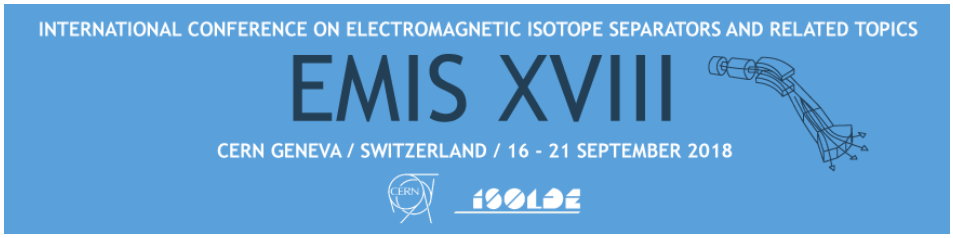

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Development of gas filled dipole magnet for FIPPS phase 2

Monday, 17 September 2018 17:30 (1 minute)

FIPPS (FIssion Product Prompt gamma-ray Spectrometer) is a new instrument of ILL for the gamma-ray spectroscopy of nuclei produced by thermal neutron induced reactions. In the current stage, FIPPS consists of an array of 8 HPGe clover detectors and a pencil-like intense thermal neutron beam.
The next phase of FIPPS aims to study i) Nuclear structure of neutron-rich nuclei far from stability produced in neutron induced fission. ii) Fission of heavy elements to explore the dynamics of the fission process. To study these under optimum conditions, ancillary devices are required to increase the sensitivity and selectivity of fission fragment detection with a good efficiency.
In FIPPS phase 2 the existing FIPPS HPGe-array will be complemented by an anti-Compton shield. Moreover, a Gas-Filled-Magnet (GFM) with a moderate mass separation (< 4 amu) [1] and a large acceptance (> 50 msr) of fission fragments will be installed. The conventional homogenous field magnet has been compared with an innovative design based on 1/r magnetic field with arc-shaped pole edges to assure point-to-point focusing of fission fragments over very wide acceptance. Thus requirements for tracking of ions are strongly relaxed.
The design of the GFM spectrometer with magnetic field calculation of the dipole magnet will be presented. Characteristics of the GFM for detecting fission fragments were studied by Monte-Carlo simulation using GEANT4, based on test experiments at LOHENGRIN [2], will be presented.
[1] H. Lawin et al., Nucl. Inst. and Meth. 137 (1976) 103-117
[2] A. Chebboubi et al., Nucl. Inst. and Meth. B 376 (2017) 120-124

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