Osiris: Electron Bunch Seeding Simulation

- Bunch size σ_r= 0.48mm
- Bunch length σ_ξ= 5.1ps = 1.2mm
- Proton population $N_{e^-} = 2.5 \cdot 10^9$
- Density: $n_{Rb} = 2 \cdot 10^{14} cm^{-3}$

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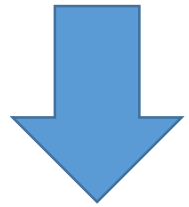
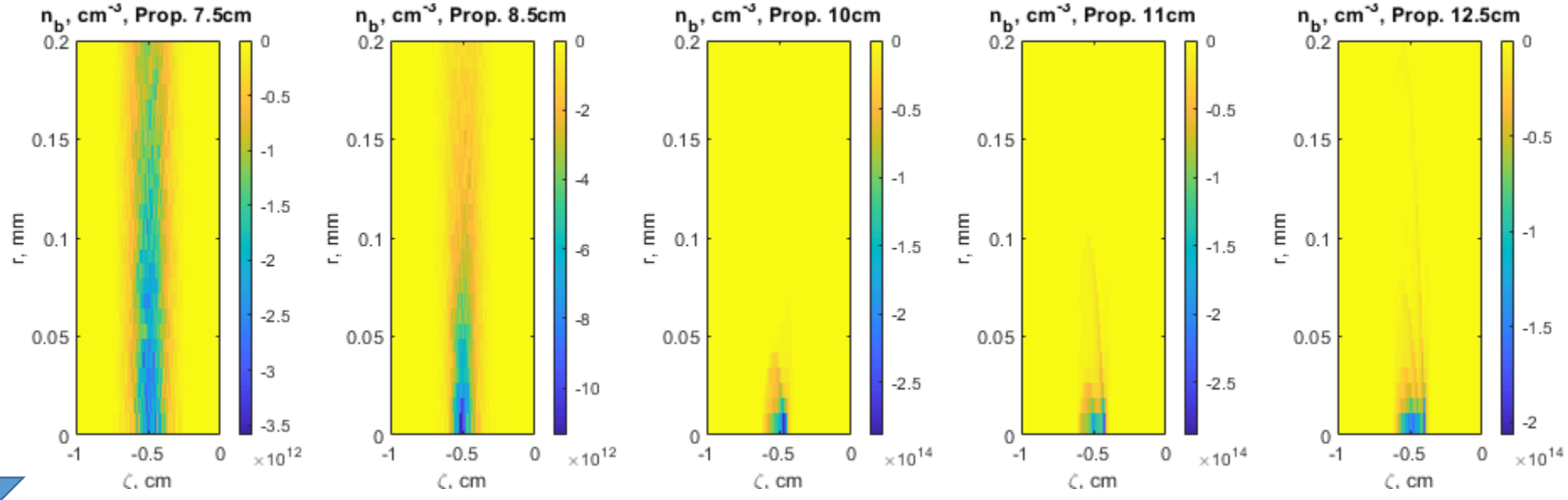
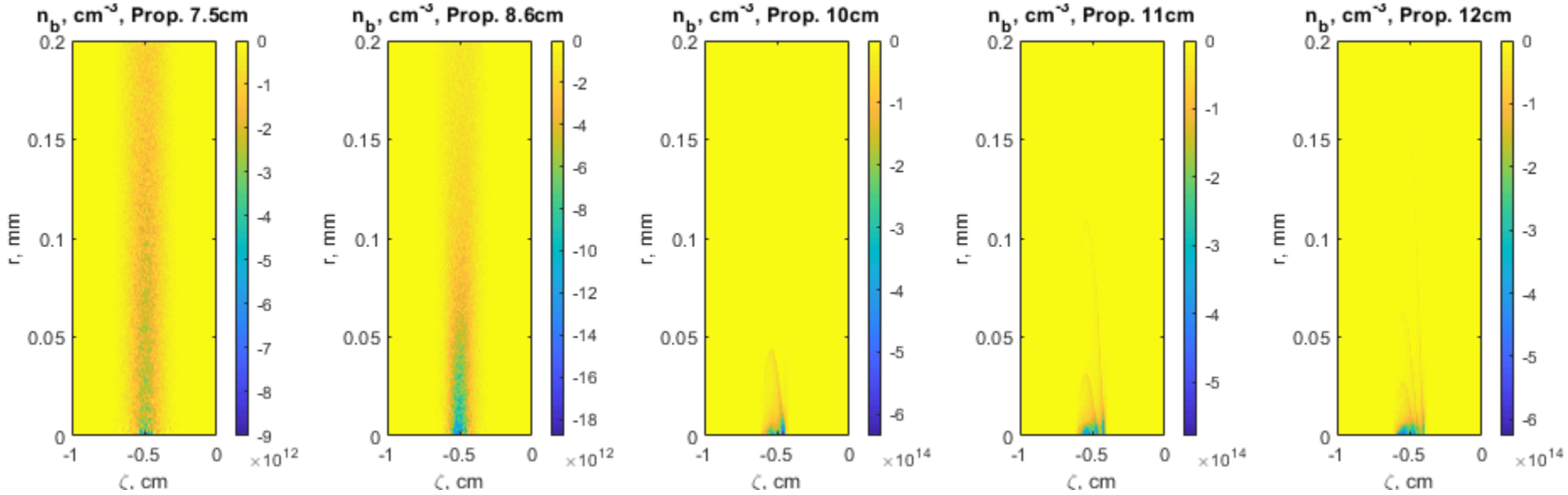
CHARGE DENSITY

