

Electron scattering off Rare Isotopes

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The new international research facility at the GSI laboratory (Gesellschaft für Schwerionenforschung) at Darmstadt will provide intense, high-quality secondary beams [1] of ions and antiprotons. The basic features of the facility are described in the conceptual design report [2]. The principal goal of the new facility is to provide the science community with a worldwide unique and technically innovative accelerator system to perform future research in the sciences concerned with the basic structure of matter, and in intersection with other fields.

The existing GSI accelerators (i.e. UNILAC and SIS synchrotron) will serve as injector for a new double synchrotron ring system providing e.g. 10^{12} ions/s up to uranium with an energy of 1.5 GeV/u. The Super-FRS facility [3] will address the production and experiments with secondary ion beams. It consists of a superconducting fragment separator together with three different experimental areas being used to perform low energy, high energy and storage ring experiments. Combining the increase in primary beam intensity with the improved ion optical properties of the separator system a gain factor over present days intensity of up to 10000 can be expected. A system of storage-cooler rings will be used to reduce the emittance and energy spread of secondary beams created via fragmentation or fission reactions. Experiments will then be carried out in the New Experimental Storage Ring (NESR) with radioactive ions at energies up to 740 MeV/u. An intersecting electron ion ring (eA collider) which will allow to scatter electrons with an energy of 125-500 MeV off exotic nuclei [4] is one of the experimental setups foreseen in the NESR.

In my talk I'd like to give an brief overview on the present experimental results, and want to discuss the opportunities that will arise from the technologically challenging experiments aiming to scatter electrons off radioactive ions.

REFERENCES

- [1] <http://www-new.gsi.de/zukunftsprojekt/>
- [2] <http://www.gsi.de/GSI-Future/cdr/>
- [3] H. Geissel et al., Nucl. Inst. Meth. **B204**(2003)71
- [4] L.V. Chulkov et al., *Future Experiments with the eA-collider at the NESR*, to be published in Physica Scripta

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