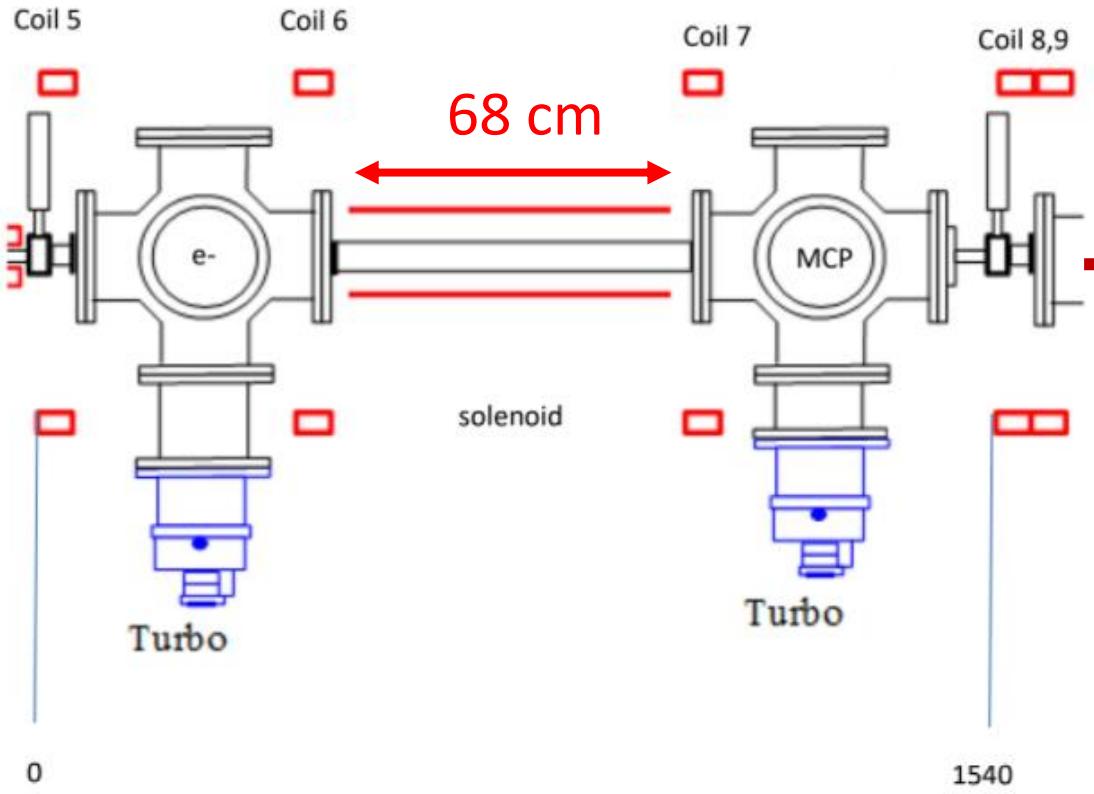
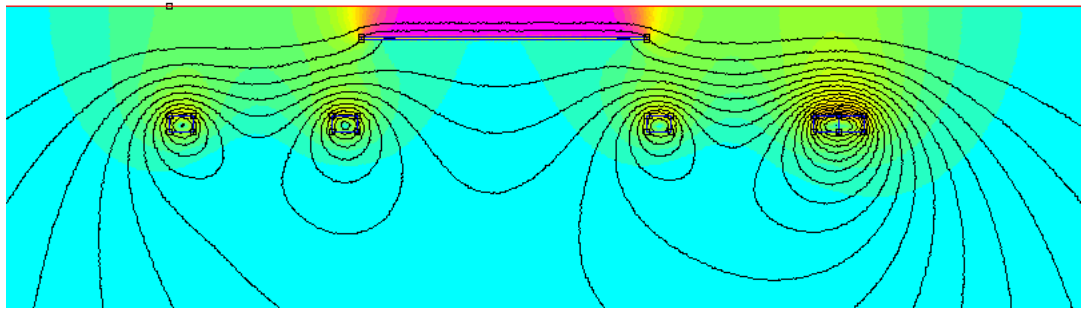
LhARA Capture Meeting

10th June 2021

Titus Dascalu

Swansea system – magnetic field





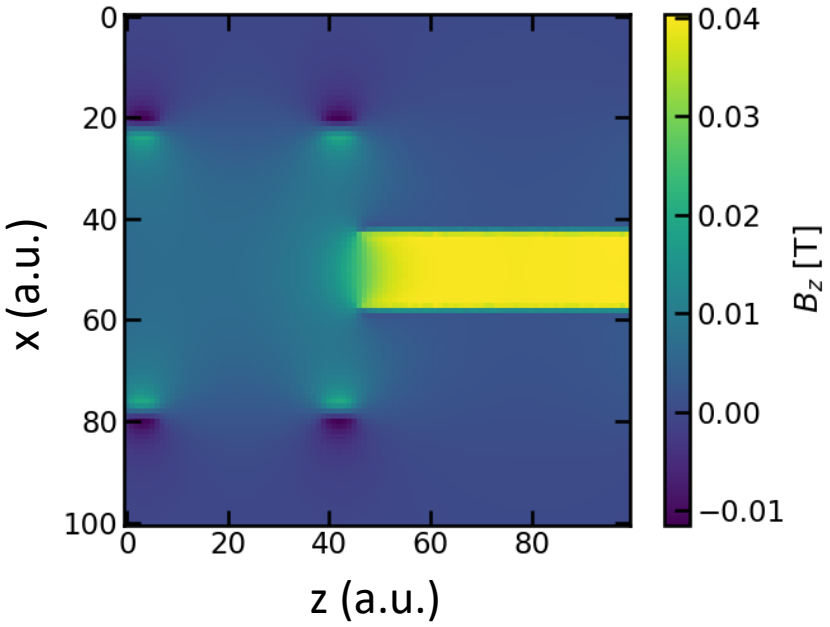
- Coils + solenoid reproduced in FEMM
- 2D axisymmetric
- Extract 2D field maps

