

PRESS RELEASE

Pfeiffer Vacuum and GSI/FAIR honor Dr. Simon Lauber with FAIR-GSI PhD Award

- **Groundbreaking findings in ion beam technology**
- **Vacuum technology an important trailblazer for research and development**

Asslar, Germany, February 01 2024. Dr. Simon Lauber was honored with the “FAIR-GSI PhD Award 2023” for his outstanding dissertation. In his dissertation, he studied the HELIAC, a novel superconducting linear accelerator built jointly by the Helmholtz Institute Mainz and GSI/FAIR Darmstadt: “Advanced numerical and experimental beam dynamics investigations for the cw-heavy ion linac HELIAC (HElmholtz LInear ACcelerator)”. HELIAC is intended to deliver intense continuous-wave ion beams for cutting-edge research ranging from superheavy elements to materials science for decades to come.

Professor Paolo Giubellino, Scientific Managing Director of FAIR (Facility for Antiproton and Ion Research in Europe) and GSI Helmholtz Centre for Heavy Ion Research, as well as Daniel Sälzer, Managing Director of Pfeiffer Vacuum GmbH, presented the award in a dedicated colloquium.

Within the scope of his thesis work, Simon Lauber made vital and forward-looking contributions, which are of immense importance for the realization of the entire HELIAC project. In order to provide for proper phase-space matching, the complete six-dimensional phase space needs to be explicitly known. Recently, sufficient experimental data from a novel bunch-shape measurement device have been collected to reconstruct the longitudinal beam characteristics with an algorithm newly

developed by Lauber. To measure the transverse phase space to be adapted to the acceptance of the superconducting part, Lauber designed, built, and commissioned a complex beam collimation system. This collimation system enabled pinpoint measurements of the HELIAC acceptance.

Together with the method for reconstructing the longitudinal phase space, this is a crucial tool for tuning and optimizing the entire HELIAC. On the basis of a complex simulation code developed by Dr. Lauber, essential beam dynamics studies were performed for the construction of a normal conducting interdigital H-type drift tube structure for the acceleration of heavy ions in cw mode. The alternating phase focusing (APF) structure used for this purpose allows an accelerator setup without any additional focusing lenses, and thus the design of a very compact and efficient accelerator structure.

In congratulating the award winner for his dedication to science, Pfeiffer Vacuum CEO Daniel Sälzer underlined that: "Pfeiffer Vacuum is firmly committed to promoting cutting-edge research. Vacuum technology made by Pfeiffer Vacuum has become indispensable for scientific research and offers the precision and reliability required for conducting complex experiments. Dr. Lauber deserves the highest accolade from us all for the dedication he has shown to research and science."

The annual FAIR-GSI PhD Award is presented to honor an excellent PhD thesis that was completed during the previous year. Eligible for nominations are dissertations that were supported by GSI in the context of GSI's strategic partnerships with the universities of Darmstadt, Frankfurt, Giessen, Heidelberg, Jena, and Mainz, or through the research and development program. In the framework of the Helmholtz Graduate School for Hadron and Ion Research (HGS-HIRe), more than 300 PhD students currently perform research for their PhD theses on topics closely related to GSI and FAIR. GSI has a long-standing partnership with the award sponsor, Pfeiffer Vacuum GmbH. Pfeiffer Vacuum is a leading global provider of vacuum solutions. In addition to turbopumps, the product portfolio includes backing pumps, leak detectors, measuring and analysis devices, vacuum components, and vacuum chambers.

Solutions from Pfeiffer Vacuum have been successfully used in GSI's facilities for decades.



Caption: Presentation of the FAIR-GSI PhD Award G. Otto, GSI/FAIR

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About Pfeiffer Vacuum

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