical solutions and to cross check the predicted performances. The different codes include: COSY INFINITY, TRANSPORT, GALOP, ZGOUBY and GICOSY, with calculations up to 5th order for some of them. The design of the HRS relies on a strong optical focusing for a wide illumination of small dipoles in order to minimize the size of the separator. This optical condition makes the system more sensitive to the fringe field effects and to the homogeneity of the dipole field. The magnetic dipoles include the possibility of easily changing magnetic edges to refine the minimization of aberrations.
The HRS has been already constructed and installed at CENBG, including all command control systems. The commissioning started in 2018 and first results of the performance of the separator will be presented.

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