Higher resolution (x10)
→ Resolving electron bunch







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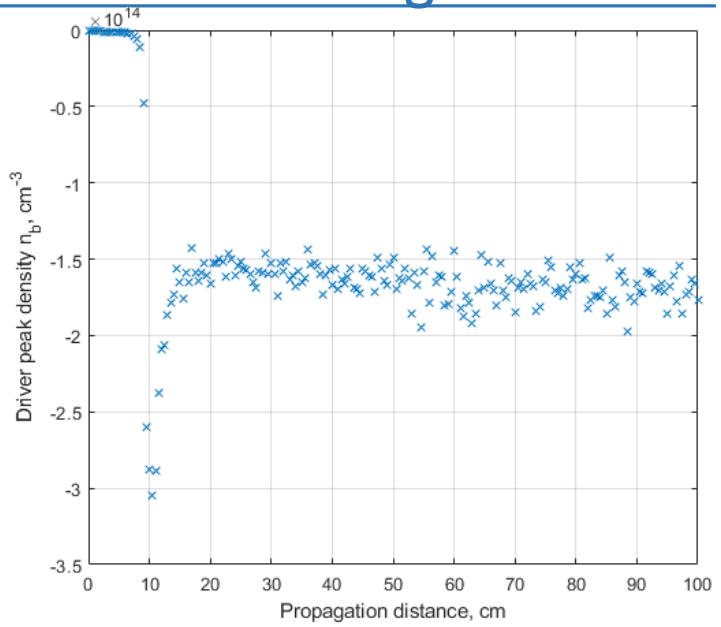
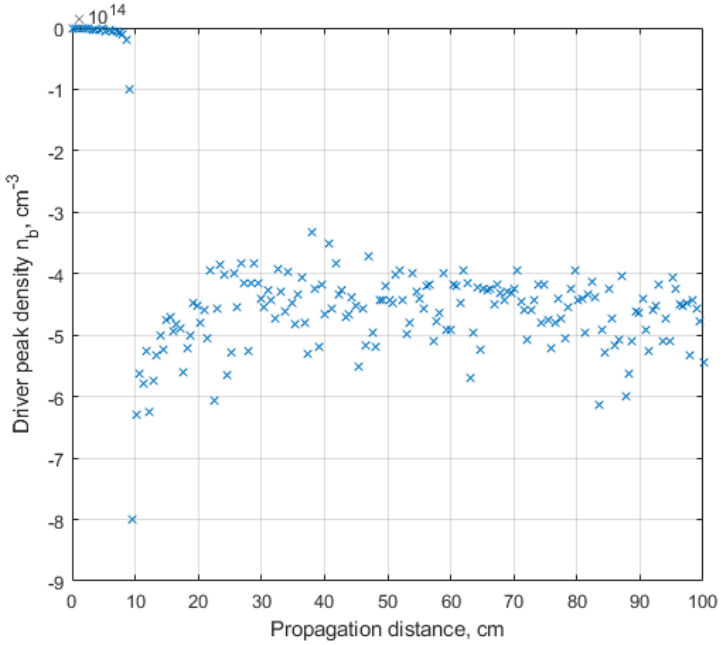
PEAK CHARGE DENSITY