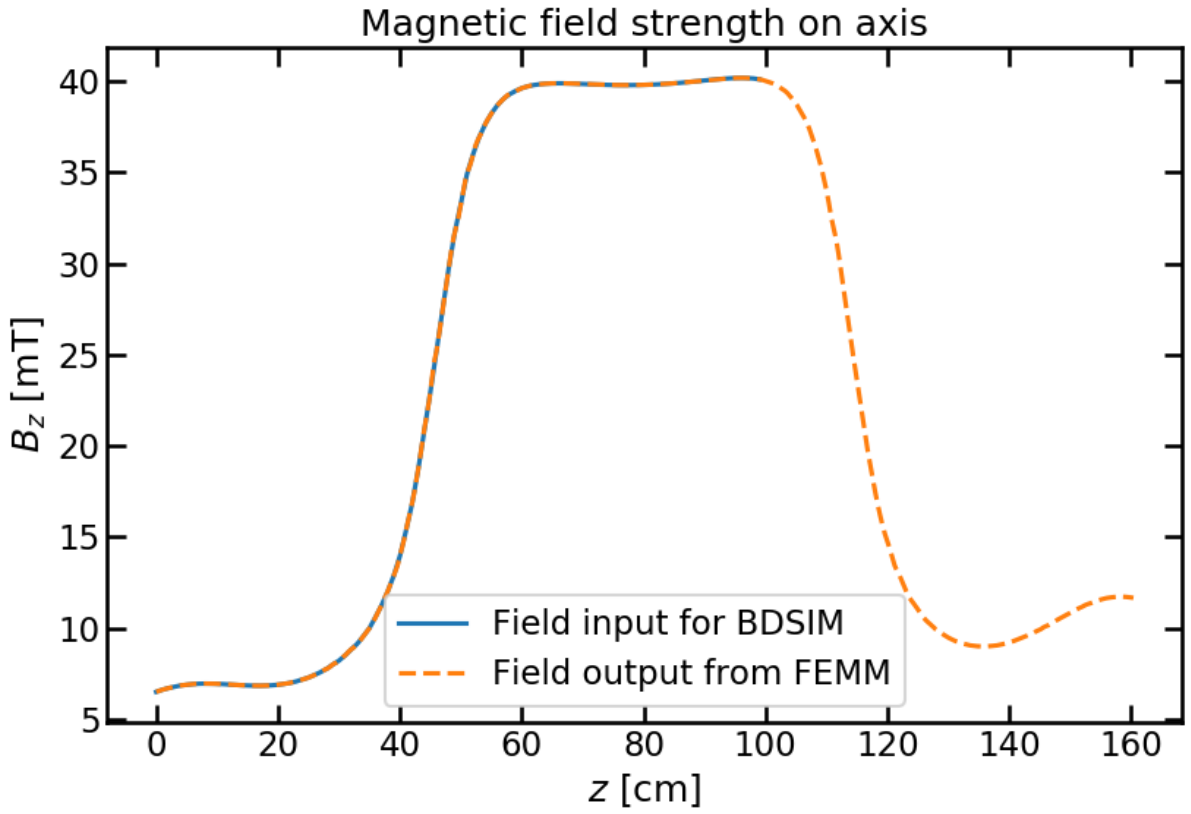
$B_z(r,z)$ and $B_r(r,z)$

Swansea system – magnetic field

- Use output from FEMM to generate 3D field maps for BDSIM

$$\boldsymbol{B}(x, y, z)$$

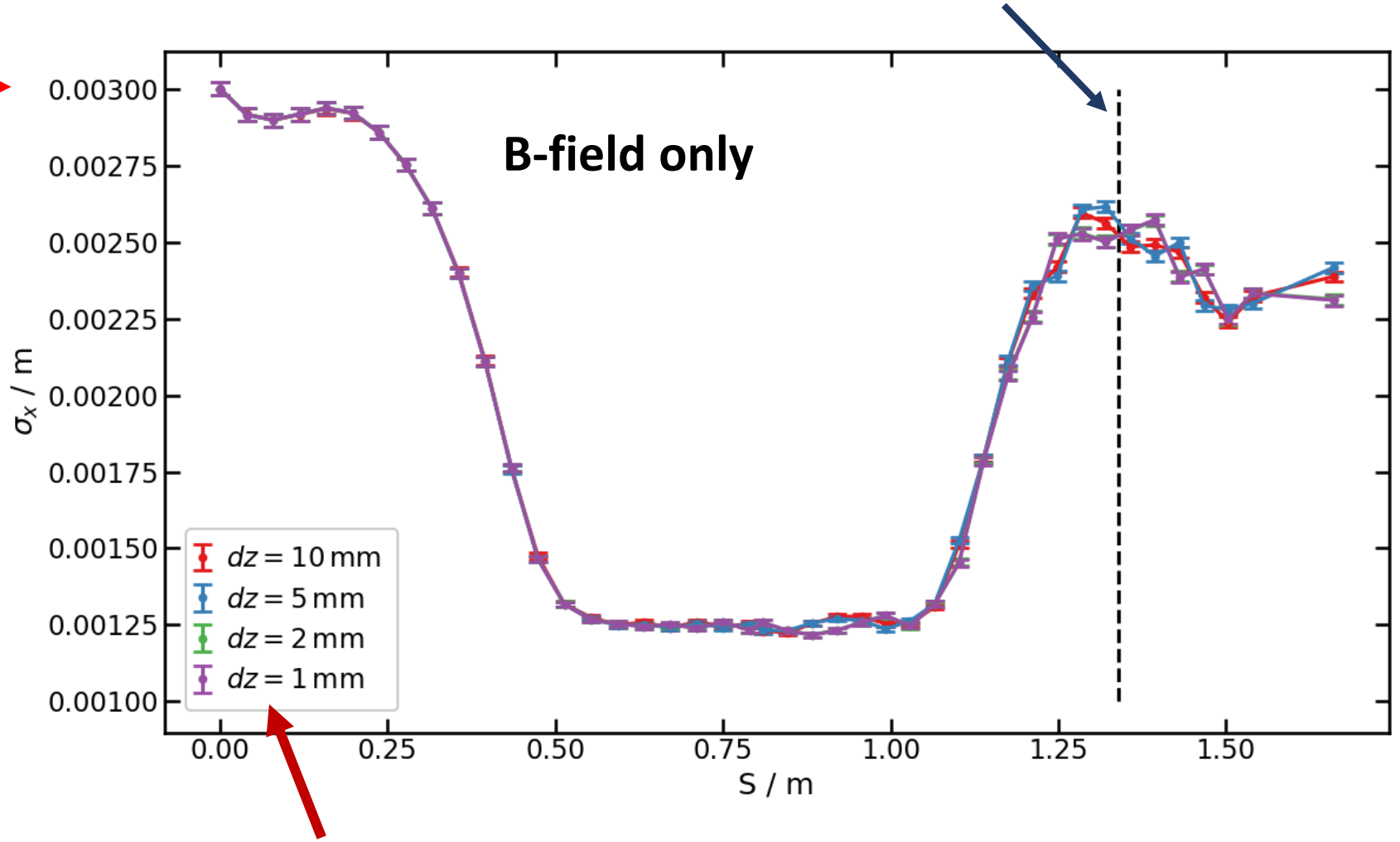




