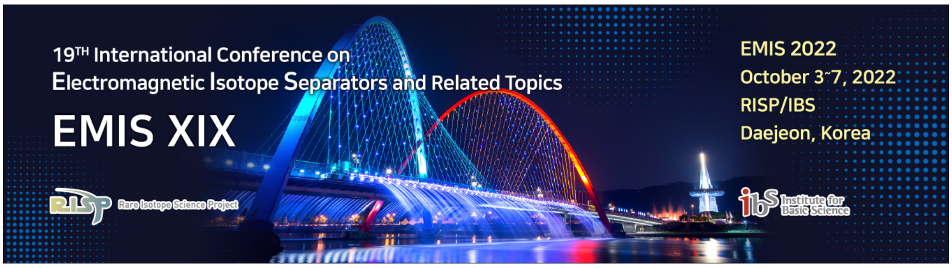

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Ion optical simulation for the NEXT solenoid separator at AGOR

Monday, 3 October 2022 21:50 (8 minutes)

The NEXT project aims to study Neutron-rich, EXotic, heavy nuclei produced in multi-nucleon Transfer reactions[1]. Part of the NEXT setup is a 3T superconducting solenoid magnet with a 90-cm wide and 1.6-m long bore. The magnet will be used to focus the transfer products of interest and to separate those from unwanted by-products as well as from the unreacted primary beam.
We developed a Python code to simulate the paths of ions through the magnetic field of the solenoid. The goal of the simulation is to determine the optimal layout of the separator to achieve the highest transmission efficiencies and strongest background suppression. The simulation requires a realistic description of the magnetic field in- and outside the solenoid. For this purpose, we implemented an interpolated approach. The trajectories of the ions through the magnetic field are determined through their emitting angles and magnetic rigidities. Therefore, we implemented the calculation of the charge state distribution in the code. As input data, our code requires the differential cross-section, the kinetic energies, and the emitting angles of the transfer products. So far, we have studied two reactions[2,3] in order to optimize the configuration of the NEXT separator:

- 136Xe+198Pt at 6 MeV/u to produce nuclei around the N=126 shell closure
- 48Ca+251Cf at 6.1 MeV/u to produce nuclei in the transfermium region

In this poster, we present an overview of our simulations and we highlight the most important results that determine the layout of the separator.

References

[1] J. Even, et al., The NEXT project: A step to the neutron-rich side (2022), submitted to Atoms.
[2] A. Karpov and V. Saiko, Phys. Part. Nucl. Lett 2019, 16, 667–670.
[3] A. Karpov and V. Saiko, EPJ Web of Conf. 2017, 163.

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