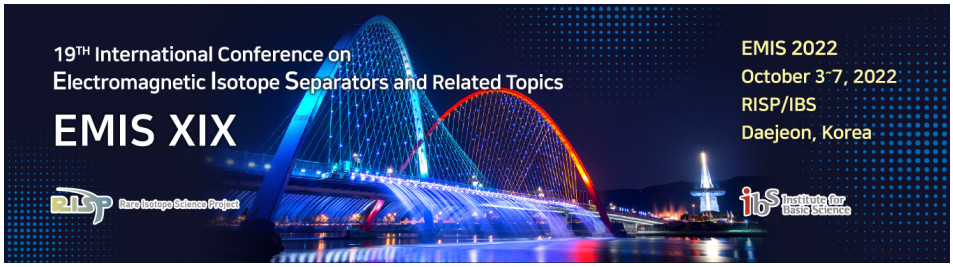

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What's NEXT? A setup for the production and separation of neutron-rich nuclei

Monday, 3 October 2022 17:42 (8 minutes)

Neutron-rich **EX**otic nuclei around the neutron shell closure at *N=126* and in the transfermium region are accessible via multinucleon **T**ransfer reactions which features relative high cross-sections. However, the wide angular distributions of the multinucleon transfer products lead to experimental challenges in their separation and identification.
In order to overcome these obstacles, we are building the NEXT experiment at the AGOR facility in Groningen. The AGOR cyclotron is capable to deliver high intense heavy ion beams at energies suited for transfer reactions. The production target for the transfer reactions is places inside a 3-T solenoid magnet. The bore of the solenoid is 160-cm long and 90-cm wide. Within this volume the transfer products are separated according to their magnetic rigidities. The isotopes of interest are focused to a gas catcher where they are slowed down. From the gas catcher the ions are transferred and bunched by a novel stacked-ring ion guide [1] into a Multi-Reflection Time-of-Flight Mass Spectrometer (MR-ToF MS) [2]. The MR-ToF MS provides isobaric separation and allows for precision mass measurements.
We will present an overview of the NEXT setup and the planned experimental program.

[1] X. Chen, J. Even, P. Fischer, M. Schlaich, T. Schlathölter, L. Schweikhard, and A. Soylu, Stacked-Ring Ion Guide for Cooling and Bunching Rare Isotopes, Int. J. Mass Spectrom. 477, 116856 (2022).
[2] M. Schlaich, Development and Characterization of a Multi-Reflection Time-of-Flight Mass Spectrometer for the Offline Ion Source of PUMA, Master's thesis, Technische Universität Darmstadt, (2021).

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