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Development of in-trap electron cooling of HCI

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The Highly charged Ions TRAP (HITRAP) located at the GSI, Darmstadt, is a facility for deceleration and cooling of ions that are produced at the accelerator complex thereby providing heavy, highly charged ions at low velocities and small energy distributions. Ion bunches consisting up to 10^8 ions are injected into HITRAP at energies of 4 Mev/u from the Experimental Storage Ring (ESR), which are then slowed down to 6 kev/u in the two-stages linear decelerator. The decelerated ions travel further down the beamline to a Penning trap that captures and cools the ions down to low temperatures, before they are ejected and transported to various precision experiments.

We present the current status of the cooling trap and the ongoing progress to demonstrate electron cooling of extended amounts of heavy HCI for the first time. During the last year, HCI coming from the accelerator complex were successfully trapped for the first time. Additional optimization is still required in order to cool online produced HCI down to low temperatures.

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