Higher resolution (x10)
→ Similar result but higher values



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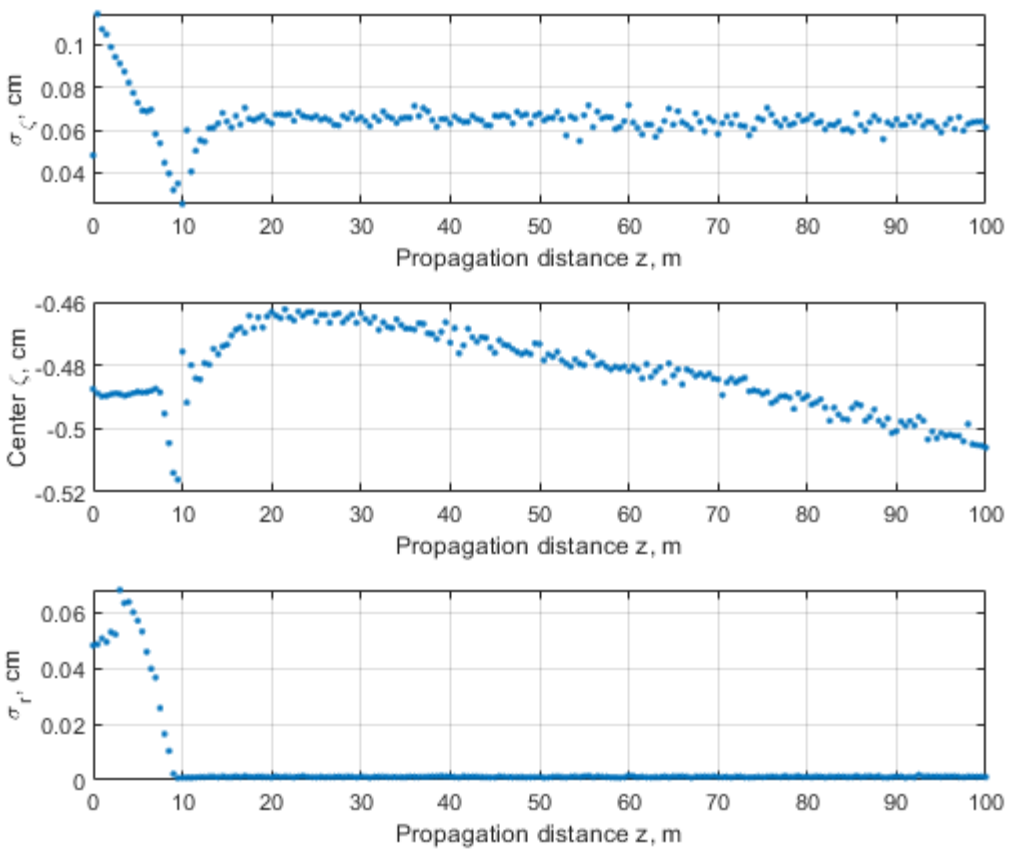
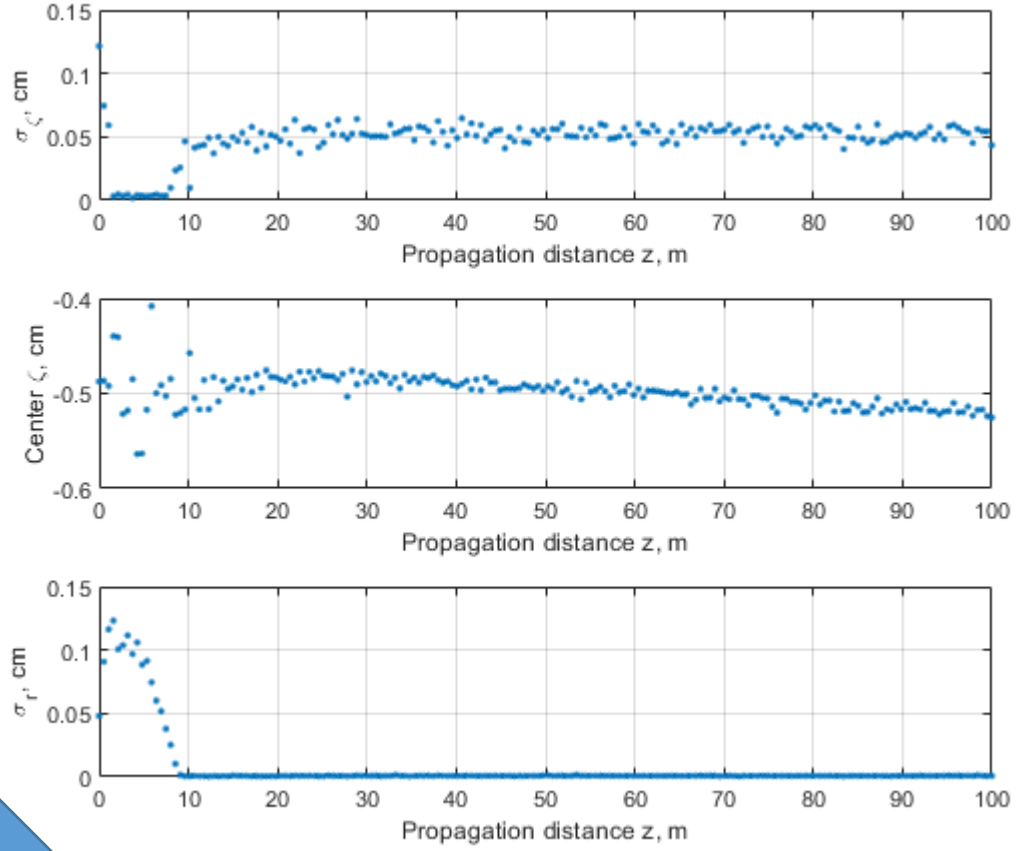
BUNCH SIZE





