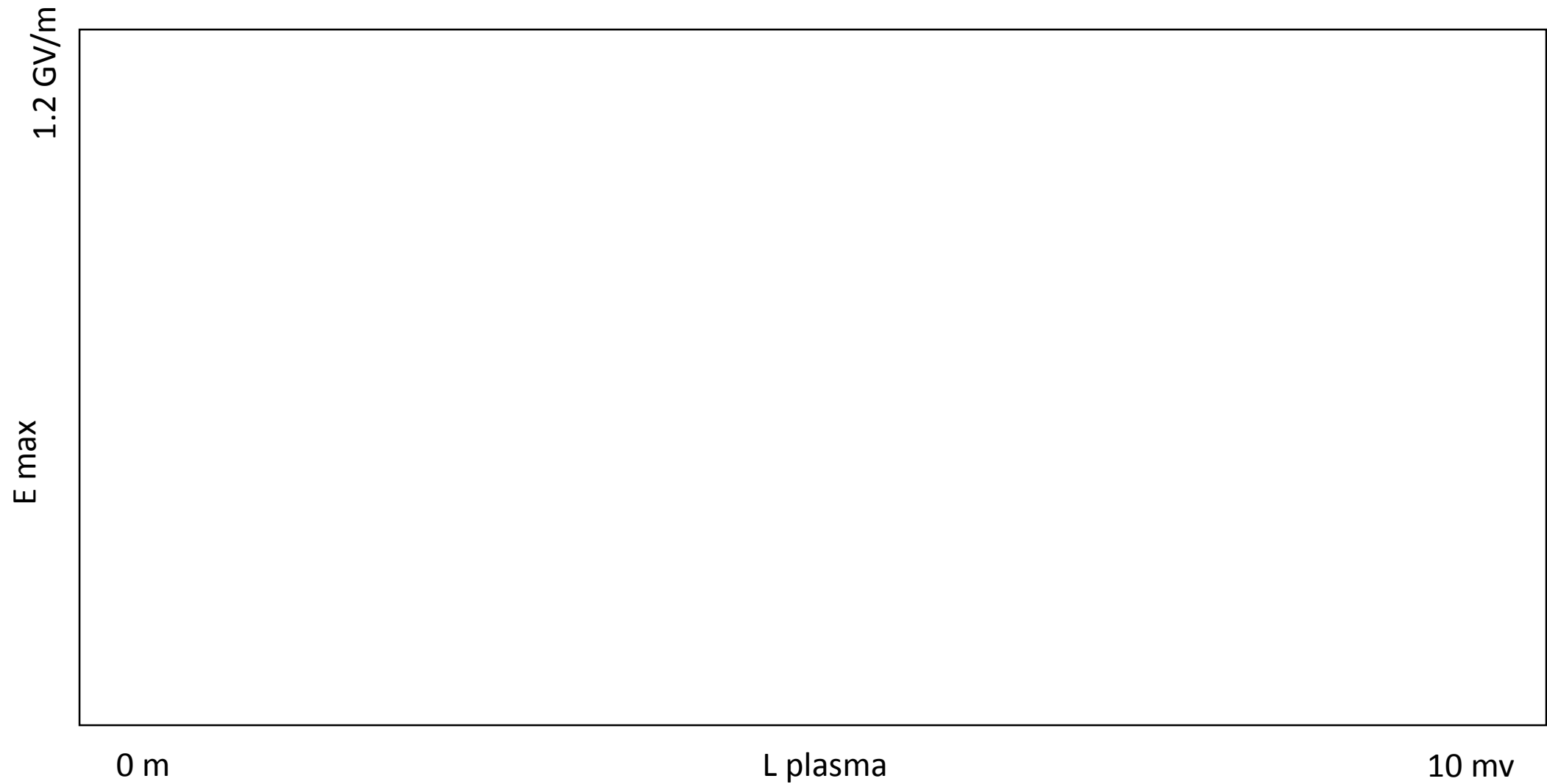


Electron seeding simulations (first attempt)

