

On the UNILAC Pulsed Gas Stripper at GSI

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Abstract

The UNILAC will serve as injector linac for heavy ion beams for the future FAIR, with the commissioning being anticipated in 2025. One of the crucial steps in the course of acceleration along the UNILAC is the stripping of the ions by a gas stripper in front of the main linac. Its efficiency is decisive in reaching the intensities required and may be increased by more than 50% by introducing hydrogen as stripping target, instead of the nitrogen used so far. This requires the stripper to be operated in a pulsed mode, since otherwise the pumping speed is not sufficient to maintain suitable vacuum conditions. The proof of principle was demonstrated in 2016. A dedicated project aims for a setup suitable for routine operation. Main issues are safety, reliability

FAIR – GSI – UNILAC - gas stripper

- all ions from protons to uranium ●
- beam pulses 0.1 ... 5 ms @ 0...50 Hz
- several beams in parallel
- stripping at 1.4 MeV/u
- FAIR: $I(U^{28+})=15 \text{ mA},$ ulletP(beam)=1250 kW
- power loss in target 15 kW











Gas target time dependence

Measurement series: Probing and reconstruction of the H_2 gas target envelope with short ²³⁸U beam pulses



Charge state

Equilibrium charge distribution spectra measured with the current nitrogen jet stripper and the pulsed hydrogen stripper for heavy (top) and medium heavy ions (bottom). The increase of the average charge state is visible for all ions, while the increase in efficiency appears only for the heavy ions.





Stripper setup, test stand & facility schematics



Pulsed gas stripper setup





Test stand



