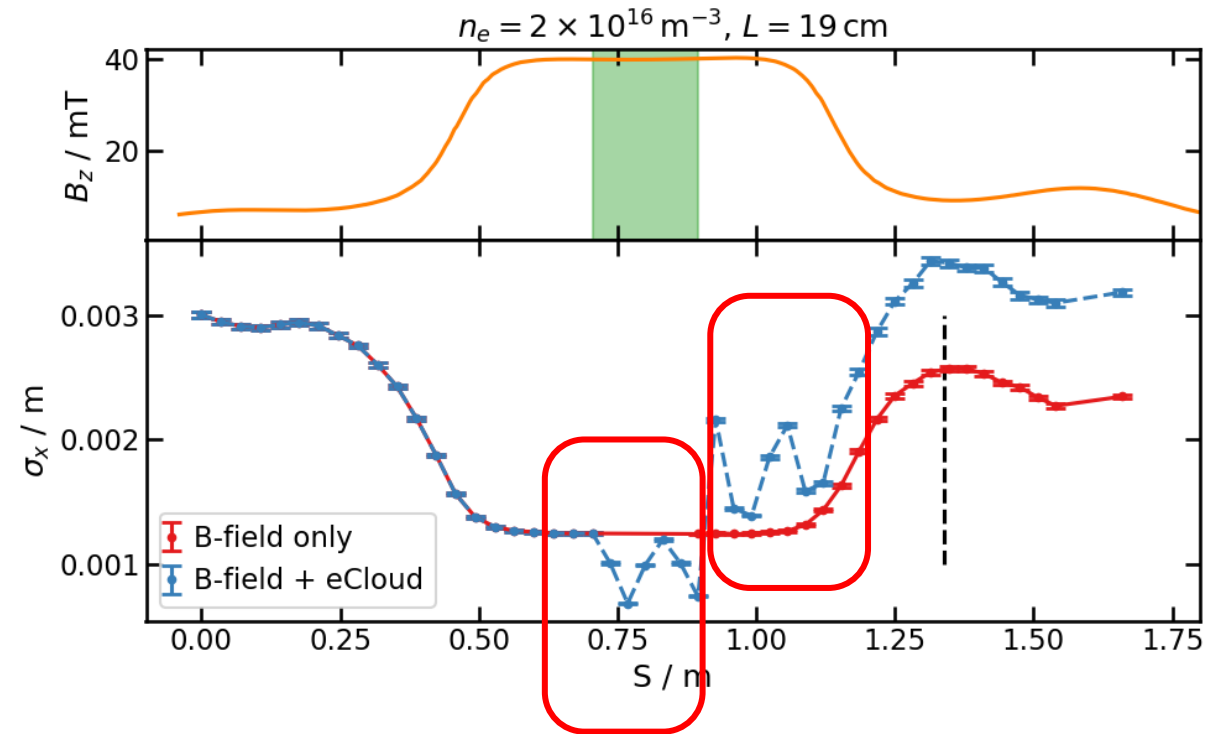
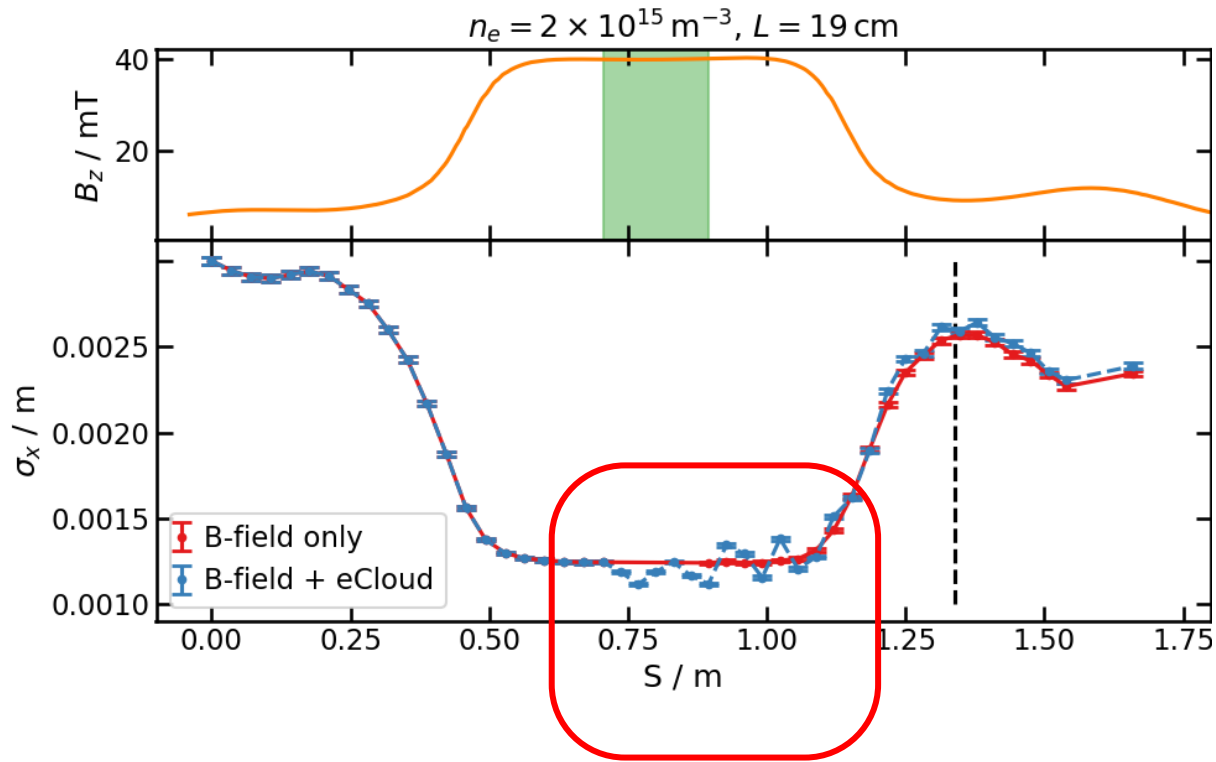