Beam tracking – convergence test

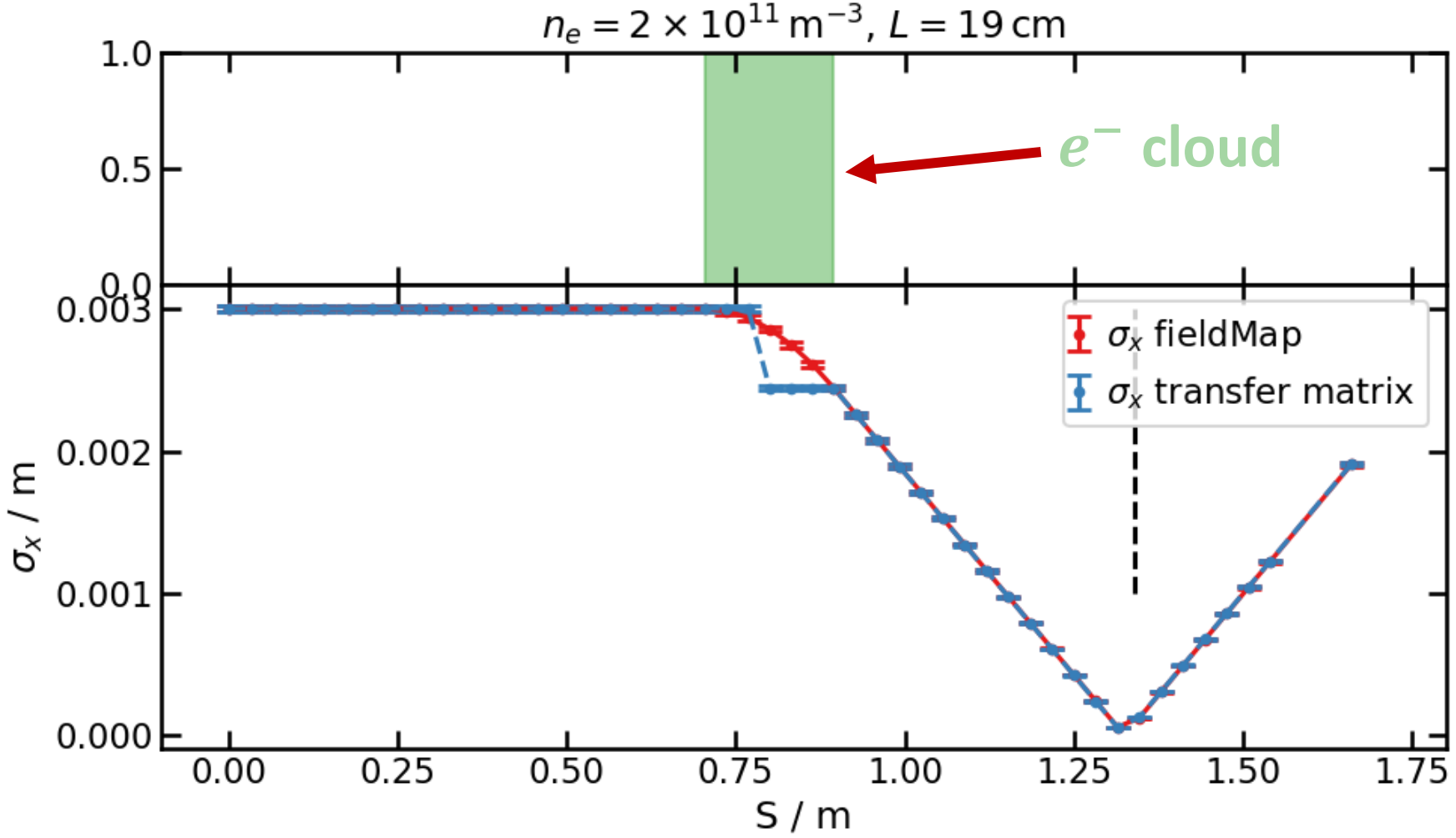
e^+ beam

- 85 eV
- Gaussian
- $\sigma_{x,y} = 3$ mm
- $\sigma_{x',y'} = 1 \times 10^{-6}$



Separation between planes at which B-field map is defined

