First Results and Simulation of the ELBE SRF Gun II

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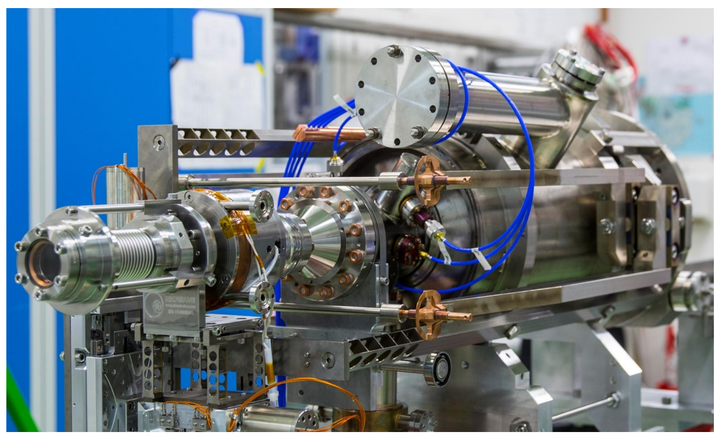
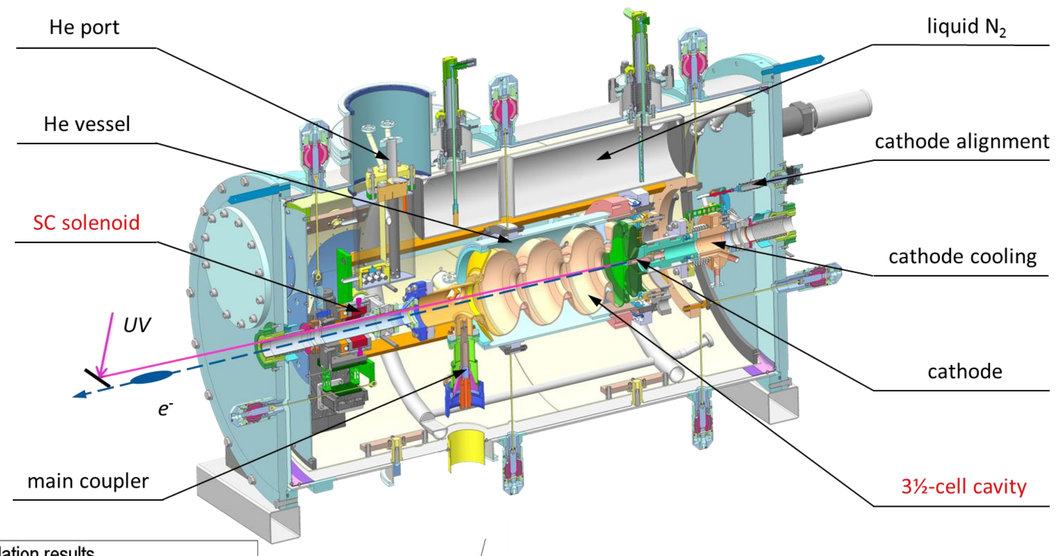
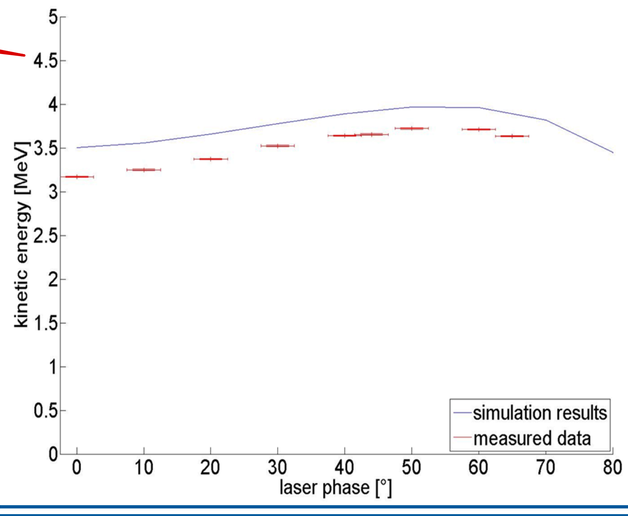
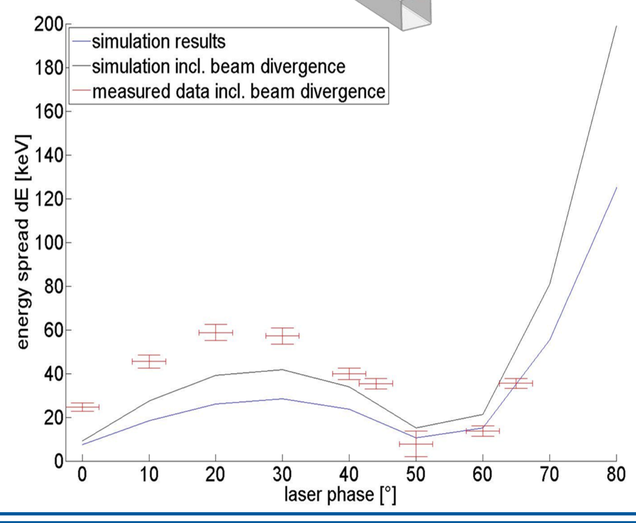
ELBE SRF Gun II

