

13th MT ARD ST3 Meeting 2025, DESY/Zeuthen

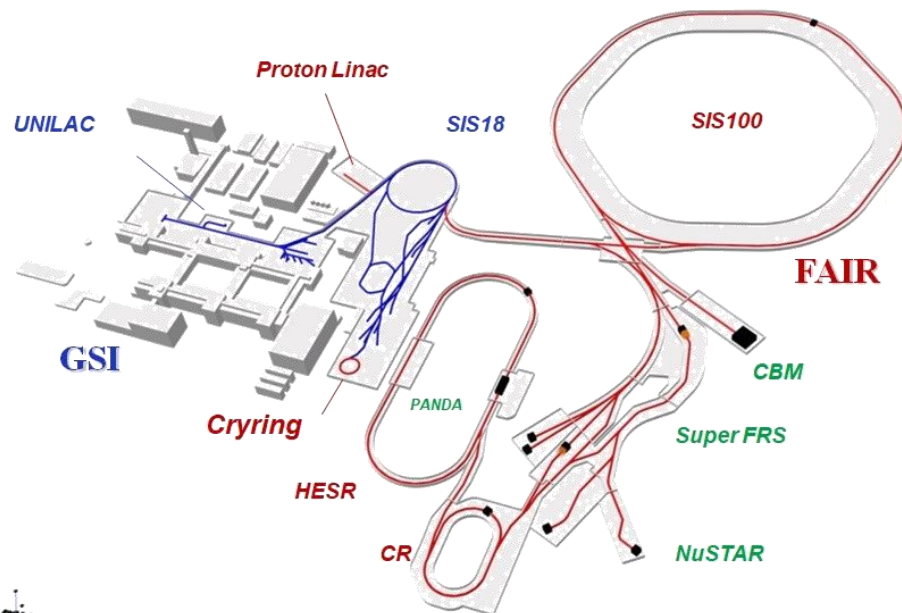
Beam Diagnostics for Measurement of longitudinal Beam Properties at UNILAC

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FAIR proton linac for antiproton program **postponed** ...

Linac design

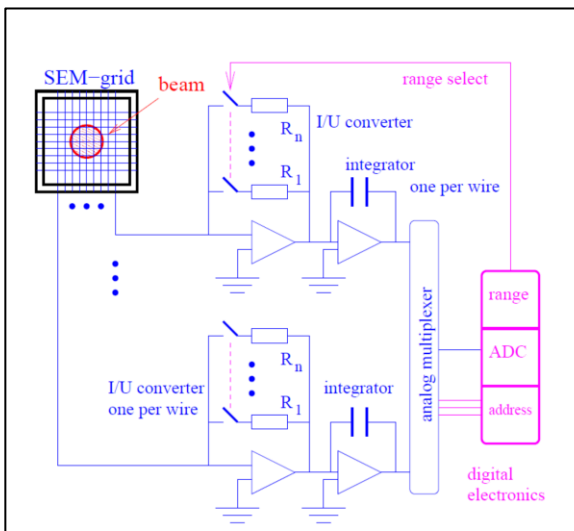
Beam energy	68 MeV
Beam current (op.)	35 mA
Beam current (des.)	70 mA
Beam pulse length	36 μ s
Repetition rate	4 Hz
Rf-frequency	325.224 MHz
Tot. hor. emit. (norm.)	2.1 / 4.2 μ m
Tot. mom. spread	$\leq \pm 10^{-3}$
Linac length	≈ 35 m



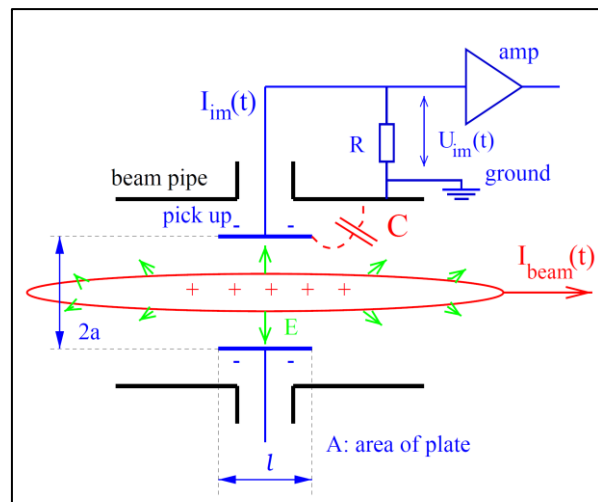
Diagnostics developed / acquired:

- Beam Position Monitors (BPM)
- Beam Current Transformers (ACCT)
- Bunch Shape Monitor (BSM)
- Secondary Electron Emission (SEM)- Profile Grids