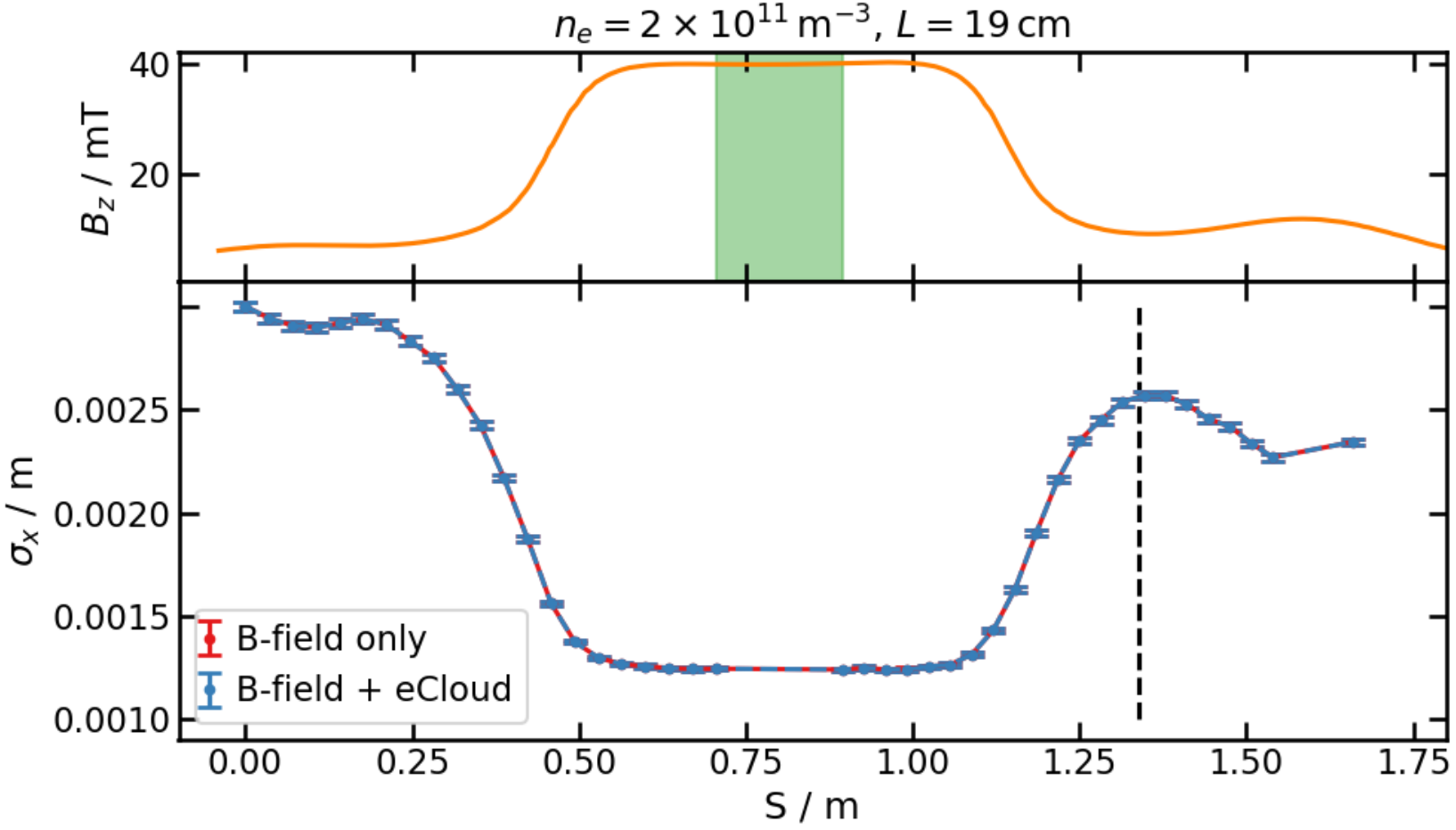
Beam tracking – verify E-field map



E-field only

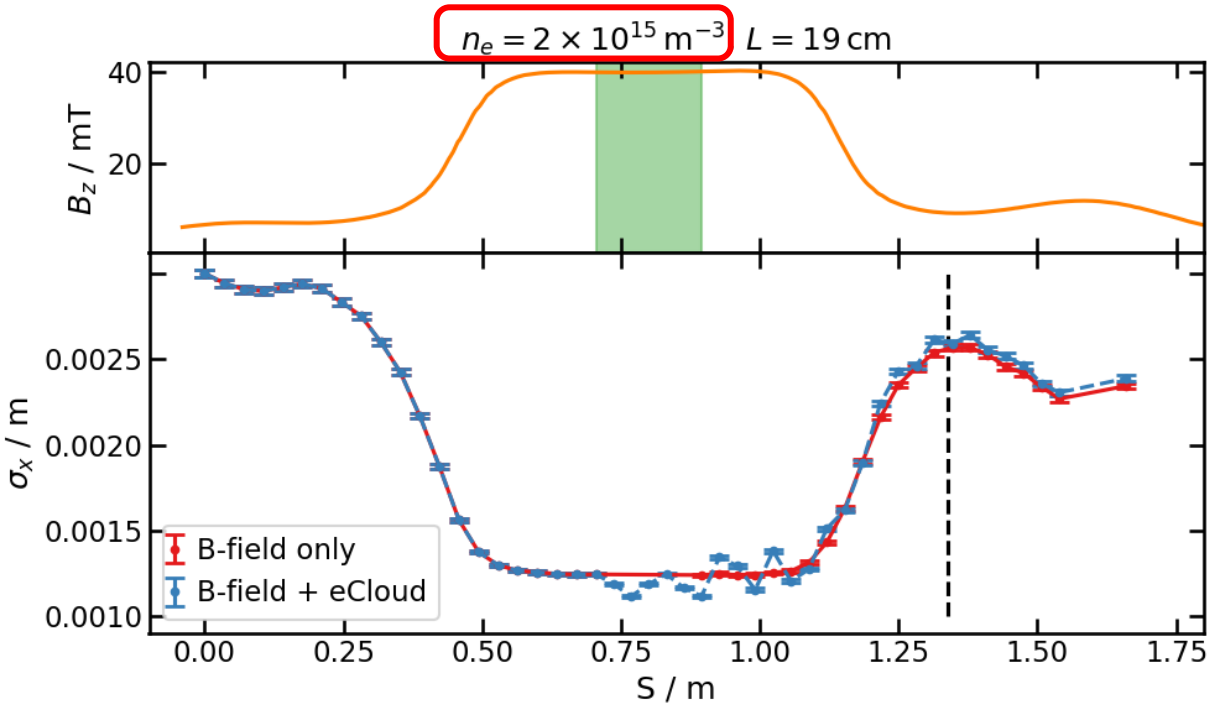
Beam tracking – plasma on/off

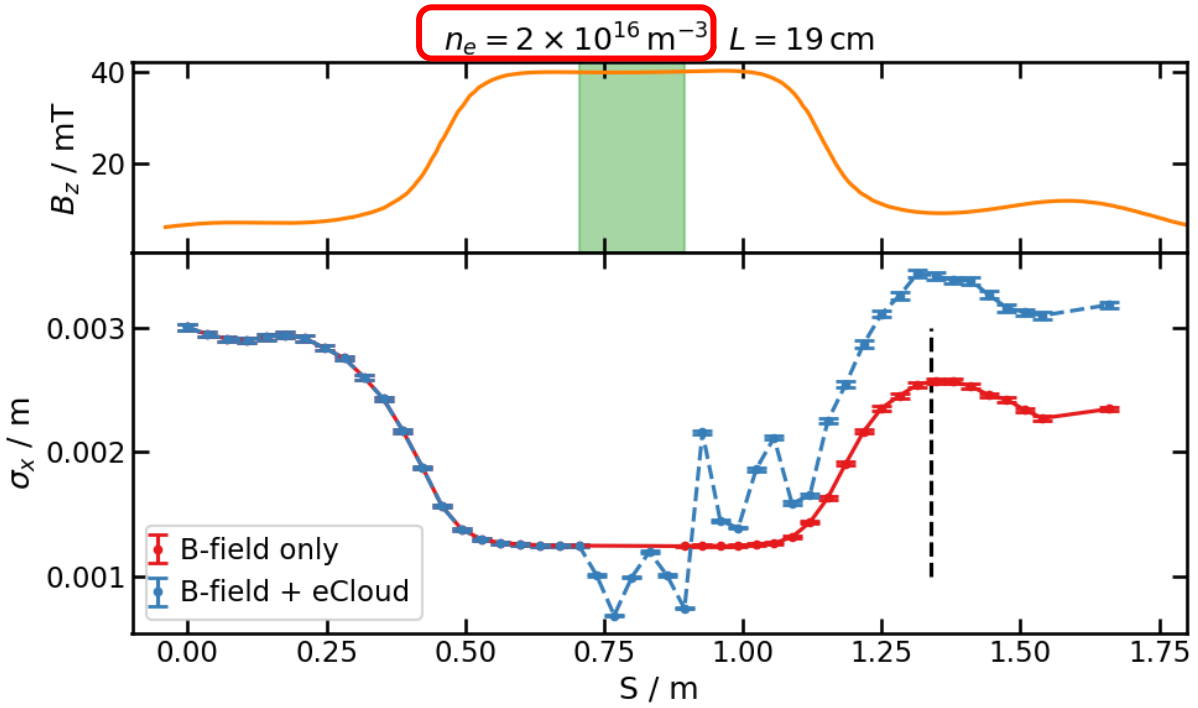