LhARA Capture Meeting

24th June 2021

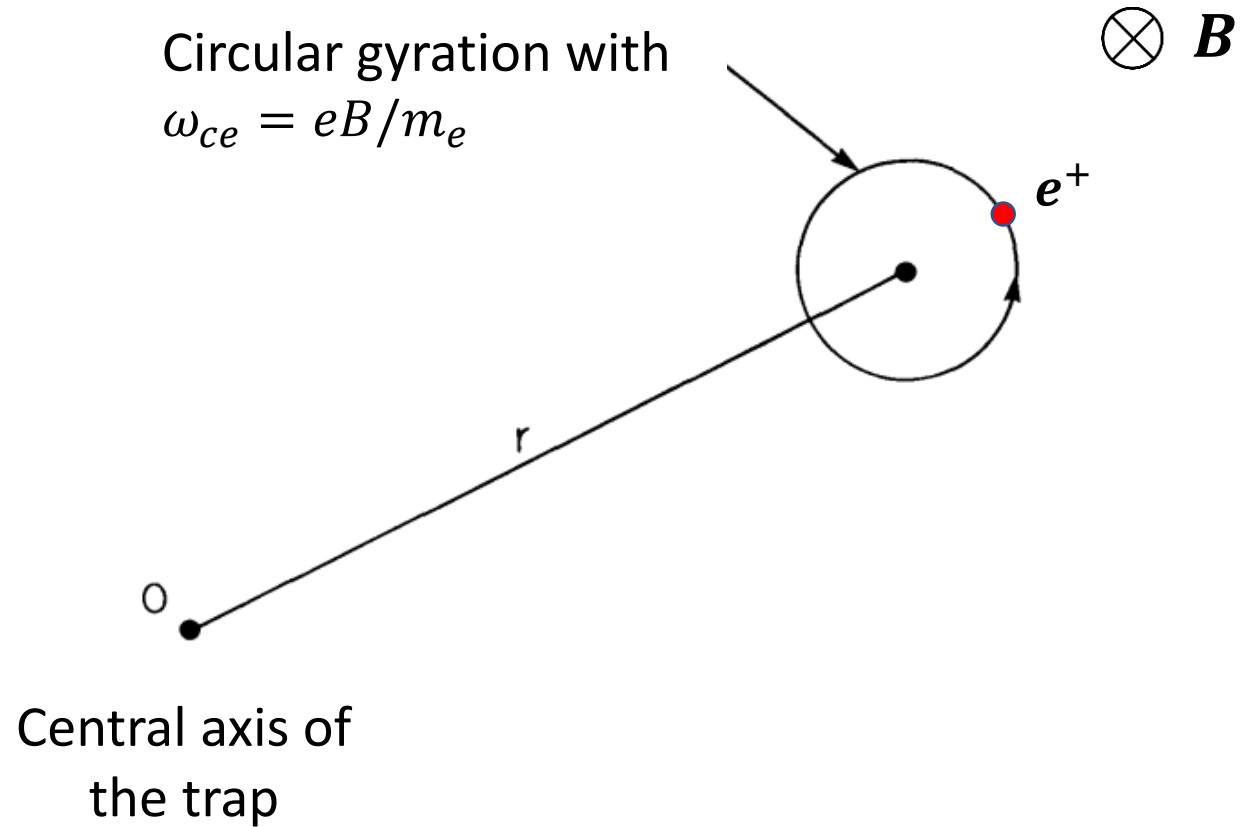
Titus Dascalu

Previous analysis



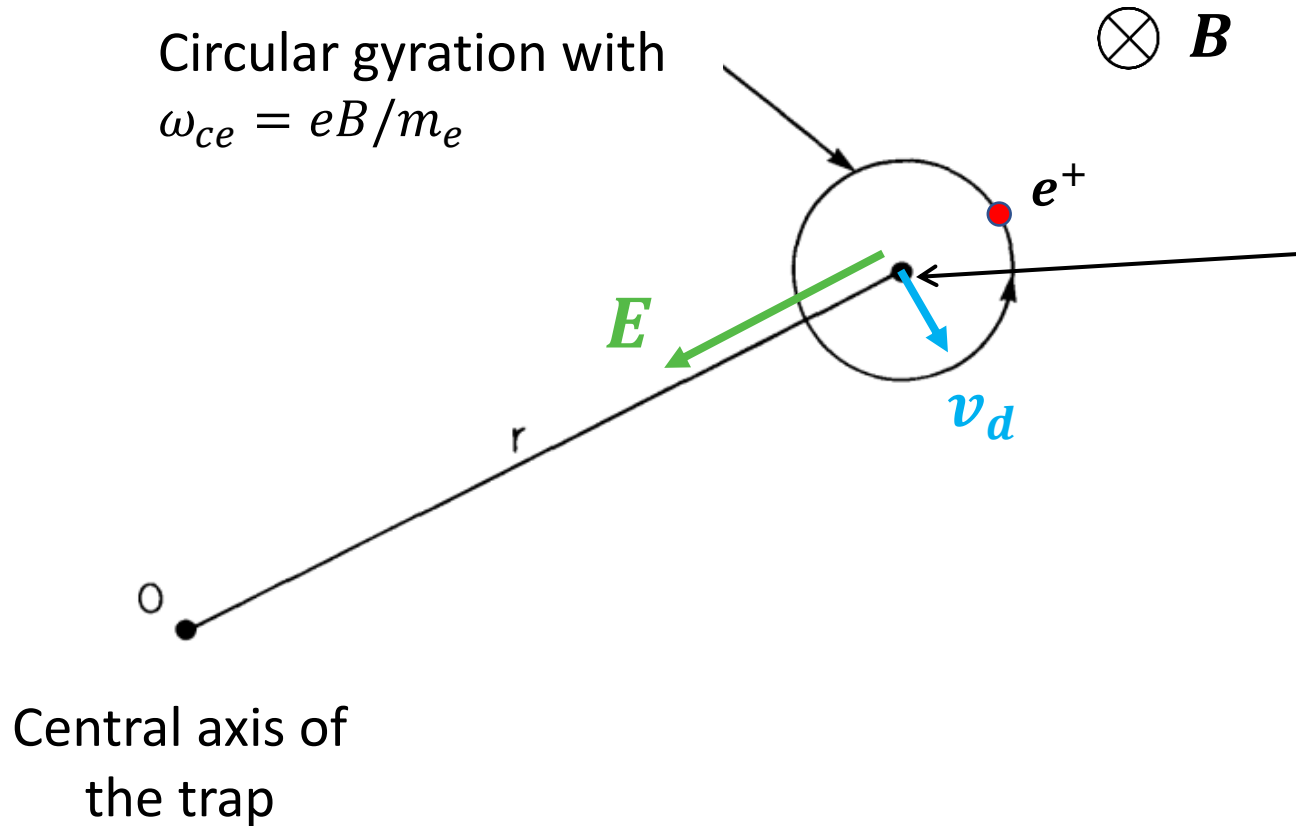
- What causes the oscillations?
 - Actual changes in beam size
 - Artefact of sampling
- Are oscillations consistent with single particle motion? **Is the beam focused?**