Pablo Israel Morales Guzmán

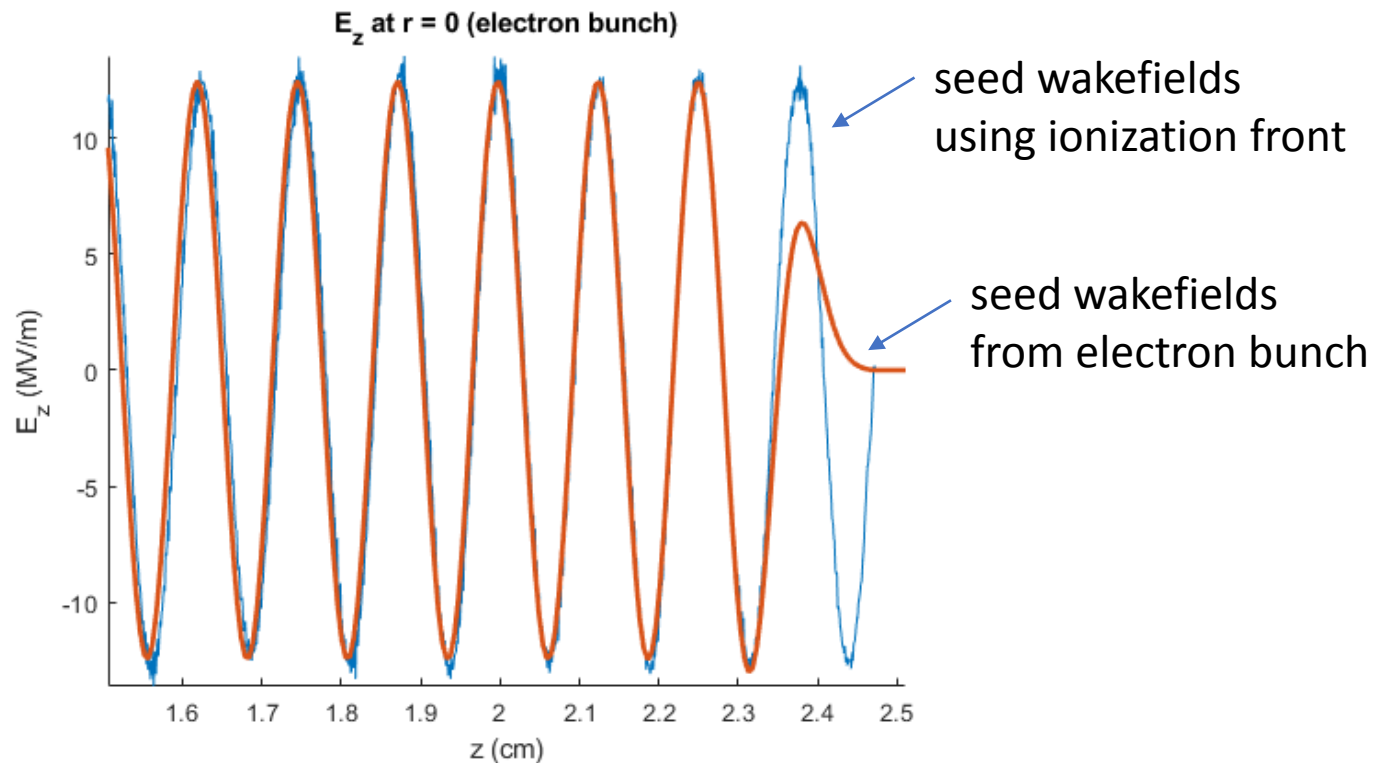
Group meeting 18/10/2019

Main idea



Linear theory

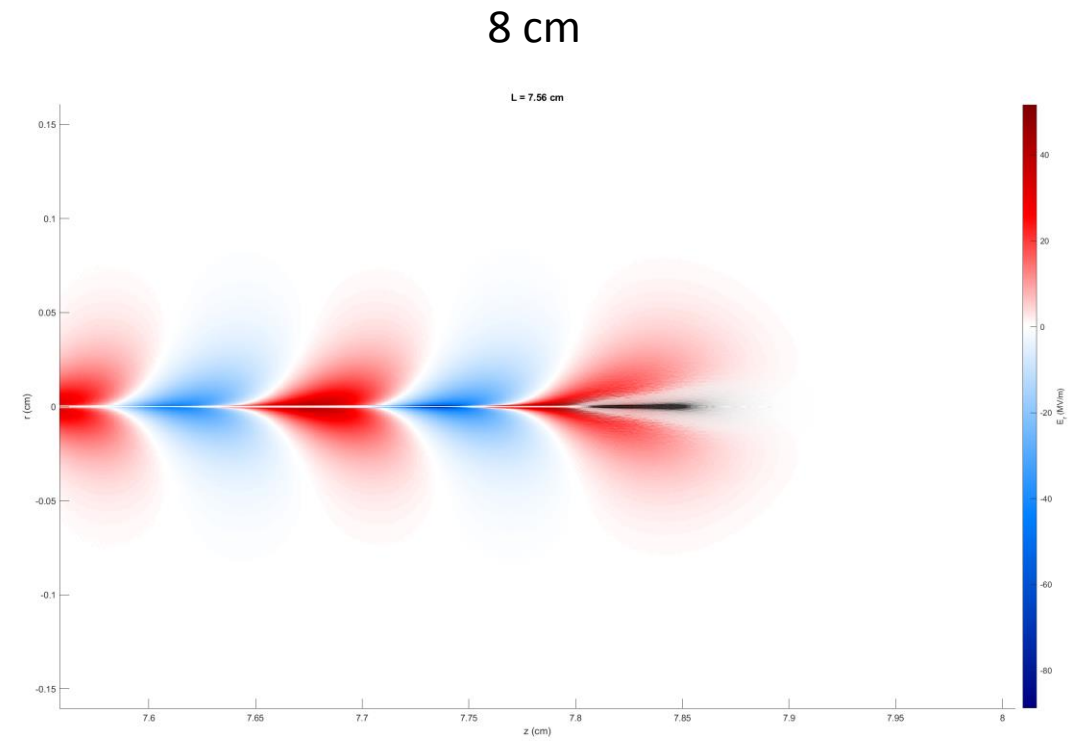
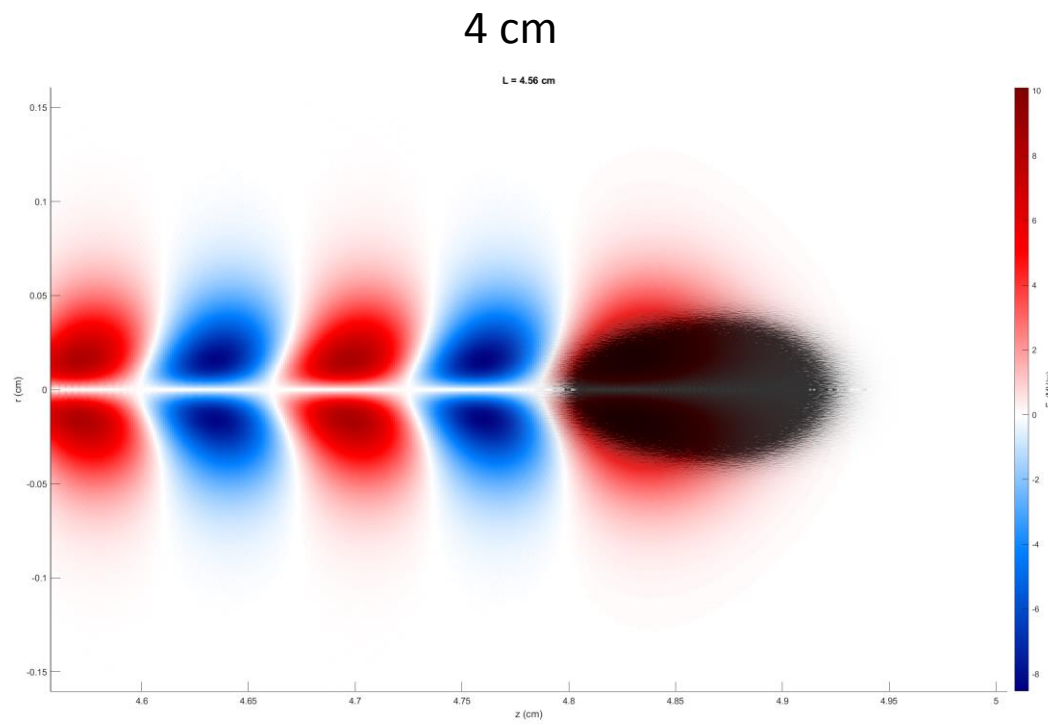
- Using linear theory, I calculated electron bunch properties such that it produced the same seed wakefields as the proton using the ionization front.