- all guiding coils on



Beam tracking – plasma on/off

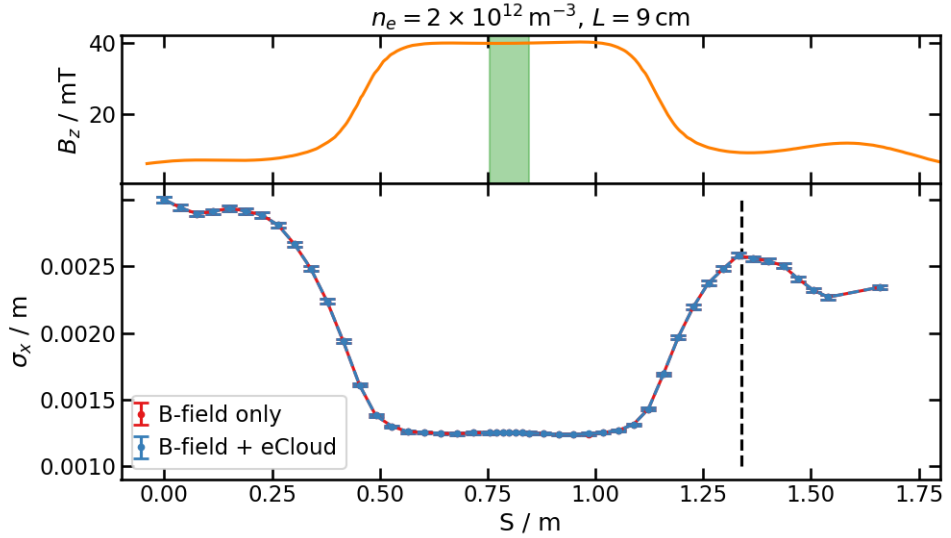
- all guiding coils on
- No significant difference up to high densities shown below