Single particle dynamics inside the e^- cloud



Single particle dynamics inside the e^- cloud

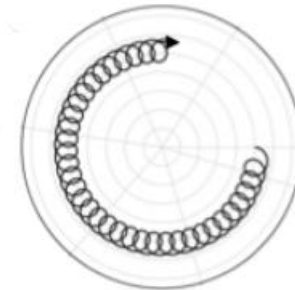
For uniform e^- cloud
 $E \sim r \rightarrow v_d \sim r$
 \therefore rigid rotation of e^+ beam



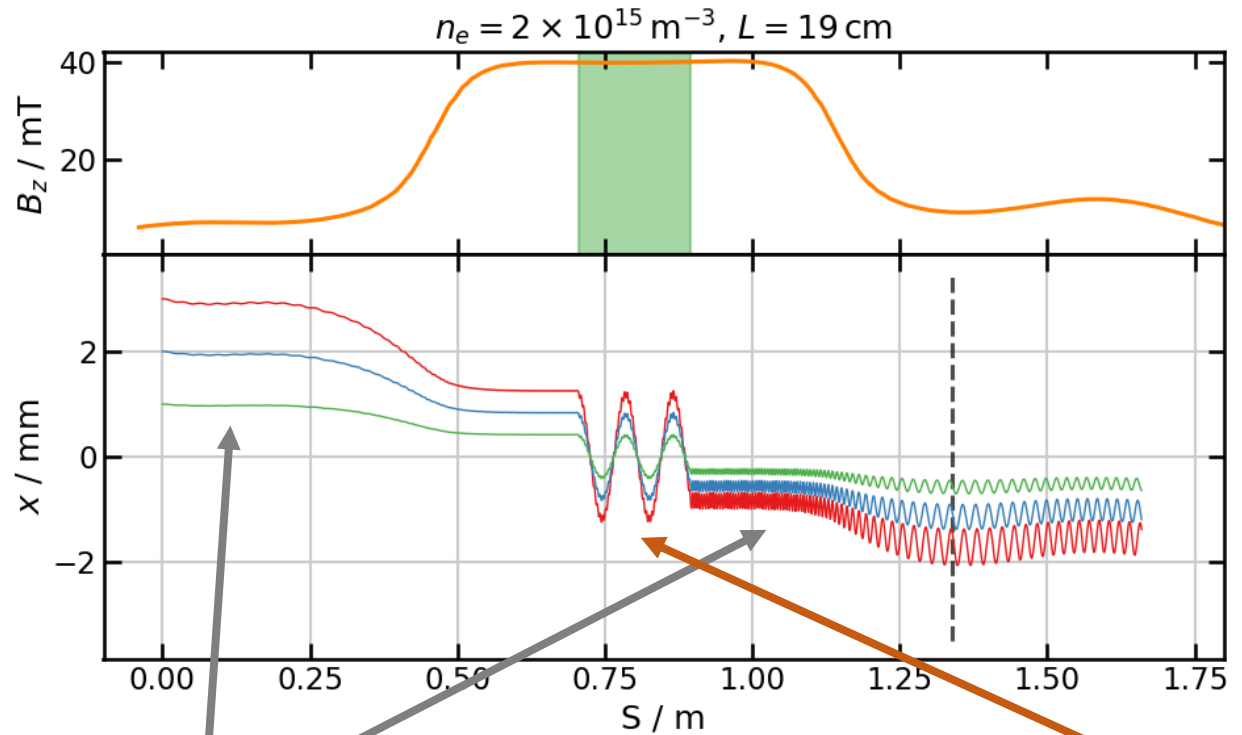
Guiding centre will drift with

$$v_d = \frac{E \times B}{B^2}$$

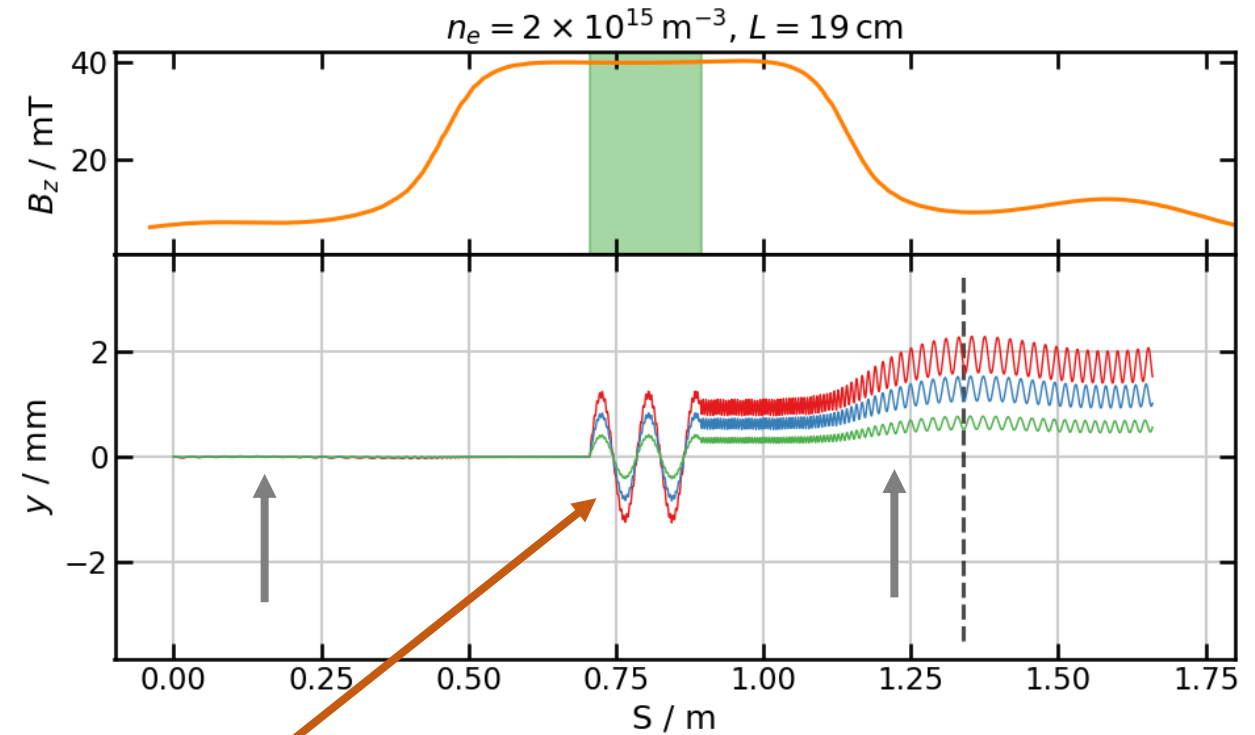
PM trap end view



Single particle trajectories inside the e^- cloud