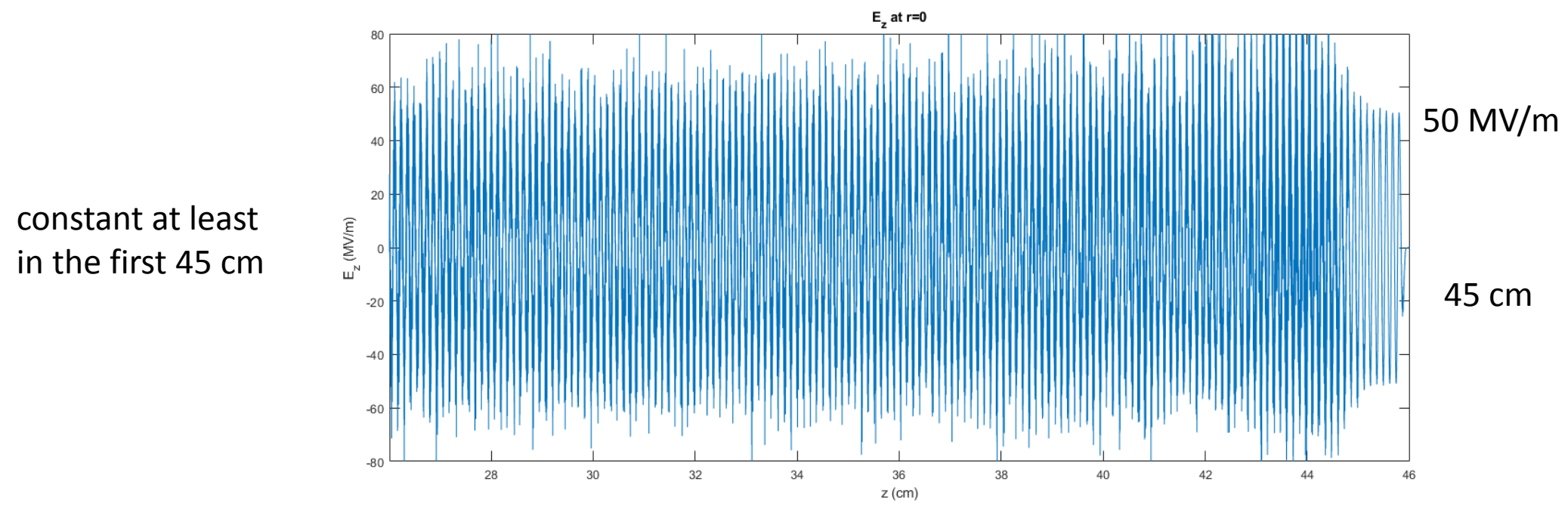
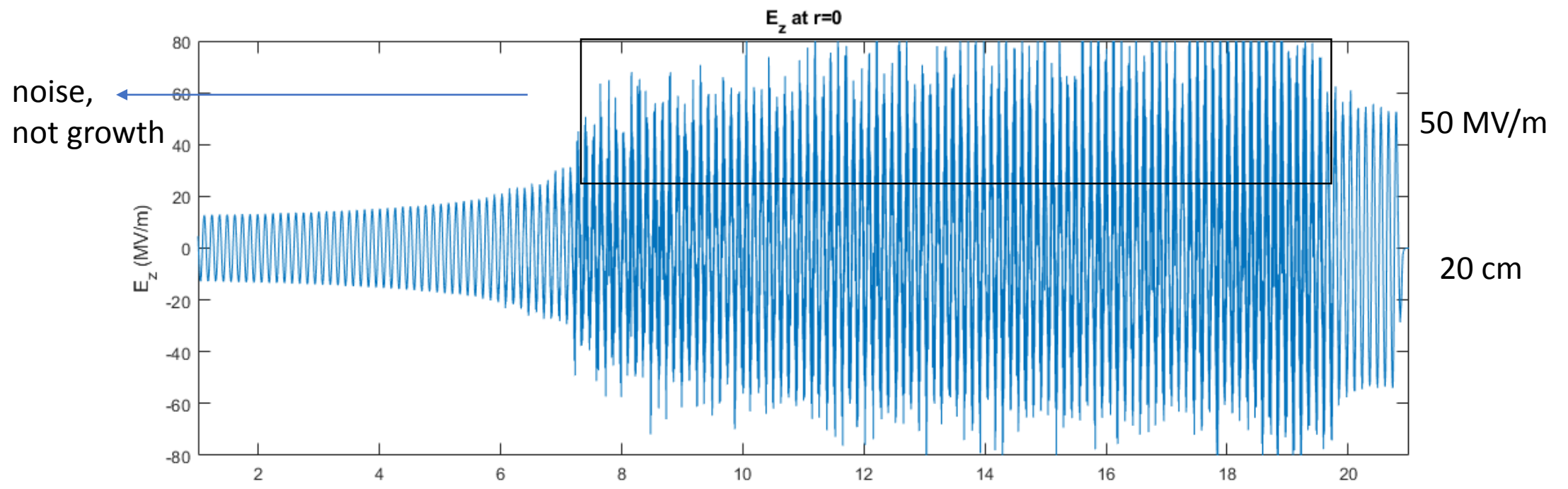