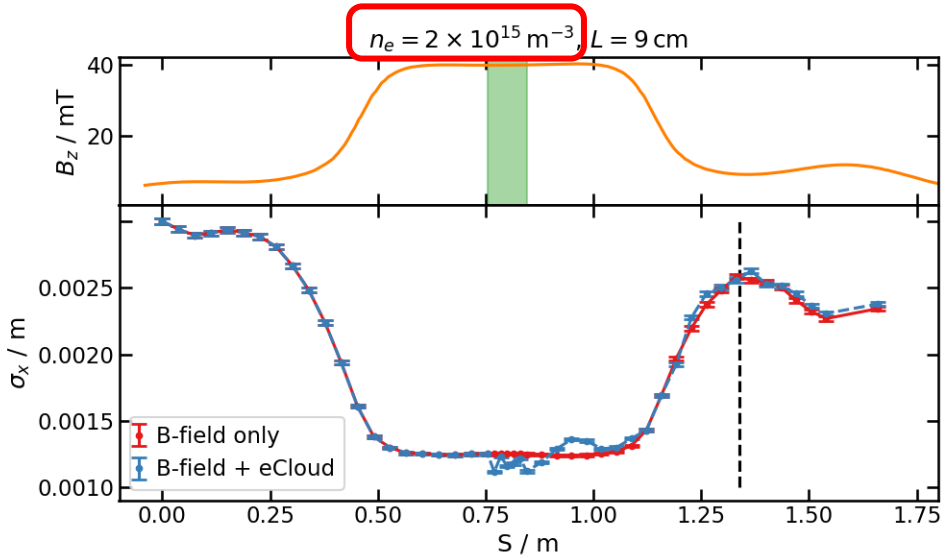


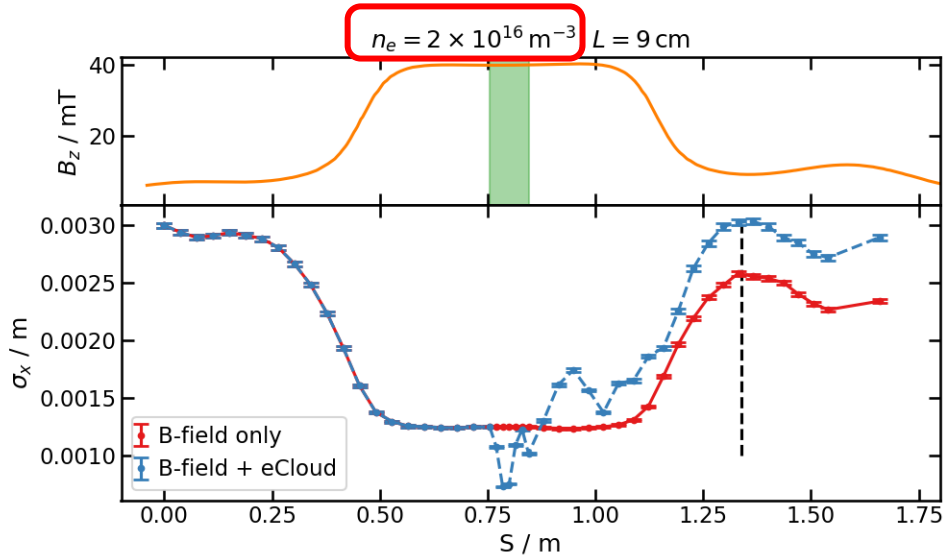


Beam tracking – plasma on/off

- all guiding coils on
- Significant difference observed at high densities for other plasma lengths, too
- L = 9 cm

