

The ISOL@MYRRHA Project in Belgium

Mittwoch, 10. Juni 2015 11:40 (20 Minuten)

ISOL@MYRRHA at SCK•CEN in Mol, Belgium, is a project for a next-generation Isotope Separation On-Line (ISOL) facility that will use a fraction of the proton beam of the MYRRHA accelerator to produce radioactive nuclei for fundamental and applied research. In the current conceptual design, ~0.2-mA beam of 600MeV will be used on a ruggedized target-ion source system, which allows the use of a range of materials (including actinides) dissipating the high power deposited by the beam. A two-stage mass separator incorporating a radio-frequency cooler and buncher will deliver high quality and high purity radioactive ion beams (RIBs) at an energy around 60 keV. An increase in RIB yields of up to two orders of magnitude for fission fragments may be reachable.

Currently, a full technical design of the facility is being prepared at SCK•CEN. The project is supported also through the Belgian Research Initiative on Exotic Nuclei (BriX), a network of the Interuniversity Attraction Poles (IAP) Programme, which brings together the Belgian expertise on nuclear physics, nuclear astrophysics and accelerator-driven systems.

An important requirement of the MYRRHA linear accelerator is reliability over long periods: the beam interruptions of more than 3 seconds should be limited to less than one every ten days, on typical cycles of three months of operation. This will allow stable operation of the ISOL@MYRRHA target-ion source for extended periods of time. The physics programme will take advantage of this feature prioritizing experiments which require extended beam times and operation in very stable conditions. The physics case of ISOL@MYRRHA is addressed in a number of dedicated workshops taking place yearly at SCK•CEN.

The availability of very long beam times is of interest for most of the research fields making use of RIBs. Examples include high-precision measurements for fundamental interaction studies, nuclear structure spectroscopy studies with very high resolution or studies of very rare phenomena, long systematic studies on samples for condensed matter and biology applications and systematic production of isotopes for nuclear-medicine studies.

This presentation will give an overview of ISOL@MYRRHA, discussing the facility design and the status of the project.

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Sitzung Einordnung: Future RIB facilities 4

Track Klassifizierung: Future RIB facilities