Higher resolution (x10)

→ Similar result but higher values

→ Still not enough?

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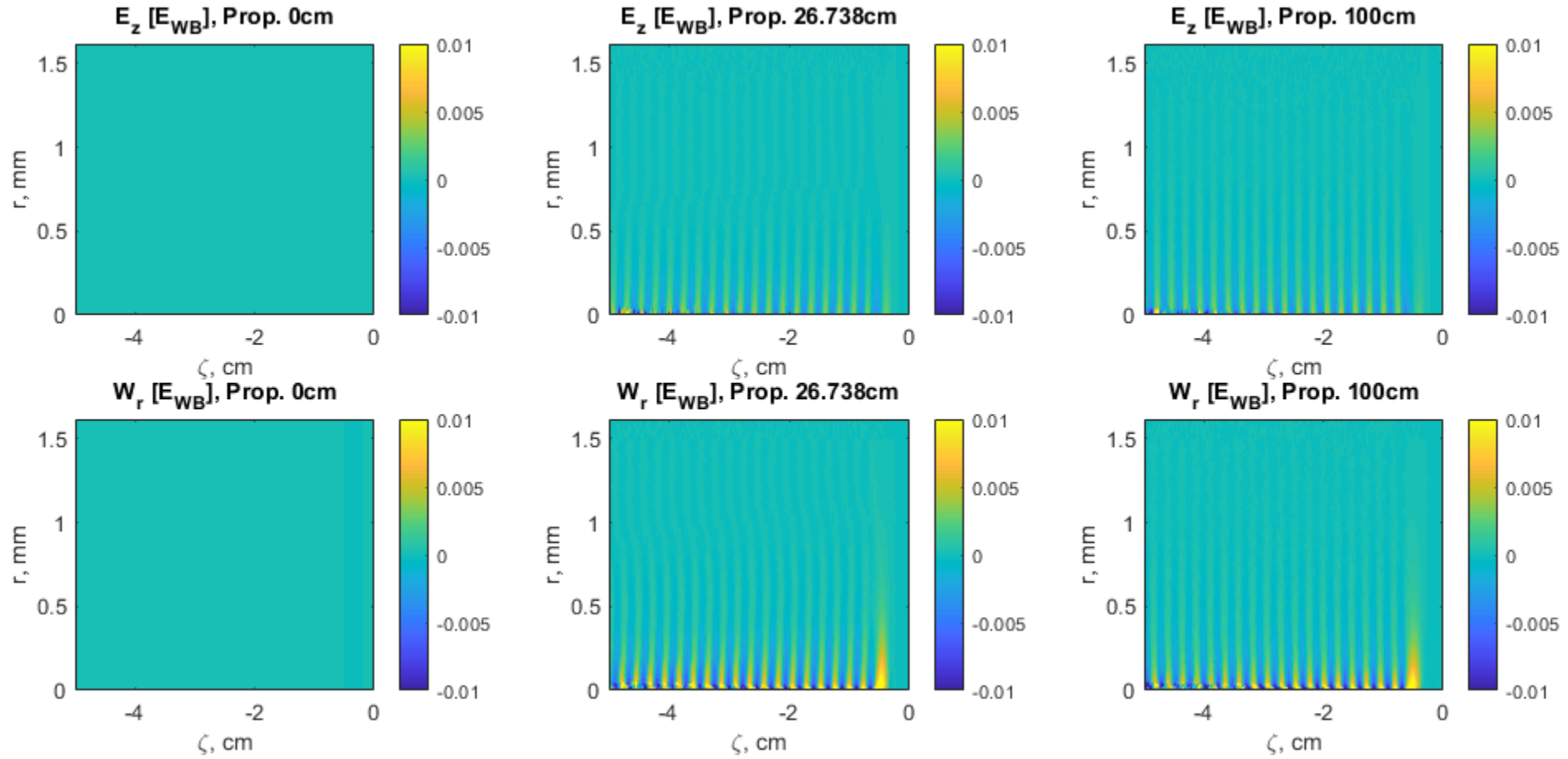
Osiris: Electron Bunch Seeding Simulation