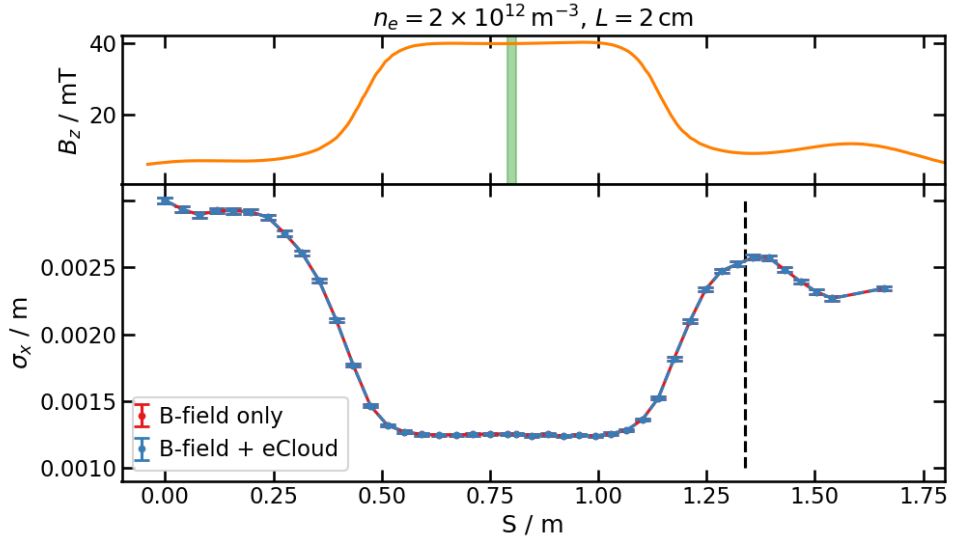


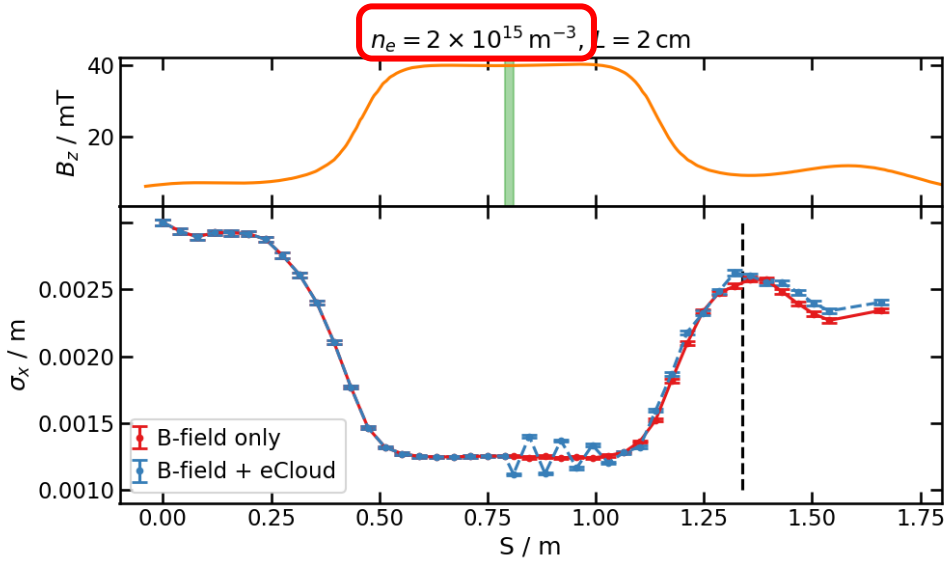


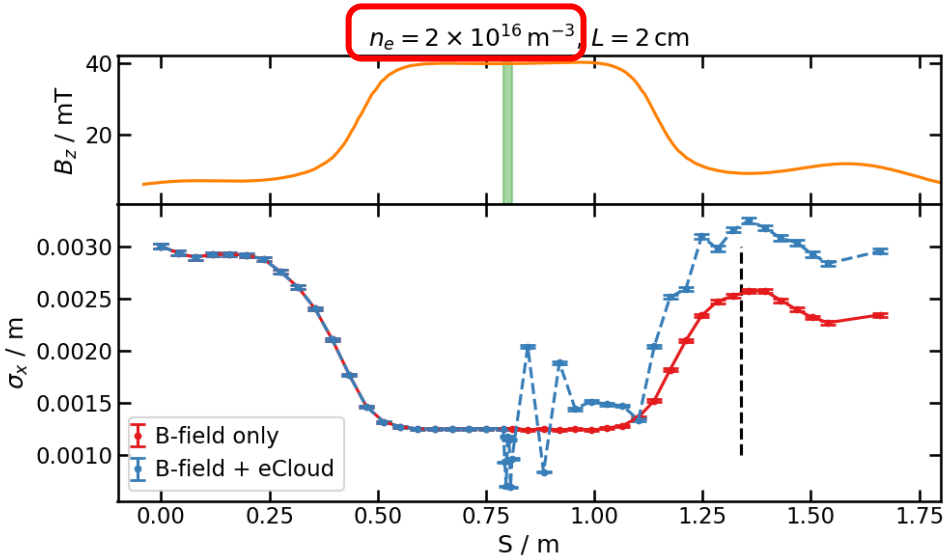


Beam tracking – plasma on/off

- all guiding coils on
- Significant difference observed at high densities for other plasma lengths, too
- L = 2 cm