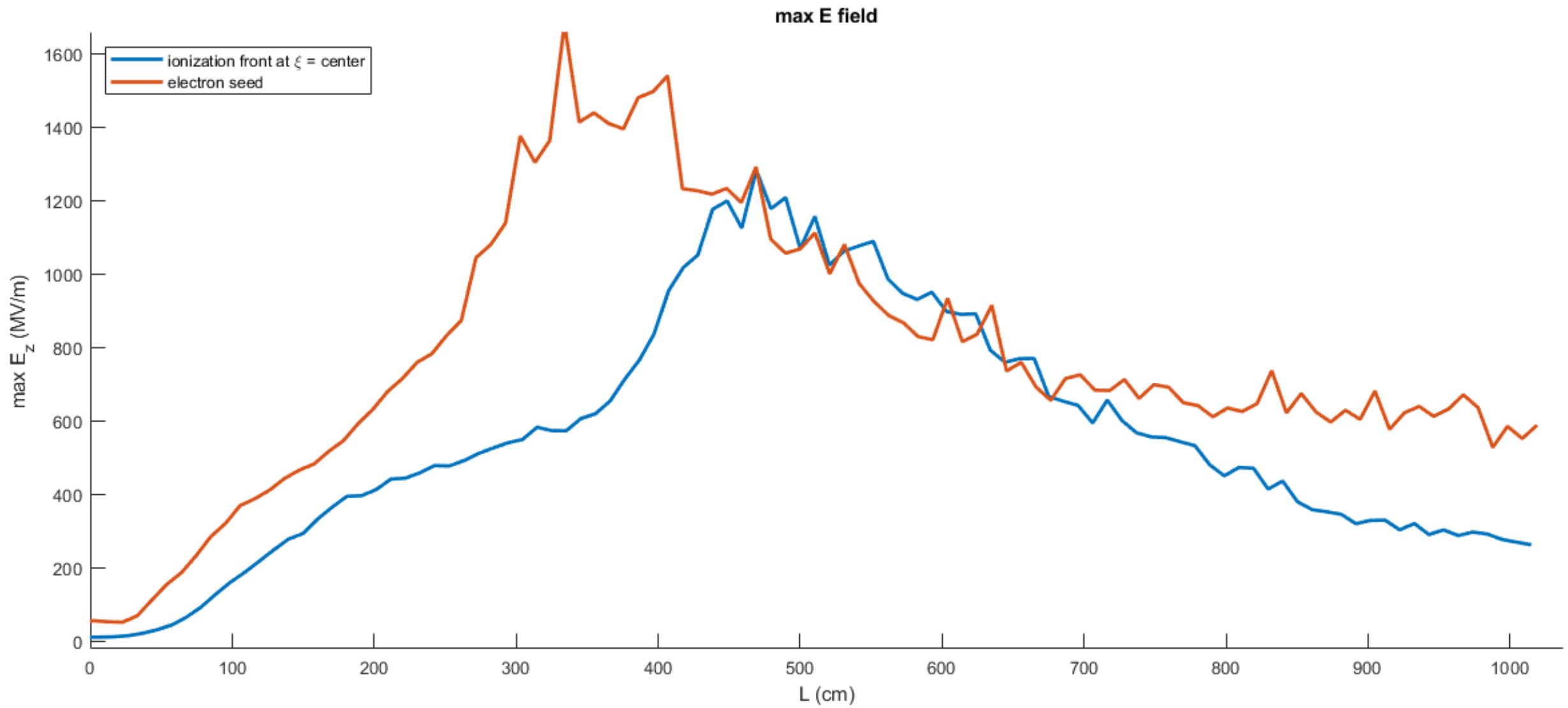
Property	Value
σ_z	0.03 cm (less than $\lambda/4$)
σ_r	0.02 cm
energy	165 MeV
norm. emittance	255 mm mrad
charge density	0.009 plasma density

Results

- Electron bunch pinches.