WAKEFIELDS



Higher resolution (x10)
→ Similar result

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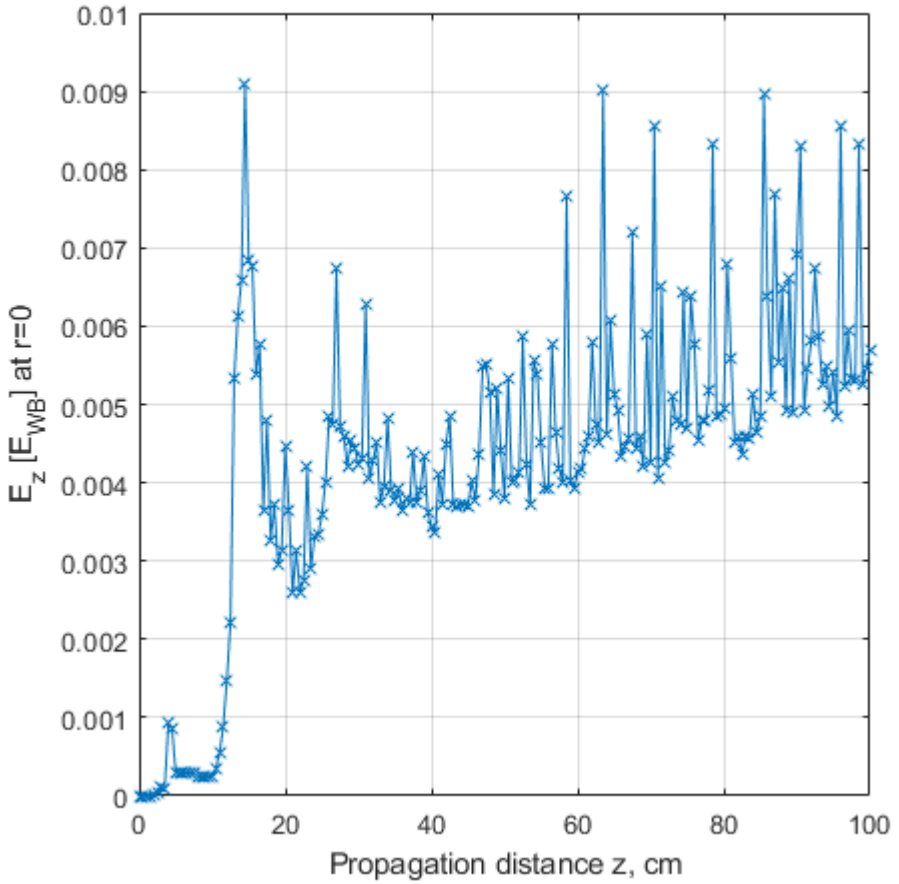
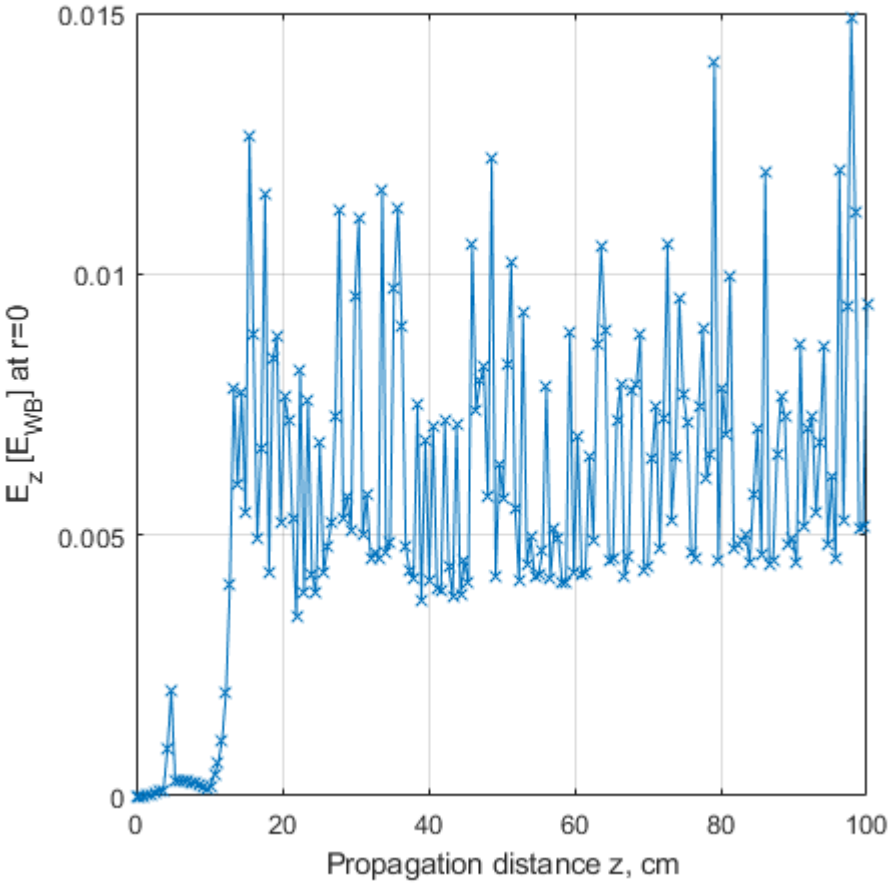
Osiris: Electron Bunch Seeding Simulation