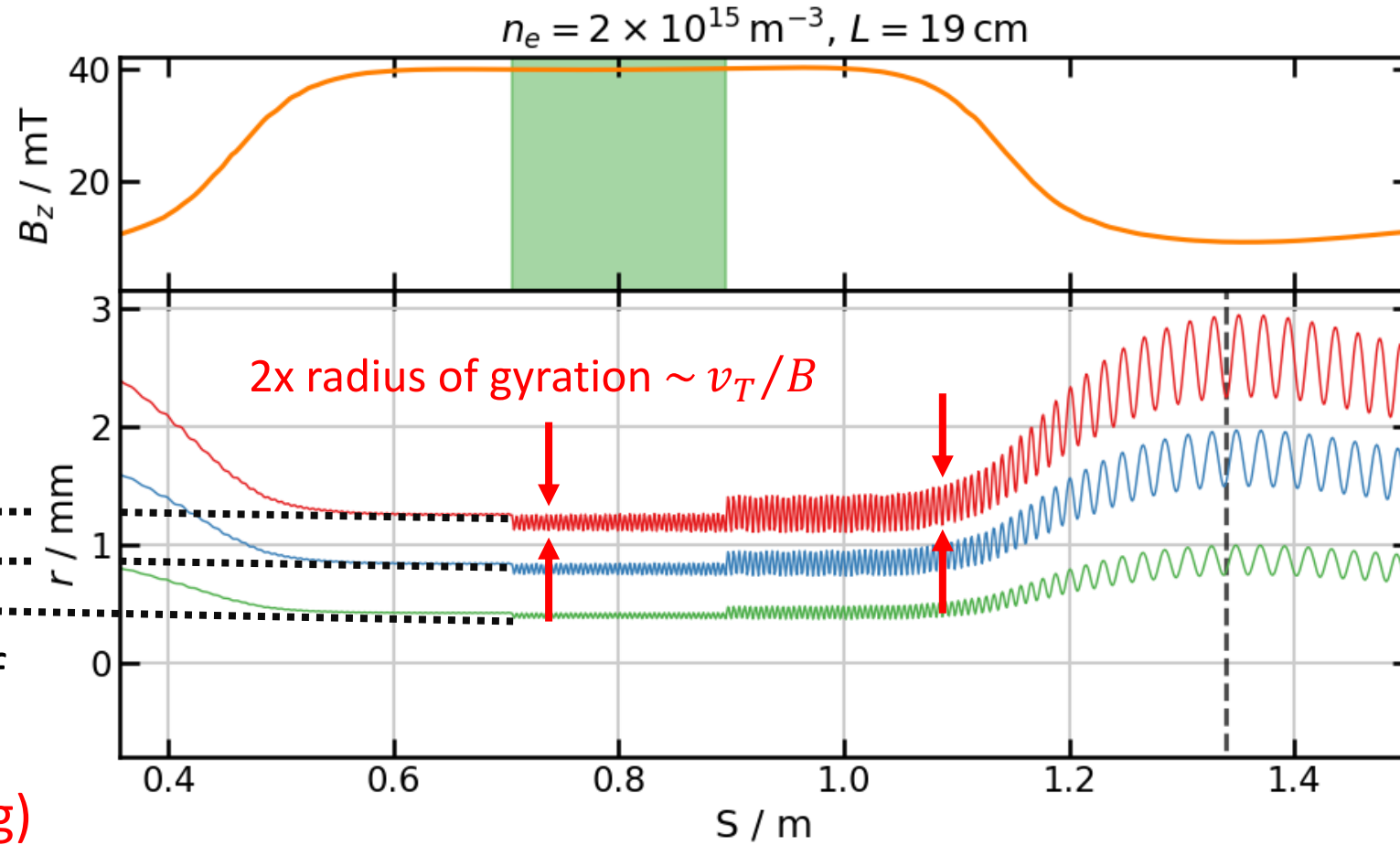


Gyromotion following the magnetic field lines



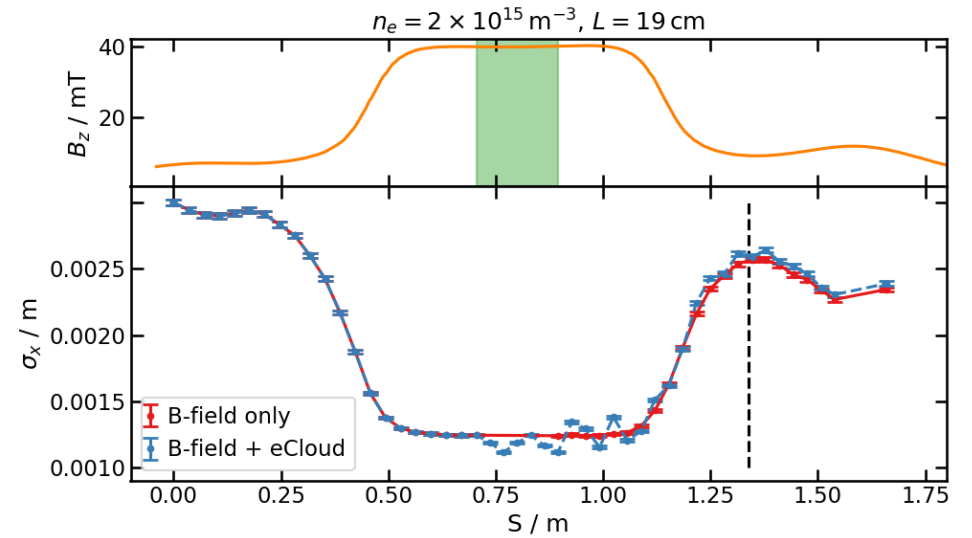
Rotation of the guiding centre + gyromotion around the guiding centre

