

Stage 1 End-to-End Beam Tracking

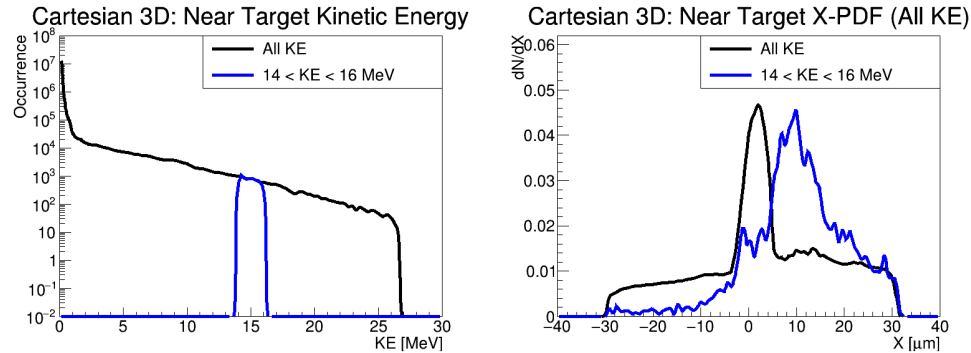


Figure: Plots of smeared 3D beam sampled near the foil target. (Left) gives kinetic energy spectrum. (Right) gives a normalised transverse position spectrum.

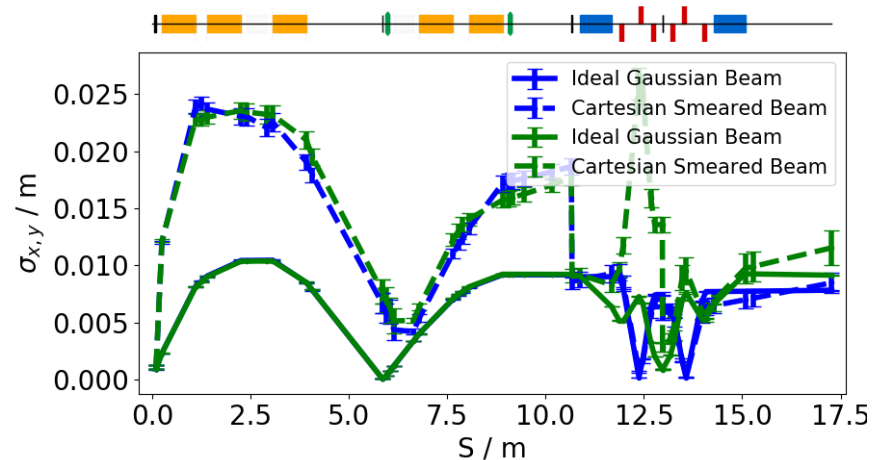


Figure: Beam size evolution through the stage 1 beam line.

Particle spectrum:

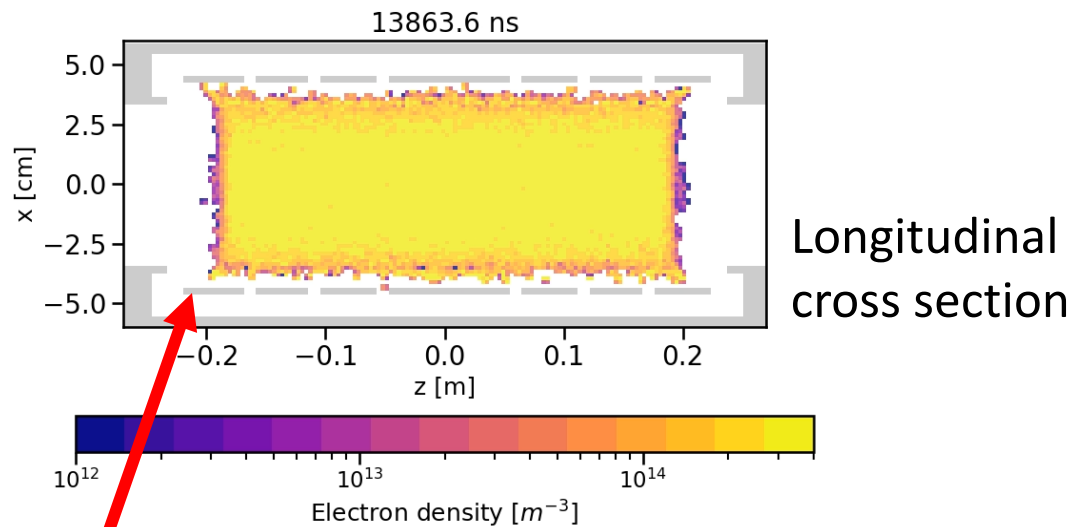
- Black coloured plot is for all energies, blue coloured plot are for energies of interest ($14 < KE < 16 \text{ MeV}$).
- Maximum energy is enhanced (2D effect).
- Beam needs to be centred.