WAKEFIELD AMPLITUDE



Higher resolution (x10)
→ Similar result but higher values

- Longitudinal: after 25cm 0.1% of wave breaking field ($E_{WB} = 1.4\ GV/m$ for $n_{Rb} = 2 \cdot 10^{14} cm^{-3}$) at r = 0



- From Fabians data at $n_{Rb} = 1 \cdot 10^{14} cm^{-3}$: $E_{crit} = 2\frac{MV}{m} = 0.2\%\ E_{WB}$ (longitudinal, transv: 1.5MV/m, to be checked, calculated by myself)

→ According to this a seeding at source entrance with wakefield should be possible…

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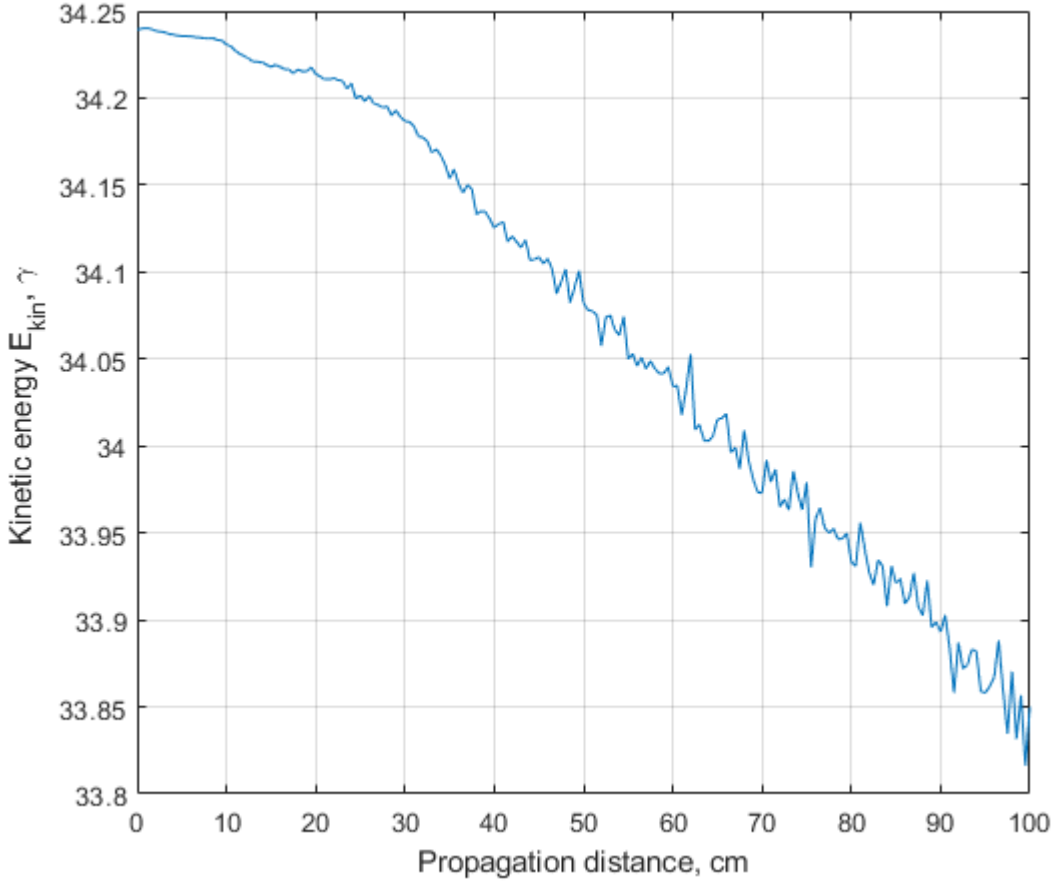
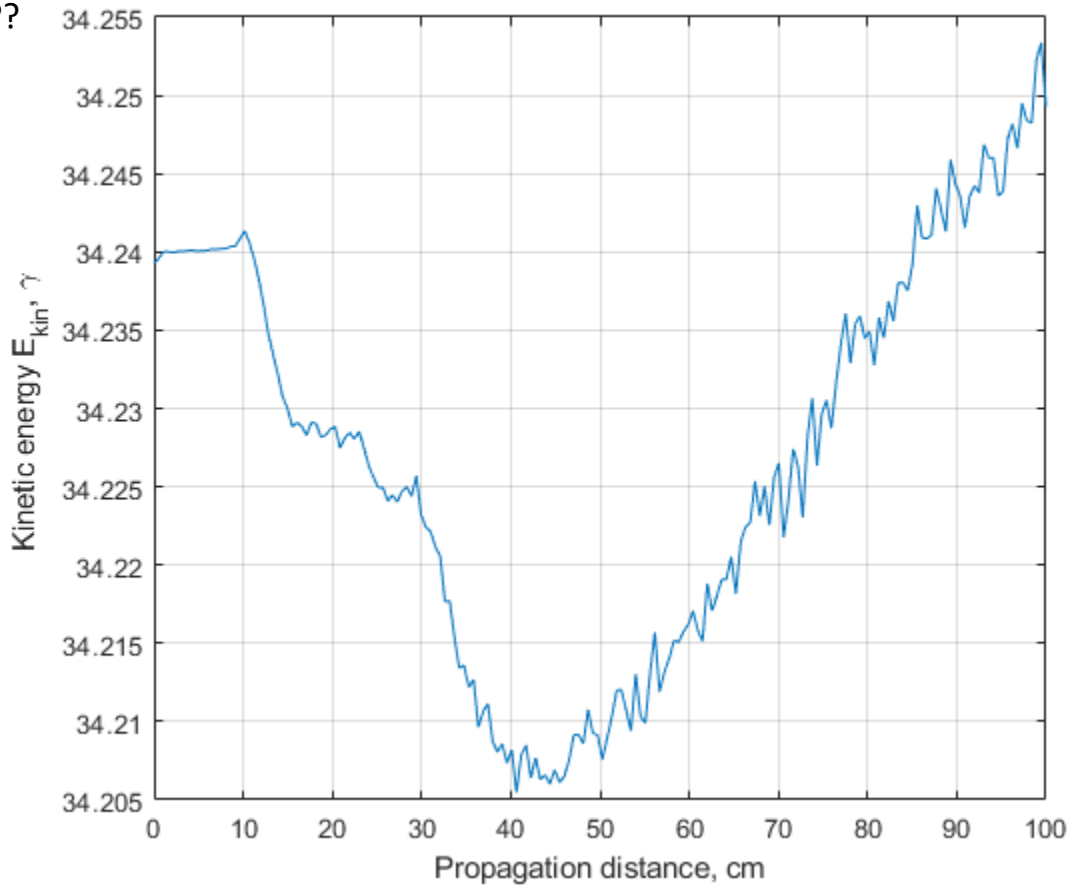
Osiris: Electron Bunch Seeding Simulation

MEAN ENERGY

Higher resolution (x10)
→ ?????? Increase????