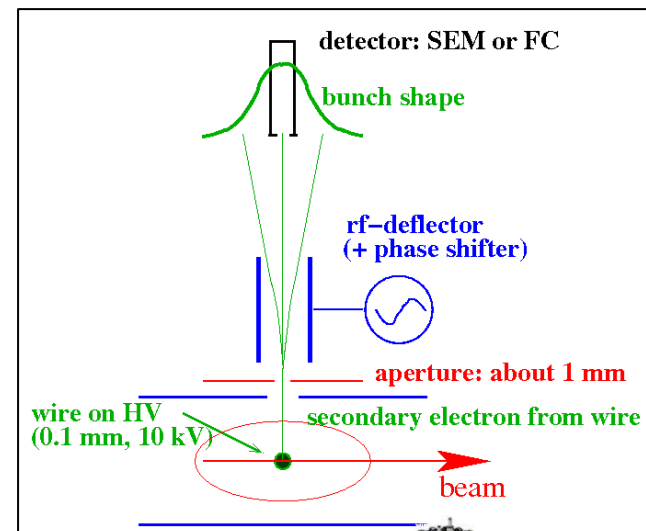
→ instruments are (in the meantime) used for beam experiments in existing GSI machines



SEM Profile Grids



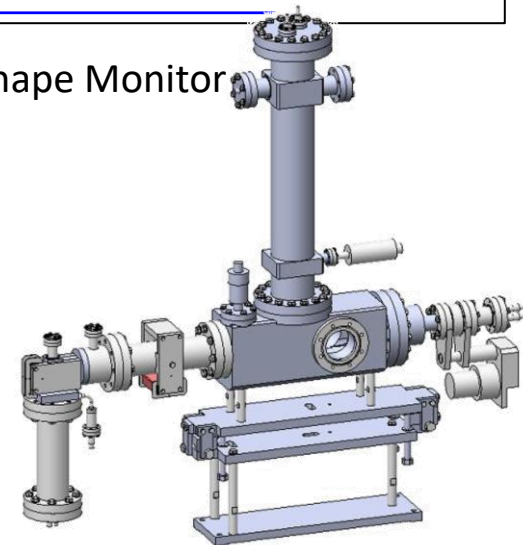
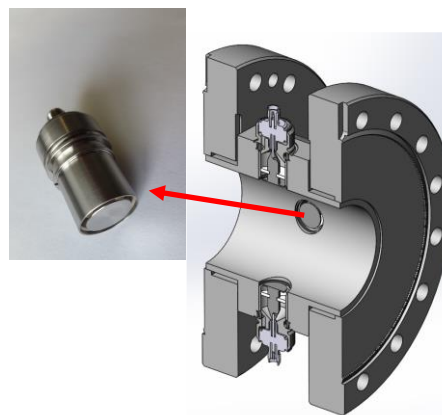
Beam Position Monitors



Bunch Shape Monitor

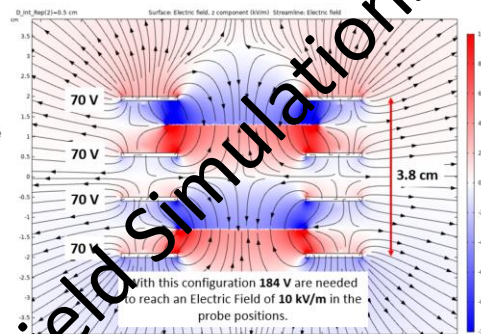
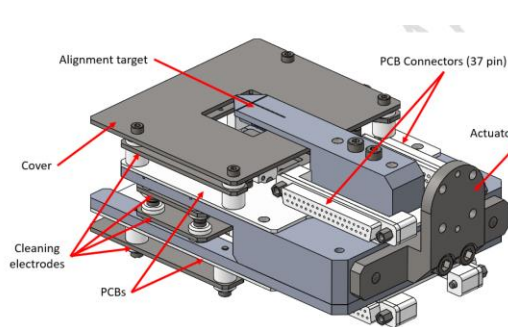


'radial' diagnostics measures longitudinal properties via dispersive elements (dipoles)

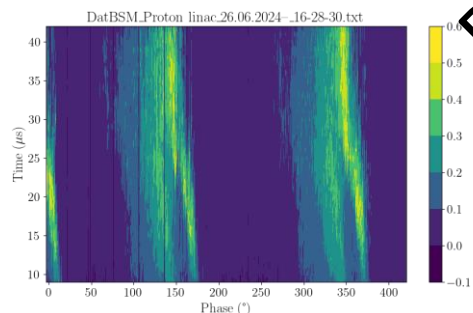
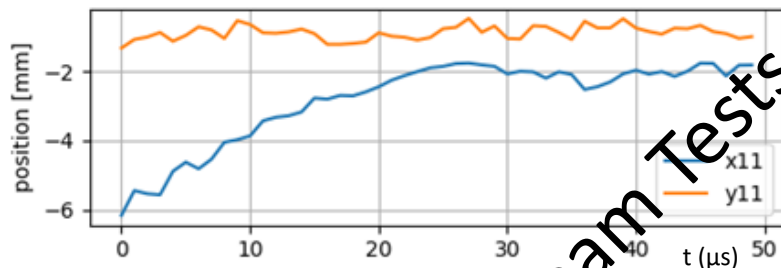


Measurement results from 2025 campaign → N. Schmidt, S. Klaproth

Field Simulations



pLinac BPM test Feb. 2022 in X2 (8.6 MeV, 200μA protons)



Beam: U^{28+} , 11.4 MeV/u, 50μs, 1Hz, ~150μA

Beam Tests