Tracking Comparison:

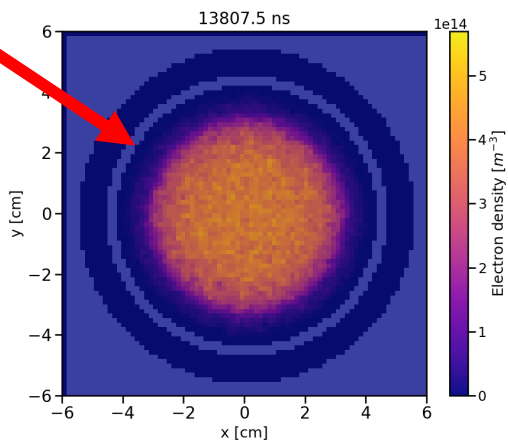
- Solid lines represent ideal Gaussian beam size evolution and dashed lines represent smeared 3D beam.
- Beam line magnets will need to be optimised.

Plasma simulations

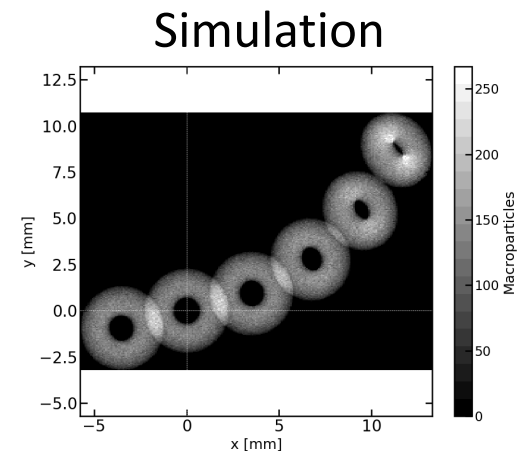
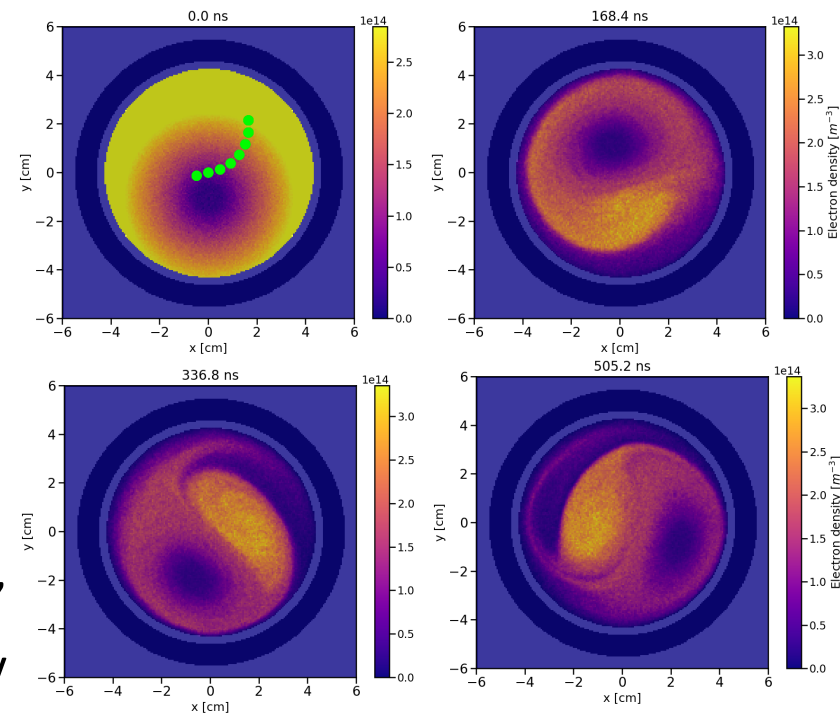
Stable regime



Lens anode



Unstable regime



Gabor Lens – objectives

Require stable electron cloud with uniform transverse profile.

- On axis electron supply not permitted.
- Annular emitter
 - requires method to reduce angular momentum.
- Cyclotron emission not possible – frequency too low.
- Collisional damping from background gas?
 - Introduces positive ions to cloud – plasma dynamics more complicated