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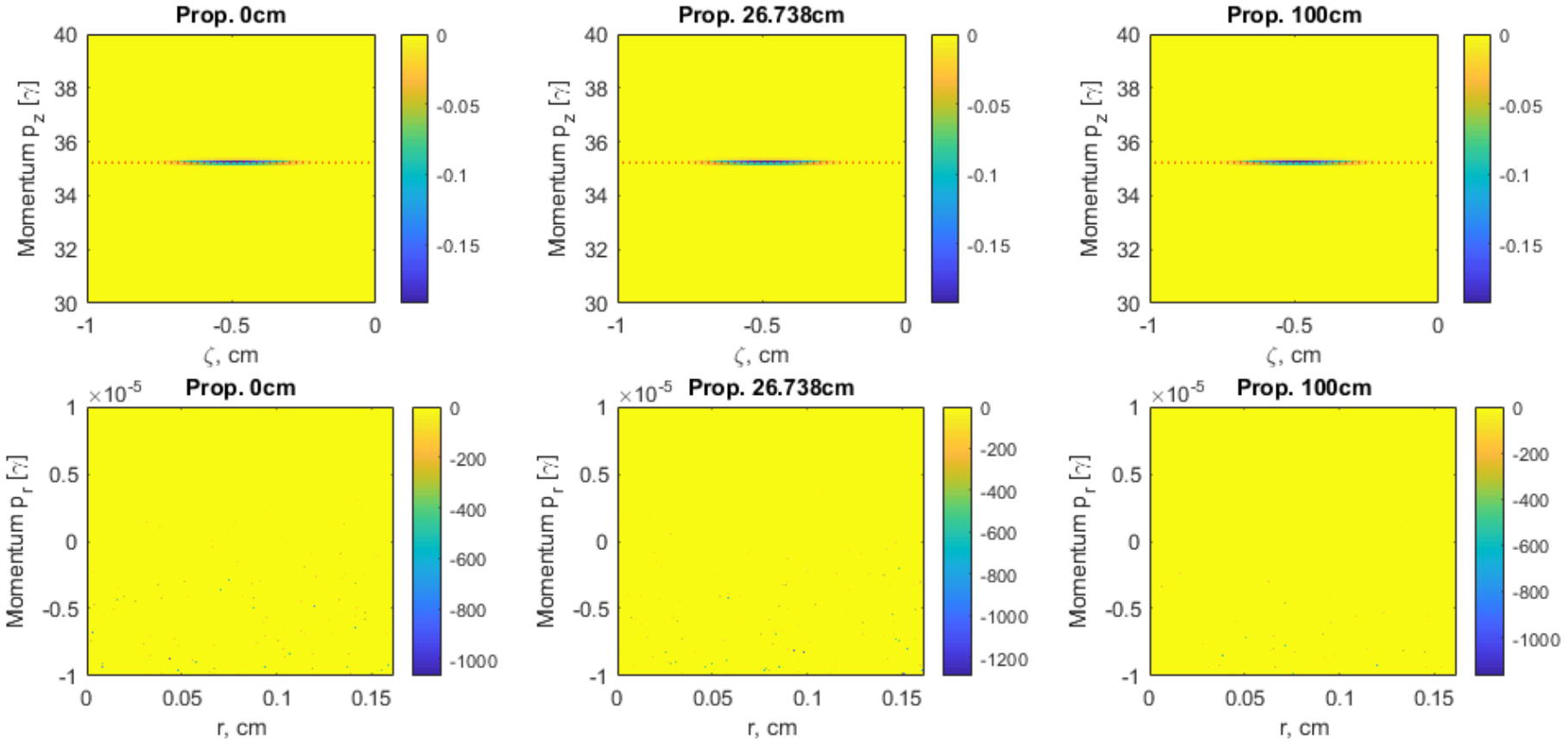
Osiris: Electron Bunch Seeding Simulation

PHASE SPACE

Higher resolution (x10)

→ Similar result

→ As mean energy increasing: maybe resolution not enough?



Conclusion: Next Simulation

→Even higher resolution in r?

→Higher resolution in momenta?