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Ion Sources for CRYRING@ESR

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CRYRING is a heavy-ion storage ring originally designed and operated at the Manne Siegbahn Laboratory (MSL), Stockholm. Recommissioned within the CRYRING@ESR project, it serves as low-energy storage ring for a wide range of research areas, from precision spectroscopy in strong field systems, dynamics in slow atomic collisions, nuclear reactions, materials research and beyond. The ring is able to store highly charged heavy ions (HCI) produced at the GSI accelerator complex after deceleration in the Experimental Storage Ring (ESR).

To maximize beam time usage, the local ion source allows the ring to operate quasi-independently of the GSI-complex, serving as test bench under real beam conditions for multiple systems: vacuum, detectors and controls. It also address operation stability issues and operators training.

The local ion source can provide a range of soft, low-charged ions from gaseous and easily vaporized solid materials. Over time, its potential for stand-alone experiments has been revised. A scientific advisory committee now evaluates and approves a growing number of beam time applications using local injector. Efforts are being made to meet the experiment's needs and to provide ion species with the required intensities, beam quality and stability. We started by using a hot cathode Nielson type ion source. A 10 GHz ECR ion source based on a permanent magnets arrangement, a rebuild of a source developed at the University of Giessen, is our workhorse now. Another ECR ion source with a frequency of 14.5 GHz, which has been in operation at IAP Frankfurt for many years, is currently being refurbished before recommissioning to serve as second source for the local injector. It will expand the range of ion species giving access to Ne8+, S10+, Ar12+ and similar A/q combinations.

This contribution will present the achievements, plans, performance and limitations of the local ion sources at CRYRING@ESR.

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