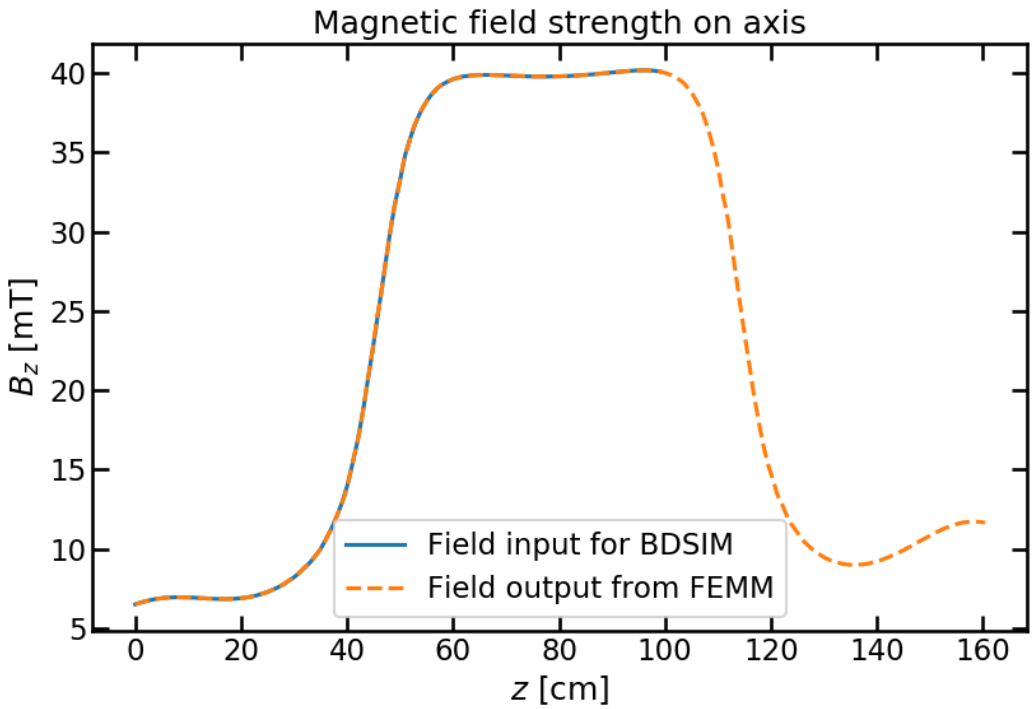


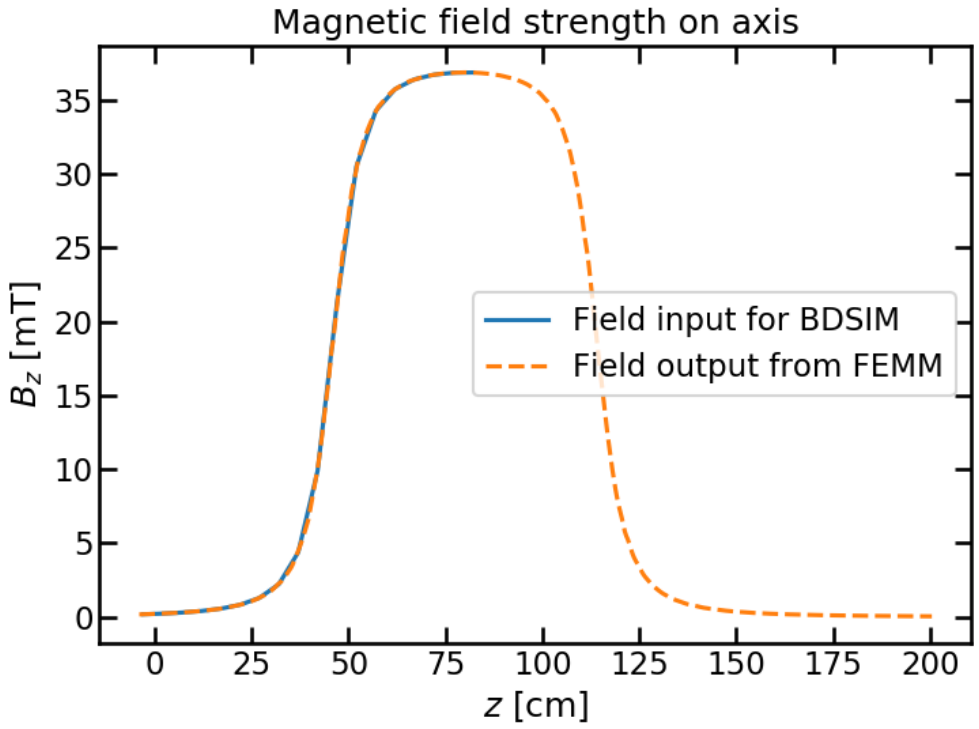




Beam tracking – plasma on/off

- all guiding coils off





Beam tracking – plasma on/off

- all guiding coils off
- No significant difference up to high densities shown below