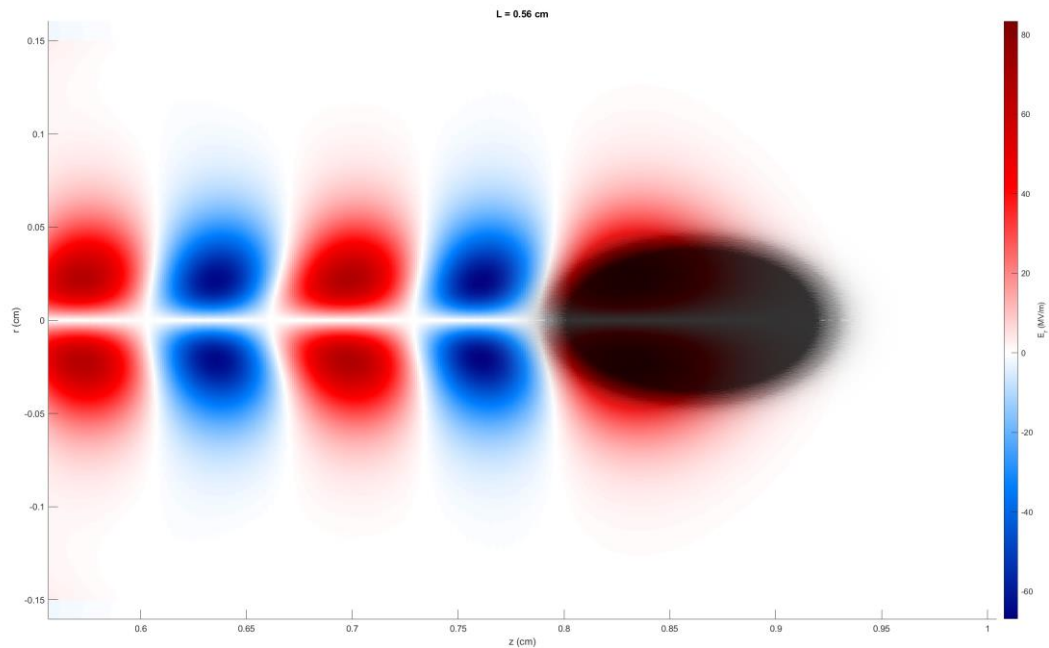




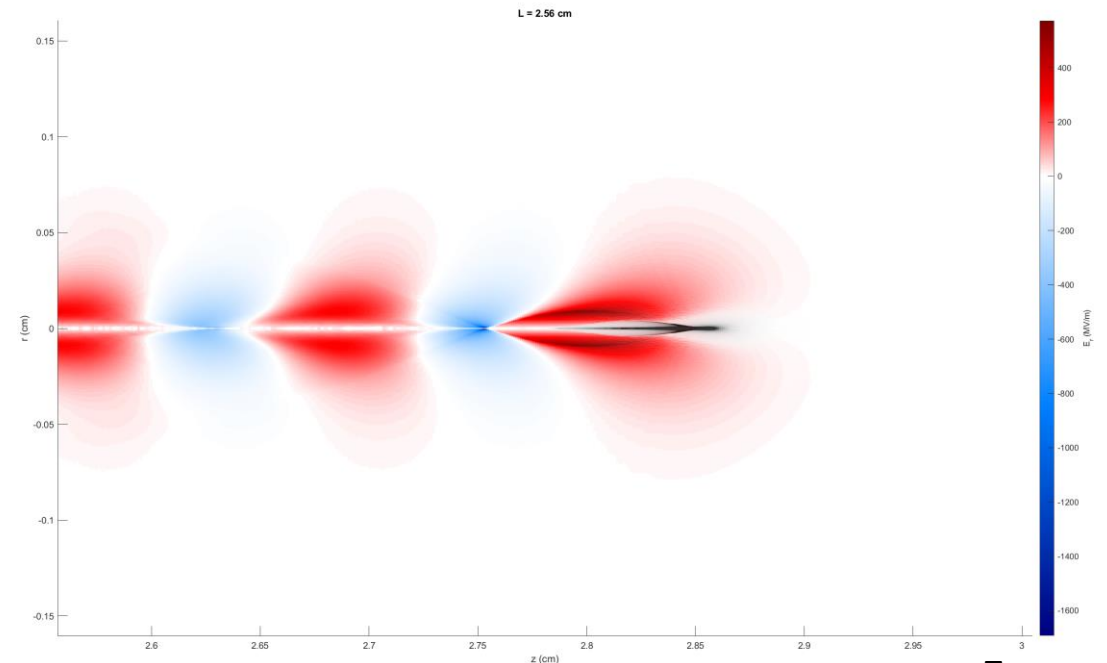
Increase charge by 10: Results

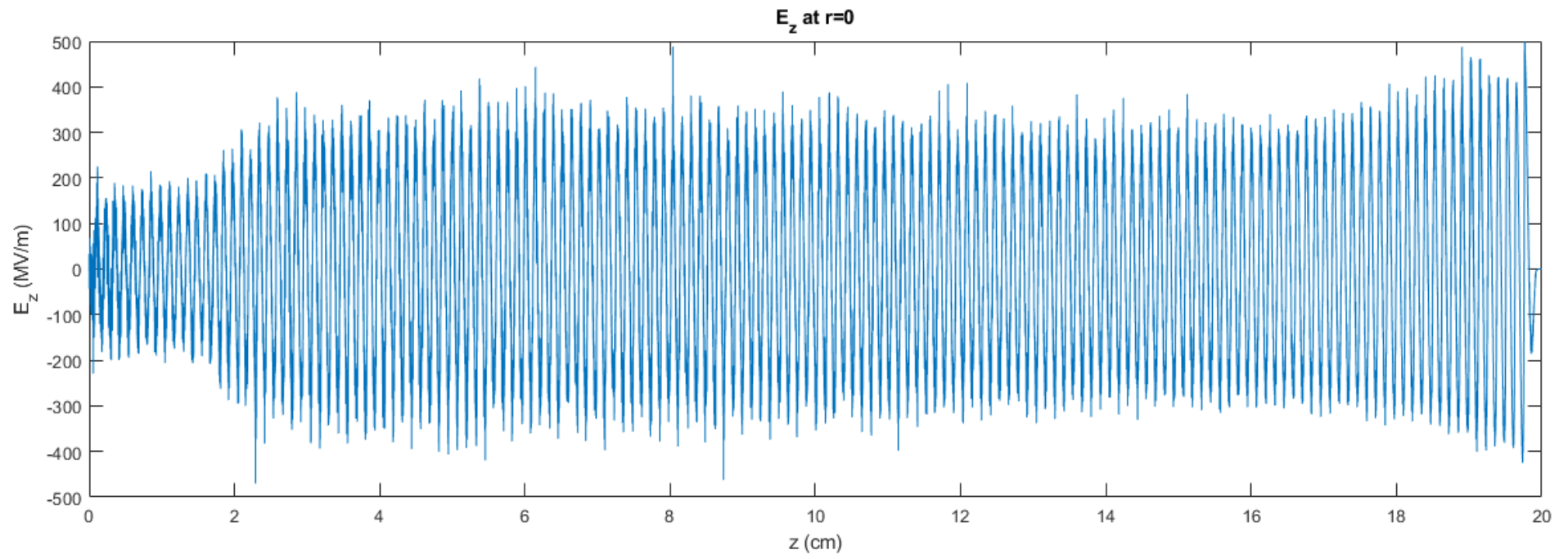
- Electron bunch pinches earlier.

