

PhD Position in Accelerator Physics – Ultra-sensitive Beam Intensity Measurement

At the GSI beam instrumentation group new diagnostics devices are permanently developed to match the requirements of the upcoming Facility for Antiproton and Ion Research (FAIR) at GSI/Darmstadt, Germany. One of the major fields of research is the non-destructive measurement of beam intensity in the high energy beam transport sections and in the storage rings. In the frame of a preceding Mari-Curie fellowship, extensive investigations on a superconducting SQUID based Cryogenic Current Comparator (CCC) for intensity measurements down to the nA range have been performed. This device measures the beam intensity via the beam magnetic field (fT-range), which requires meticulous shielding. The results from the prototype measurements led to the design of an advanced CCC for FAIR, which shall be installed in our Crying@ESR facility.

The work related to this topic is particularly attractive for ‘hands on’ physicists, who have at the same time strong interest in fundamental physics and high-end technology. It covers a large spectrum of topics in the accelerator field, like mechanical design, vacuum, cryogenics, superconductivity, electronics, simulations, control applications, beam operation, data acquisition etc. The focus of the PhD work can to some extent be defined according to the inclination of the candidate. However, the goal is the setup, commissioning and successful operation of the new FAIR CCC in Crying, as well as its optimization and comparison with other diagnostic schemes.

Requirements:

- We are looking for a skilled, motivated physicist with a very good university degree (Master of Science or equivalent) in physics, who likes to combine practical laboratory work with exploration of basic principles and theoretical background by doing simulation calculations.
- Highly sensitive measurements in an accelerator environment are a challenge - just as the construction of complex, superconducting diagnostics devices is. Besides a good eye for physical correlations and basic experience in some of the above mentioned fields, a positive working attitude, strong determination and persistency are indispensable requirements for the job.
- Since we have close collaborations with other laboratories, and are part of a research network, documentation and communication with partners like FSU-Jena, TU-Darmstadt and CERN play an important role, so open-mindedness and social competence are expected from the candidate. Moreover, the position is part of the AVA network, which includes active information exchange and communication with fellow scientists.

What we offer:

- The candidate will work in the field of high-end technologies, on an interesting and challenging device, which combines numerous aspects of physics and technology. Practical and theoretical aspects are well balanced.

- Practical experience in the multi-national accelerator facility at GSI will be gained. Introduction to the world wide accelerator community and top level institutes is offered. A part time stay at another accelerator laboratory or at an innovative company is foreseen.
- Participation in a group, which is world leading in the development of beam intensity monitors.
- An excellent working atmosphere in a dynamic growing laboratory, where the ambitious and widely noticed FAIR project is becoming reality.
- There will be a realistic time schedule and planning for all steps of the thesis, supervised by competent staff.

Publications related to the topic of the thesis can be found under:

<http://www-bd.gsi.de/dokuwiki/doku.php?id=projects:ccc:papers>

GSI aims to increase the number of women in scientific positions. Female candidates are therefore particularly encouraged to apply.

Please send your application including the common documents (cover letter, curriculum vitae, certifications and photo) electronically to Dr. Thomas Sieber, T.Sieber@gsi.de or Dr. Peter Forck, P.Forck@gsi.de

In case of any questions, please also do not hesitate to contact us.