



## 2019 HGF – GSI – OCPC – Programme

### for the involvement of postdocs in bilateral collaboration projects

**Title of the project:**

Setup and commissioning of a high intensity EBIT for CRYRING@ESR

**Helmholtz Centre and institute:**

GSI Helmholtzzentrum für Schwerionenforschung GmbH

**Project leader:**

Frank Herfurth

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**Description of the project** (max. 1 page):

The CRYRING@ESR facility is a low energy storage ring especially for heavy, highly charged ions. It has been relocated 2013 from Stockholm as an in-kind contribution to FAIR to profit from the availability of heavy, highly charged and short lived ions at GSI/FAIR.

After production at about 400 MeV/nucleon, the ions are stored, cooled and decelerated in the experimental storage ring, ESR. Extracted at about 10 MeV/nucleon ions are transported to CRYRING@ESR, injected and then brought to the desired energy in the range between 0.3 and 10 MeV/nucleon with the available RF structure. Cooled with a dedicated electron cooler heavy, highly charged ions are available for experiments that range from atomic through nuclear physics till solid state and surface science.

The recommissioning after the relocation and modernization is about to be finished with first ions from ESR end of 2019. For commissioning but also to prepare experiments,

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CRYRING@ESR has its own injector based on a RFQ linear accelerator. To test the experiments detectors and concepts it is planned to construct and setup a dedicated electron beam ion trap source (EBIT/S). This source should produce light to medium heavy, highly charged ions abundant enough for extensive offline tests of detectors. Such the valuable and highly demanded online beam from the GSI accelerator complex will only be used for the final experiment.

The central topic of this project is the commissioning of the EBIS/T. The source is built in collaboration with the MPIK Heidelberg and based on a successful design already applied once. An overall period of three years is envisaged for the complete endeavour. The applicants task would be to contribute to and advance the setup, commissioning and final characterization of the newly built EBIT/S as ion source.

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**Description of existing or sought Chinese collaboration partner institute (max. half page):**

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We are looking for a collaboration partner to enhance our work on the field of electron beam ion traps/sources. Further collaboration possibilities open up on the diagnostics of low energy, low intensity ion beams and the detection of ion source parameters based on X-ray signatures.

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**Required qualification of the post-doc:**

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- PhD in Physics/Electrical Engineering
  - Previous experience in at least three of the following fields: atomic physics, ion trapping, ion sources and beamlines, electronics, vacuum technique
  - A proven ability to devise, implement and work with hands-on experimental equipment
  - Interest or demonstrated expertise in cryogenic technology
  - A good knowledge or the ability to learn in the fields of ion optics, simulations of low energy beams and clouds, and computer control.
  - Additional skills in at least one high level programming language (C++, Python, Java etc.) Previous engineering and CAD knowledge and/or experience is advantageous, but not a necessity
  - Experience in documenting the ongoing work and results
  - Ability to work in a team work and good communication skills
  - Language requirement: English (Cambridge level B2 or better, i.e. fluent in face to face communication and able to write technical reports)
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