

ACCELERATOR SEMINAR

Manfred Grieser

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Thursday, 15th February at 4 p.m.

KBW lecture hall

Planckstraße 1, 64291 Darmstadt

"The Cryogenic Storage Ring CSR"

The CSR is a fully electrostatic storage ring used to store atomic, molecular and cluster ion beams in the energy range of $q \cdot (20-300)$ keV, where q is the charge state of the ions. The whole storage ring can be cooled down to temperatures of only a few Kelvin where the stored molecular ion beams reach their lowest quantum states. This very low temperature also creates an extremely high vacuum. In fact, observations in the first cryogenic operation indicate residual gas densities below 20 molecules/cm³. In March 2014, to demonstrate the functionality of the CSR, a 50 keV 40Ar⁺ beam was stored for hundreds of turns in the ring under room temperature conditions. The complete storage ring was not yet cooled or baked-out at this time, a vacuum in the 10⁻⁷ mbar range was obtained, limiting the storage life times for singly charged ions to the order of a few milliseconds. In 2015, the storage ring was cooled down to an average temperature below 10 K. At this temperature lifetimes for singly charged ions up to 2500 s have been achieved. Electron cooling of a ¹⁹F⁶⁺ ion beam was demonstrated last year. A report of the lattice, elements, diagnostics, first cryogenic operation of the storage ring and electron cooling will be given in the talk.



Coordinator: Manuel Heilmann

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