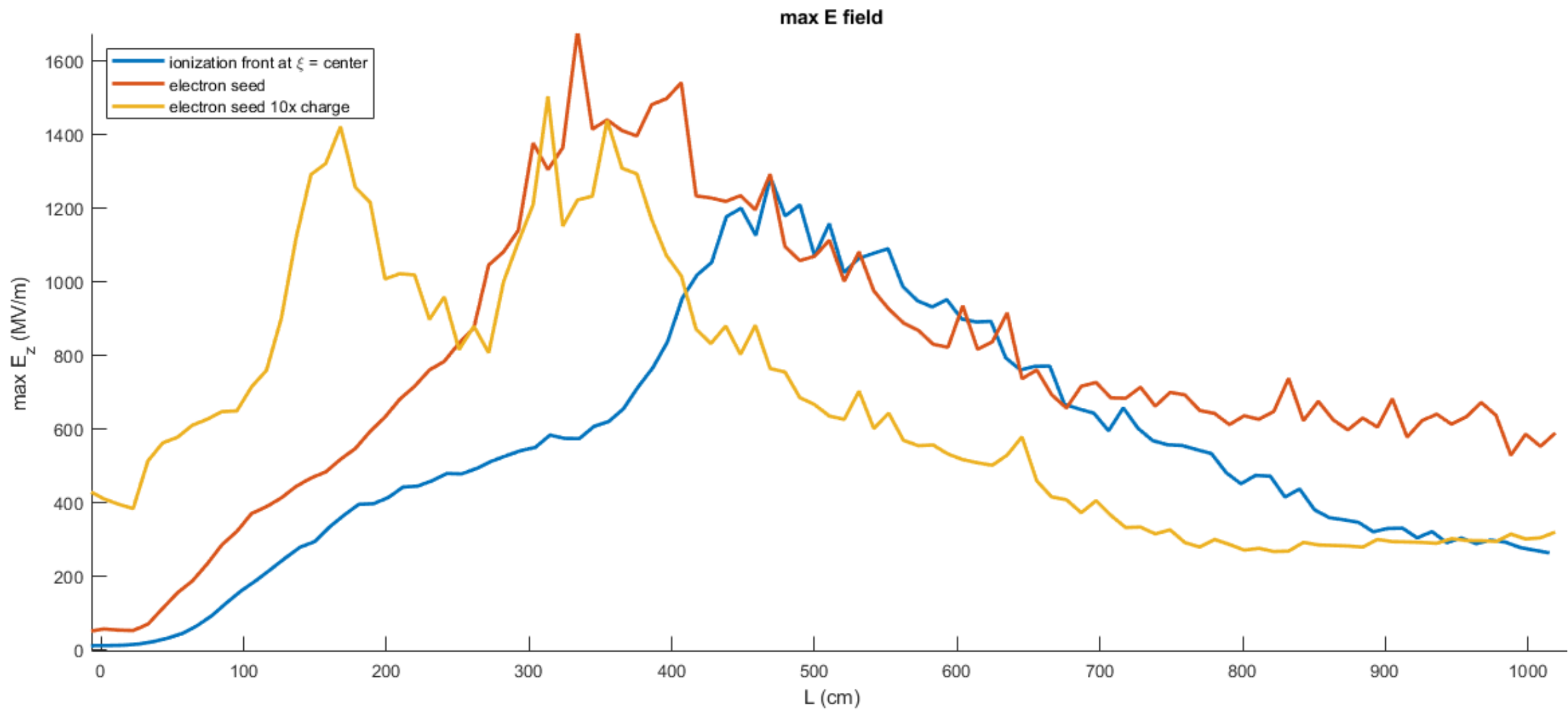
1.5 cm



2.5 cm

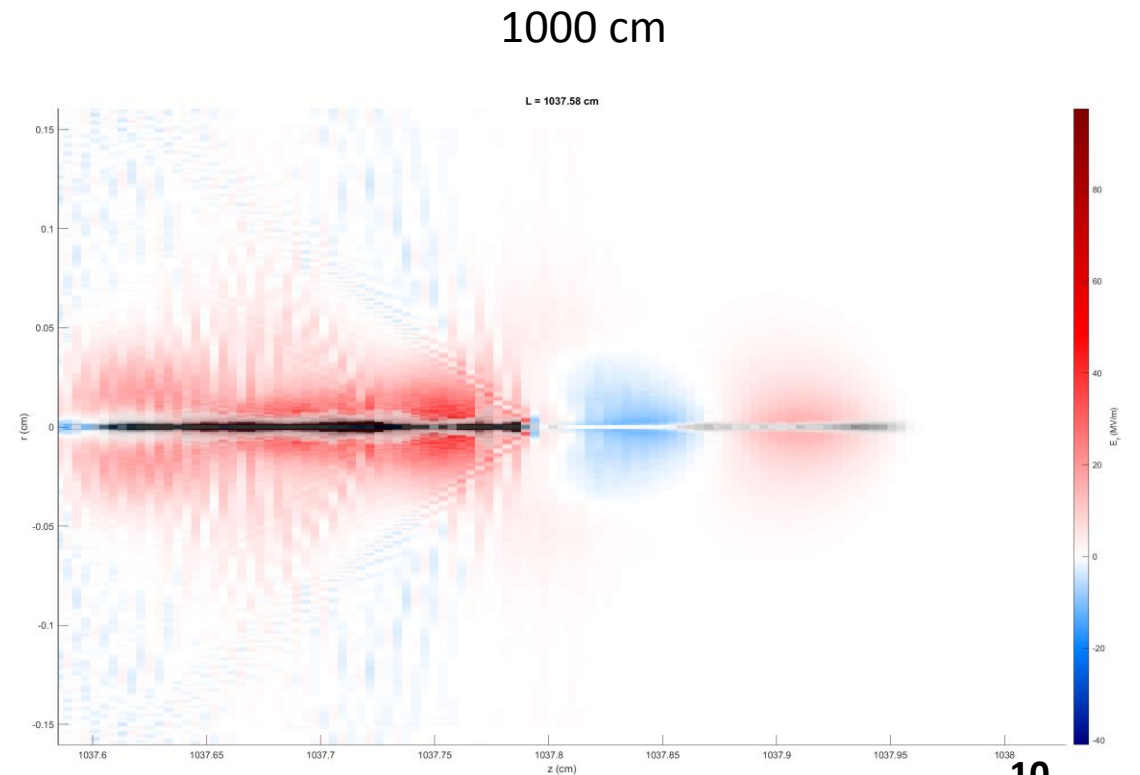
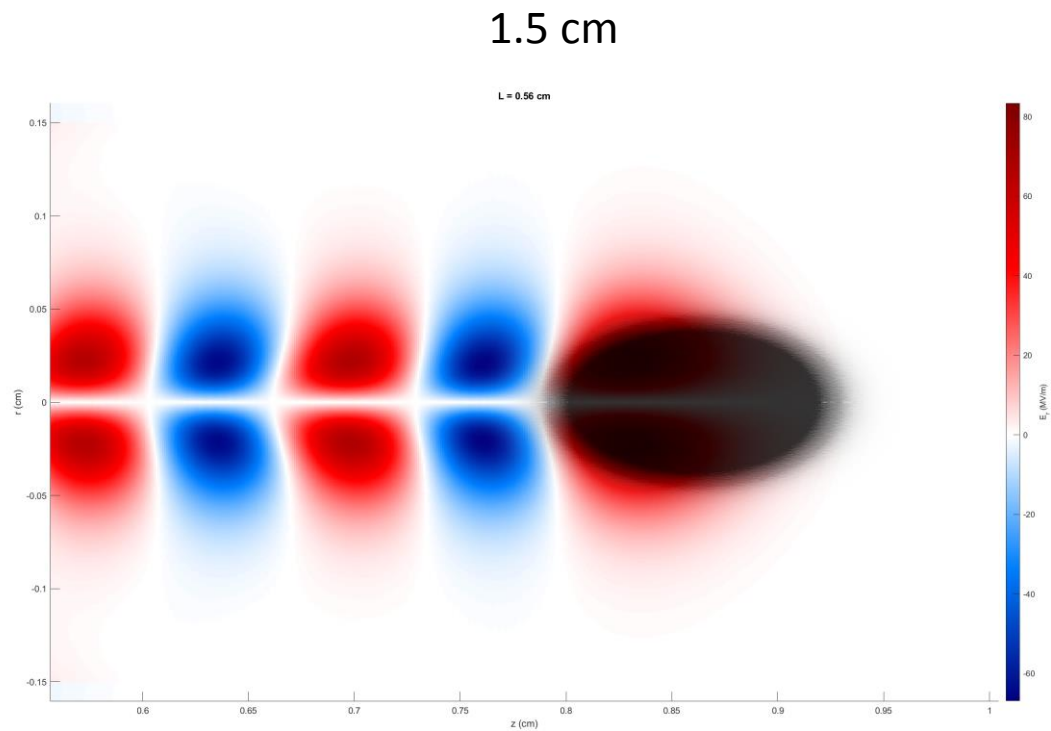