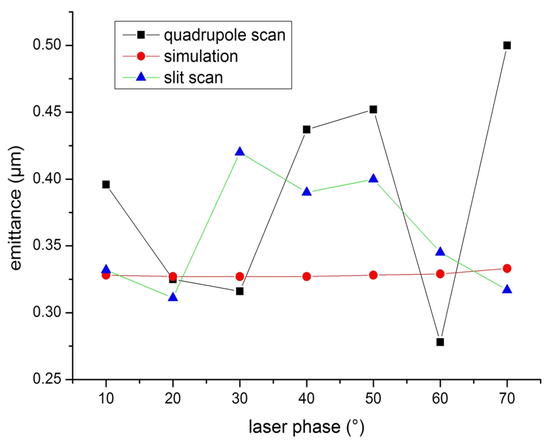
- installed in May 2014.
- fine grain 3½-cell Nb cavity
  higher gradient (J-Lab)
- SC solenoid
  emittance compensation
- 8 MV/m stable operation
  cavity training going on
- copper cathode, Cs_2Te in 2015
- 13 MHz 77pC / 500kHz 1nC
- high bunch charge transport



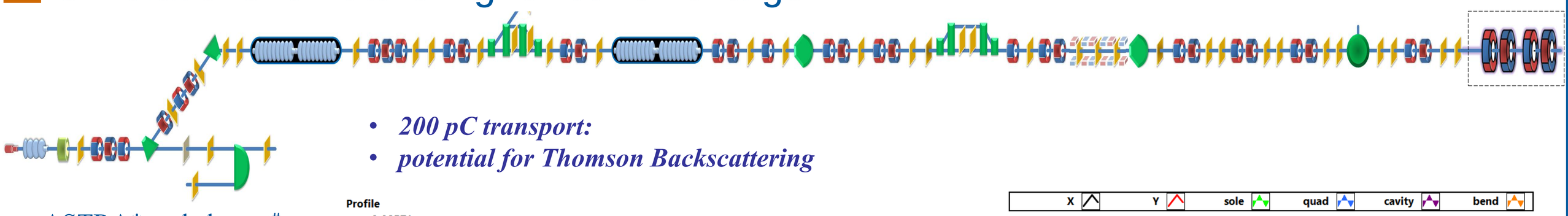






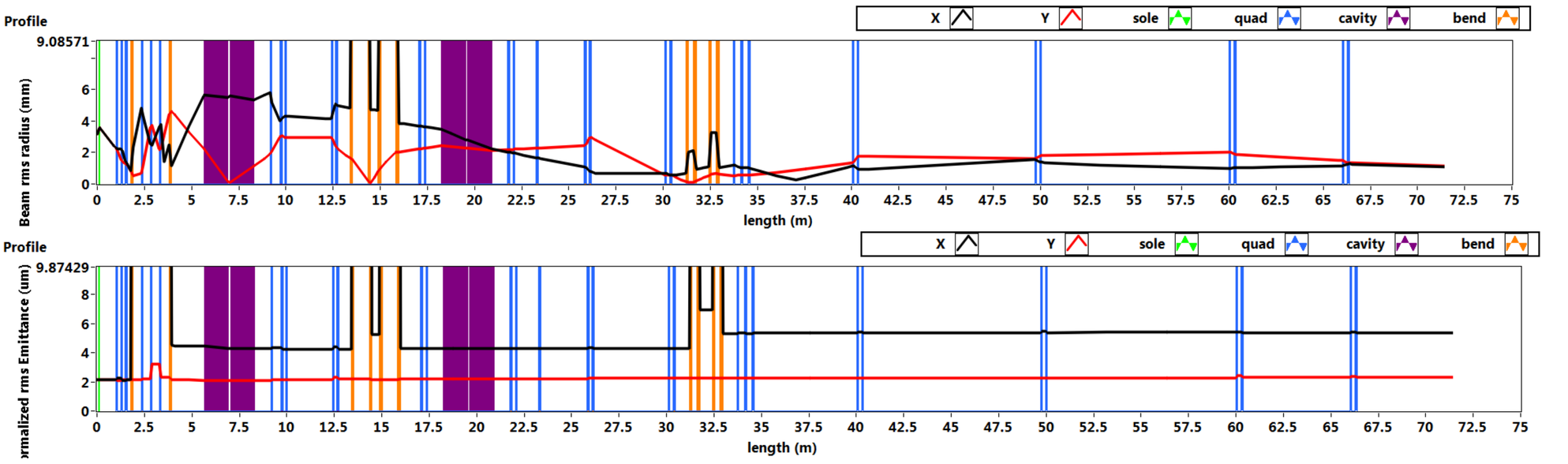


Simulations for future higher bunch charge



- *200 pC transport:*
- *potential for Thomson Backscattering*

- ASTRA* and elegant# with Labview
- 3rd matrix, CSR and LSC considered
- 2D parameter scan for longitudinal optimization
- simplex optimization for transverse beam quality



	E (MeV)	ΔE (keV)	X (mm)	Y (mm)	X' (mrad)	Y' (mrad)	ε_x (µm)	ε_y (µm)	Δt (ps)
Gun exit	5.3	52.9	3.2	3.2	4.0	4.0	2.1	2.1	6.1
Beamline	29.0	248.0	1.0	1.1	0.09	0.05	5.4	2.3	1.8

*from desy, http://tesla.desy.de/~lfroehli/astra/

#M. Borland, Advanced Photon Source LS-287, September 2000.

gun cavity exit

after Chicane 1

after Chicane 1

beamline end

Outlook

- wall effect & wakes between bunches
- optimization with Linux clusters at HZDR
- high bunch charge operation

Acknowledgments

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