Single particle trajectories inside the e^- cloud

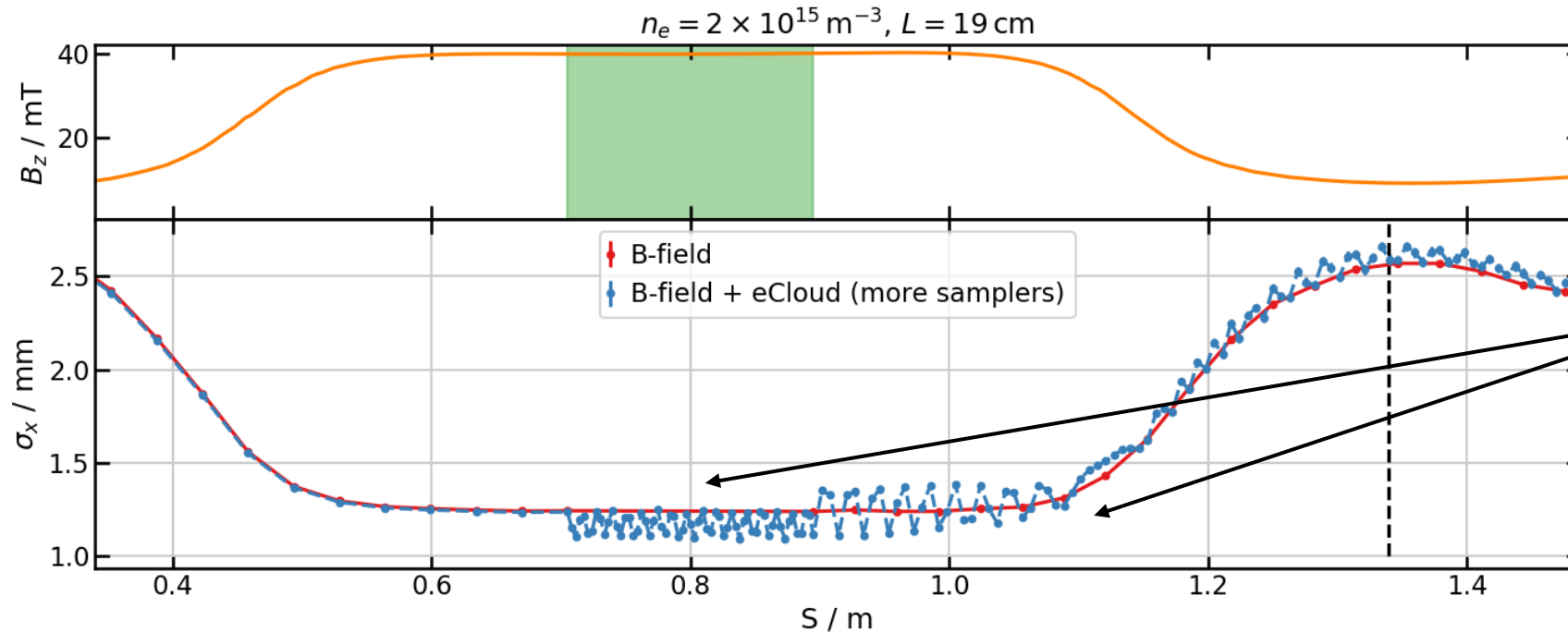


Back to beam size

before



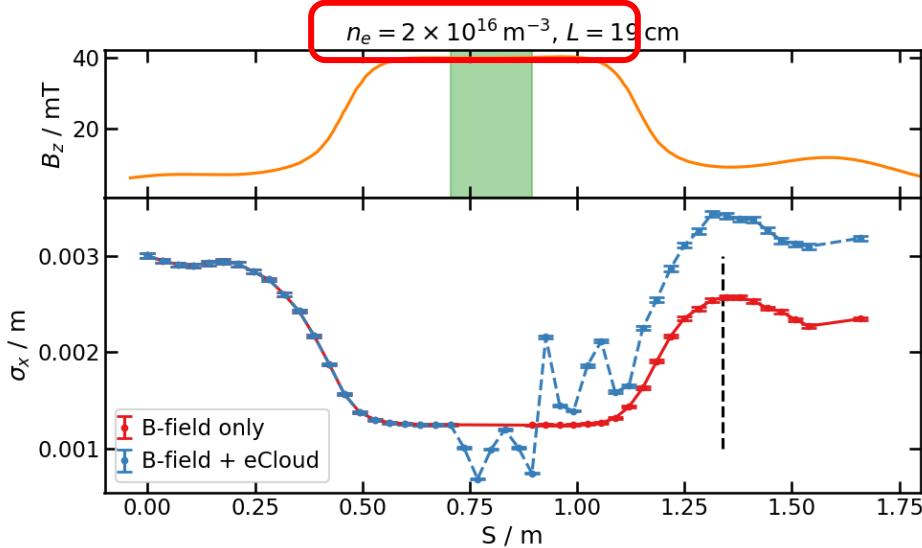
With more samplers



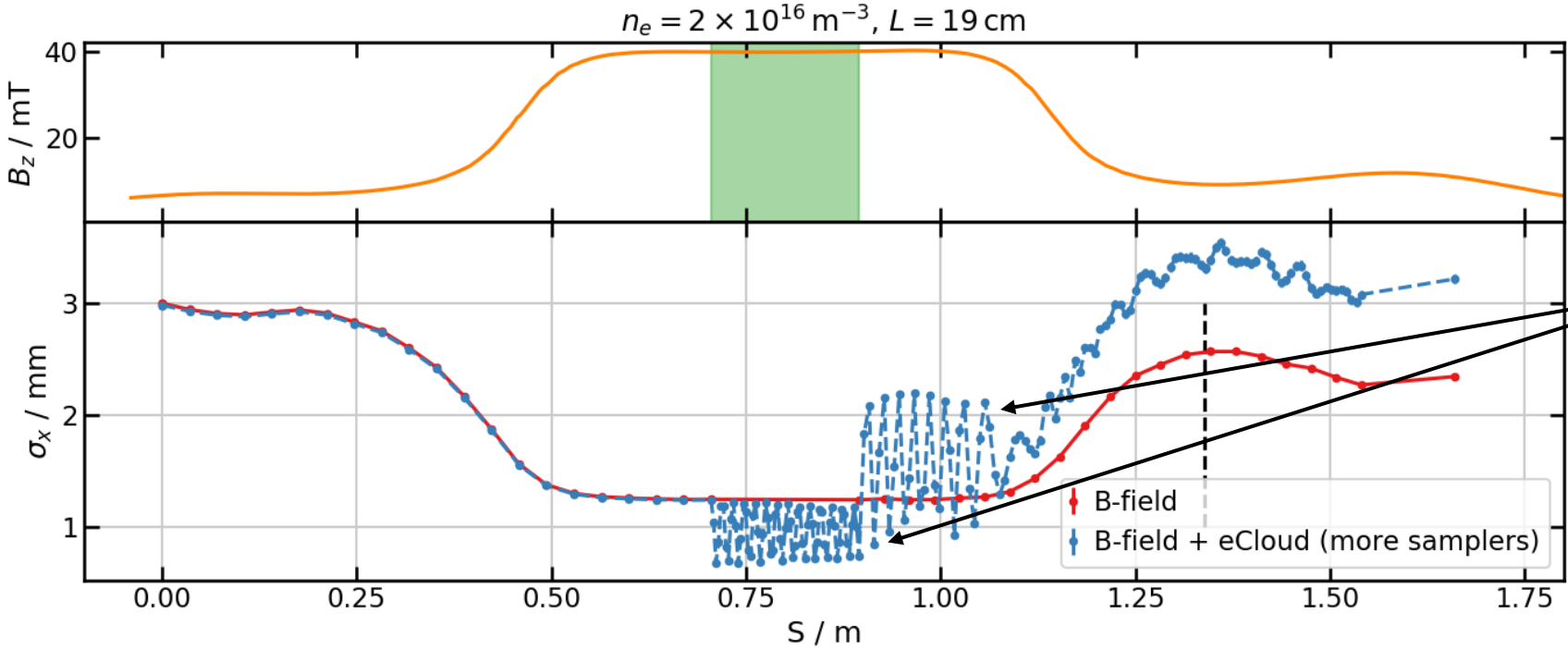
Sample oscillation of beam size due to gyration of each e^+

Back to beam size

before



With more samplers



Sample oscillation of beam size due to gyration of each e^+

Beam rotation in the e^- cloud

single particle trajectories