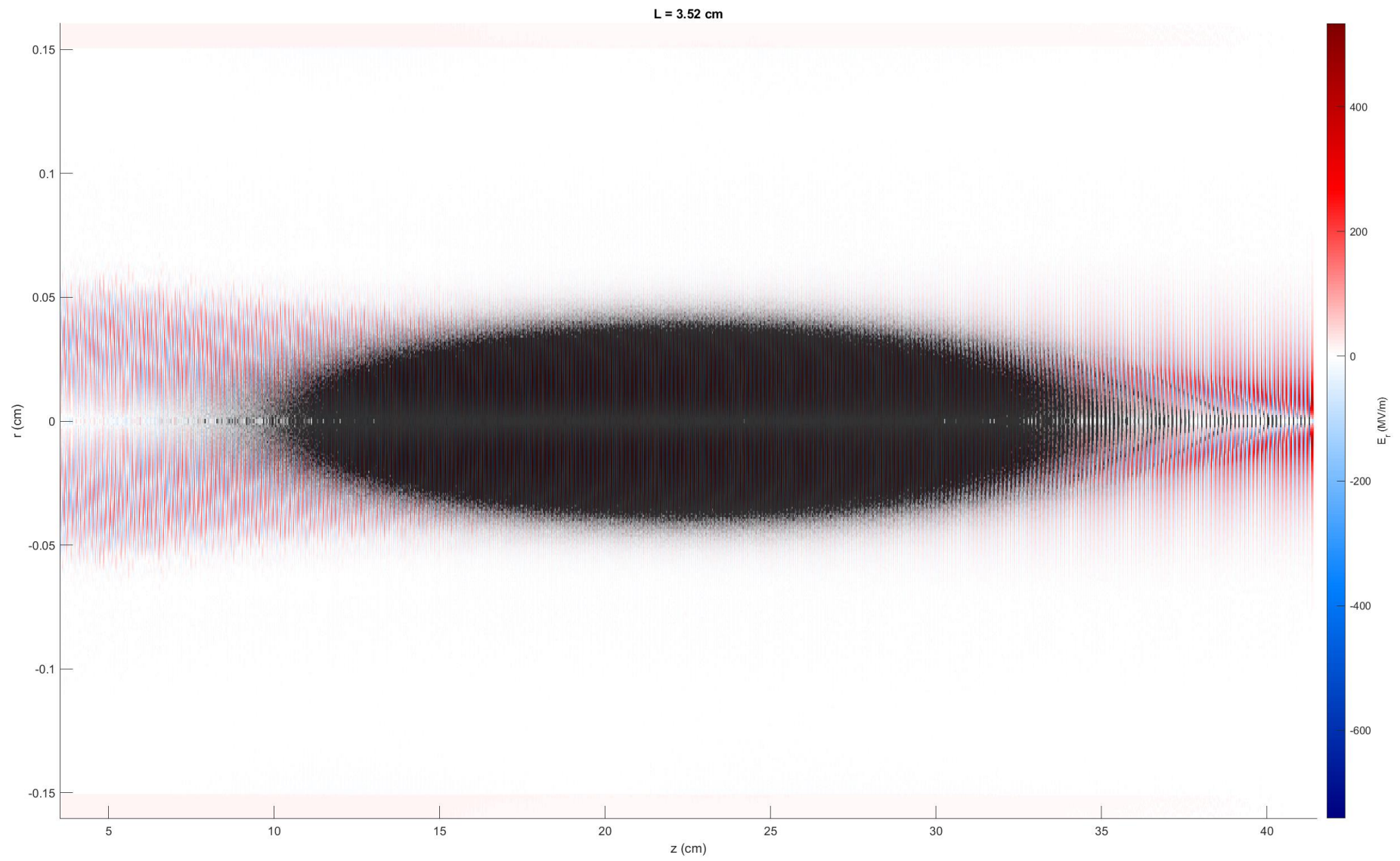


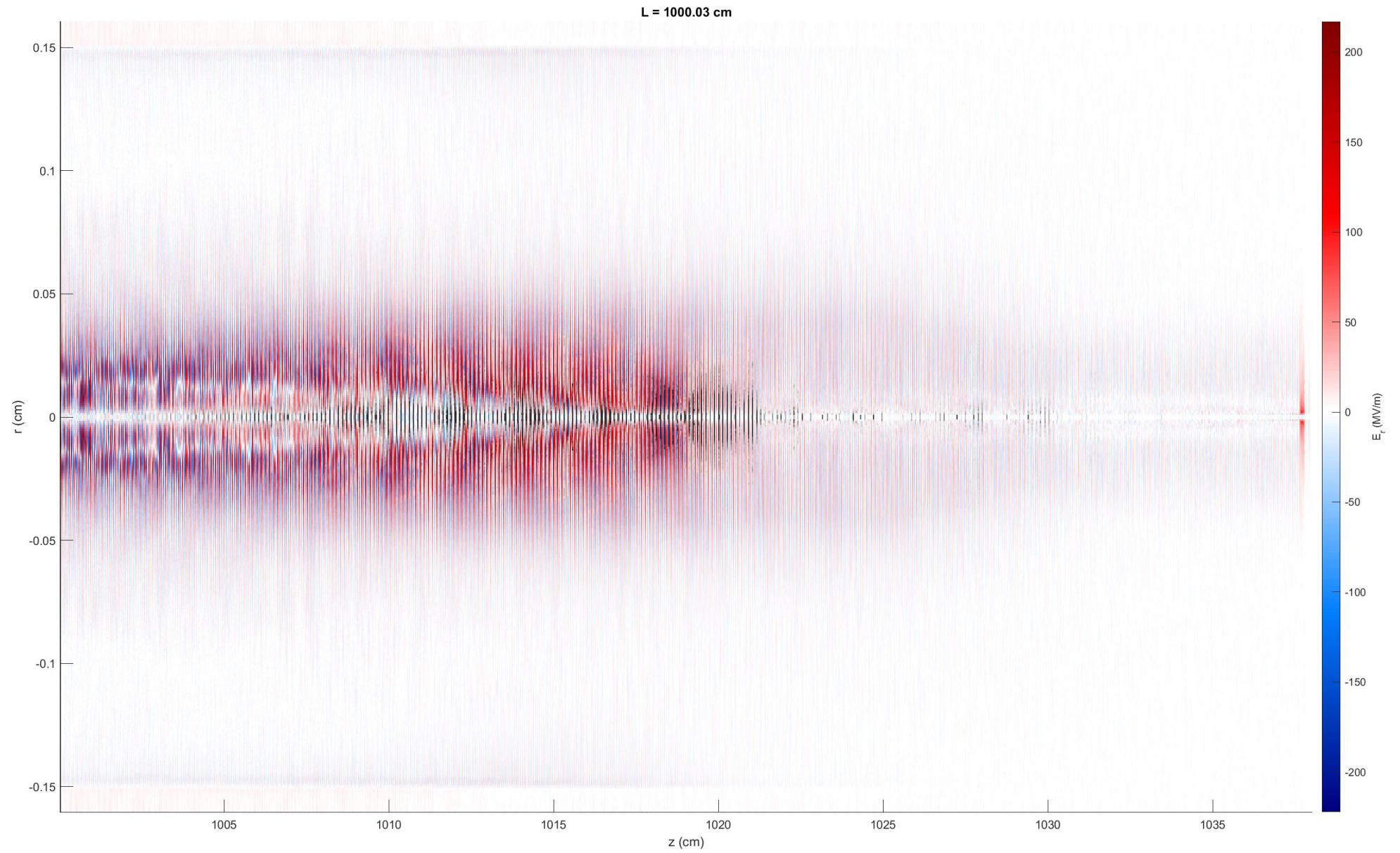


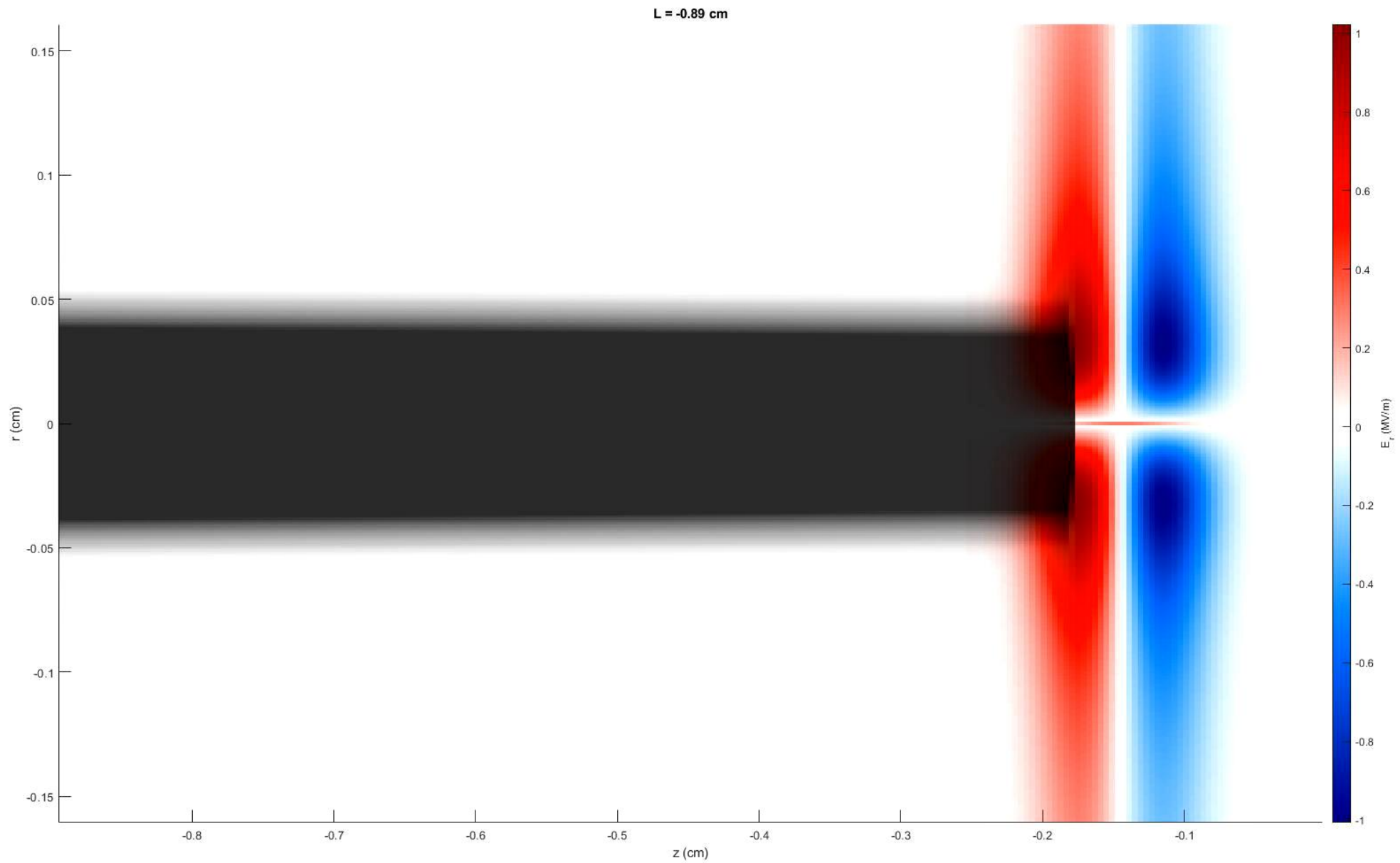
Dephasing

Electron bunch does not have enough energy to maintain a velocity close to c









I have to find

- Electron bunches that have a ...
 - constant size
 - constant wakefields production
 - constant phase
- ... during at least 1m (or how long?)
 - Energy
 - Emittance/size
 - Charge density
- Start with blowout matching and then trial and error

