
VA 1: Cryogenic Vacuum Pumping

Time: Monday 10:00–11:00

Location: HSZ 101

Invited Talk

VA 1.1 Mon 10:00 HSZ 101

Cryogenic pumping for the fabrication of highest-purity semiconductors — •WERNER WEGSCHEIDER — Laboratorium für Festkörperphysik, ETH Zürich, 8093 Zürich, Switzerland

Cryogenic capture pumps based on closed-cycle gaseous He refrigerators are extensively used in semiconductor industry due to their high pumping speed resulting in short pump down times of vacuum chambers. For highest-purity growth of semiconductor heterostructures, where molecular beam epitaxy (MBE) is the method of choice, background vacuum levels below $1\text{E-}12$ mbar have to be reached. This requirement presents a major challenge for the design of such a MBE system in which cryogenic capture pumps are exclusively used. I will present the outline and results of a GaAs based MBE system which was specifically designed for the fabrication of highest-mobility two-dimensional electron gases. The performance of these structures, which represent the key ingredient for so-called high-mobility transistors (HEMTs), depends critically on the purity of the growing material and thus on the vacuum level in the growth chamber.

VA 1.2 Mon 10:40 HSZ 101

The cryogenic vacuum system of SIS100 at FAIR — •STEFAN

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FAIR, Facility for Antiproton and Ion Research, is a new international accelerator facility for the research with antiprotons and ions. The accelerator complex will be built in Darmstadt (Germany) in cooperation with an international community of countries and scientists. The synchrotron SIS100 is the main working horse of the facility. This synchrotron, presently in its advanced planning phase at GSI, is designed for acceleration of high intensity, low charge state heavy ion and proton beams. The machine will have a circumference of about 1.1 km and utilise fast-ramped superconducting magnets. For this reason, about 80% of the whole beam pipe vacuum will be operated at cryogenic temperatures. In these cold sections, the cooling of the beam guidance magnets will be used simultaneously for cryopumping the beam pipes. We present an overview on the infrastructure of the cryogenic beam vacuum system of SIS100 and discuss some design details and special features.