

The S-EBIT Facility at the Helmholtz Institute Jena

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Synopsis The EBIT facilities are currently being built at the Helmholtz Institute Jena. The high voltage electron beam ion trap S-EBIT shall provide highly charged ions - ultimately fully stripped heaviest ions up to uranium - for precision experiments and also serve as a development platform for SPARC experiments at the future FAIR facility. A status report of the S-EBIT facility as well as the experiments in preparation will be given.

The Super-EBIT (S-EBIT) [1] plays an important role for accomplishing the mission of Helmholtz Institute Jena (HI-Jena) [2] towards Facility for Antiproton and Ion Research (FAIR) [3]. It considerably expands the opportunities for developing new technologies and procedures for novel experiments with highly charged ions (HCI). In the S-EBIT program of HI-Jena the emphasis is put on X-ray spectroscopy and the interaction of intense laser radiation with HCI, including the respective diagnostics. Moreover, the S-EBIT program may be of substantial importance for bridging the gap of the transition time for heavy ion experiments between GSI and FAIR. As an operating source of HCI during the shutdown of GSI accelerator, it will facilitate research and development works indispensable for plasma and SPARC experiments at FAIR [4]. The project will open up further points of contact, e.g. in the fields of X-ray wavelength standards, astrophysics, and material sciences. The S-EBIT is being built for commissioning at the experiment platform of the HITRAP facility [5], where it will not only be used as a standalone device but also serve as a source of highly charged heavy ions for HITRAP (see Figure 1). This is of particular importance for the FAIR related shutdown period, where virtually no beam time will be provided for SIS18/ESR and consequently for the HITRAP facility. The S-EBIT will provide extracted medium Z ions up to about $Z=66$ with sufficient intensities, allowing to perform a unique physics program and to make use of the available experimental infrastructure of HITRAP as well as of the novel instrumentation provided by the HI-Jena [6].

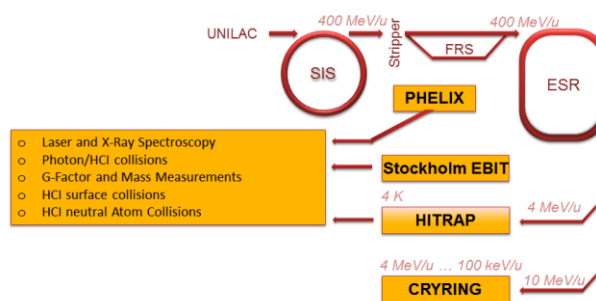


Figure 1. Schematic of experimental arrangements related to the HITRAP along with the main physics topics.

In addition, the important R&D projects related to FAIR, such as tests of spectrometers, position sensitive detectors operating in UHV environment and so on can be conducted which are of particular relevance for the first available facility of the FAIR project, the CRYRING@ESR [7]. Moreover, first experiments with highly-charged ions in intense laser fields can be carried out (PHELIX) at the HITRAP location.

A status report of the S-EBIT program will be presented.

References

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