UPPSALA UNIVERSITET

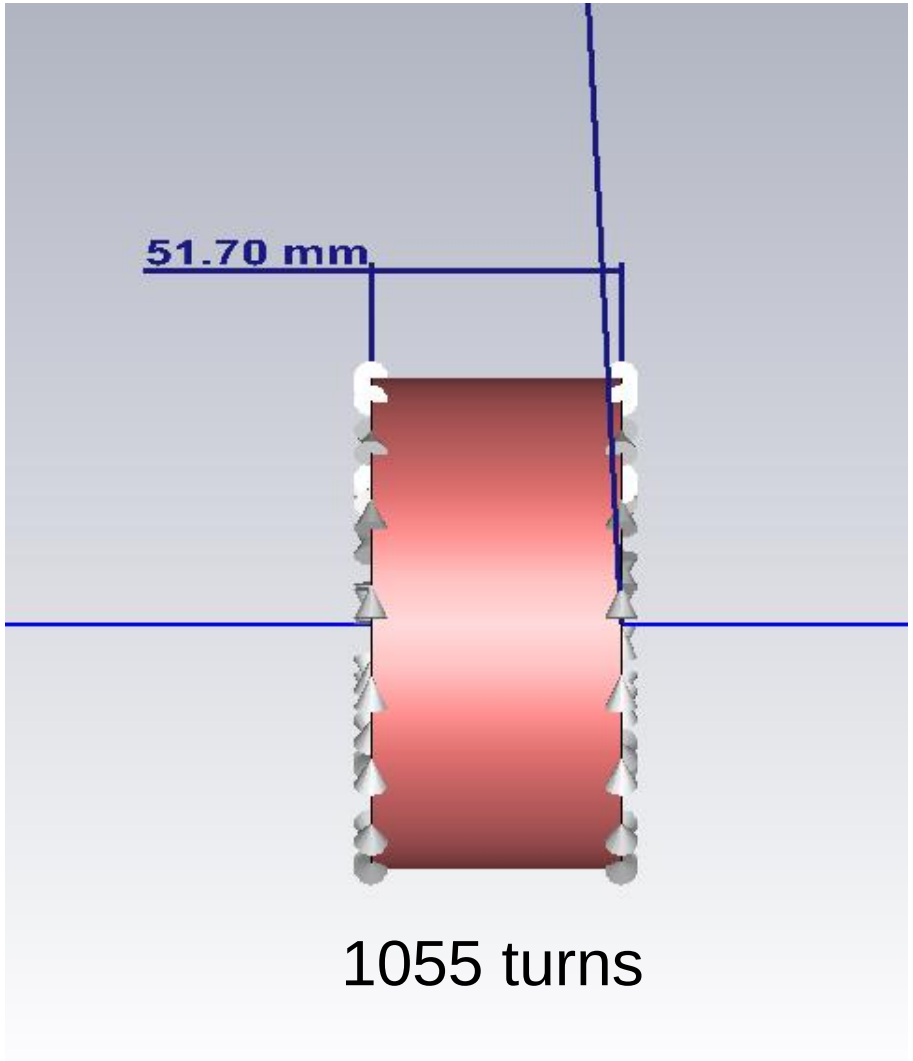
Magnetic systems and bunch dynamics in Astra

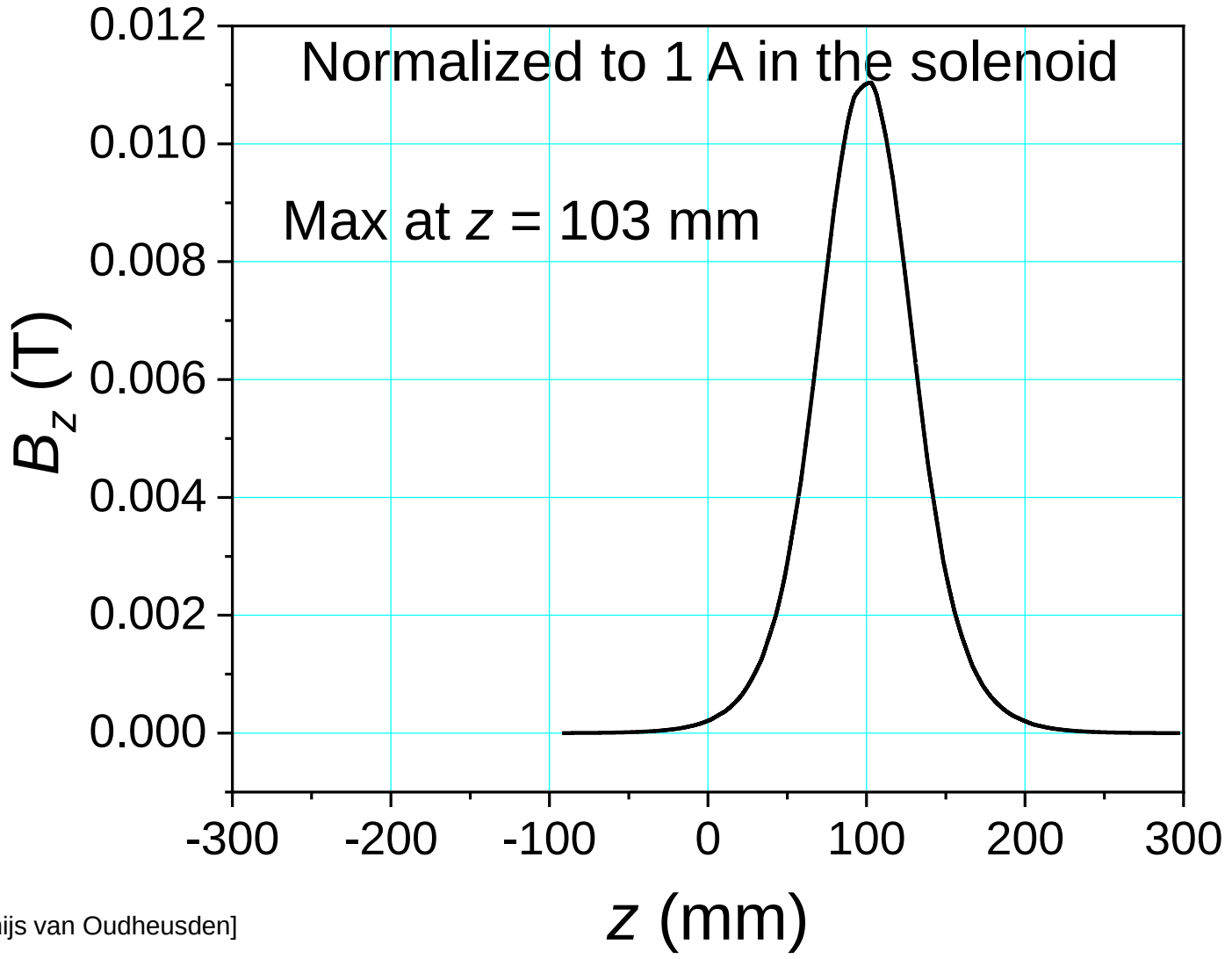
Kévin Pepitone

04 May 2020

Magnetic system: CST simulations

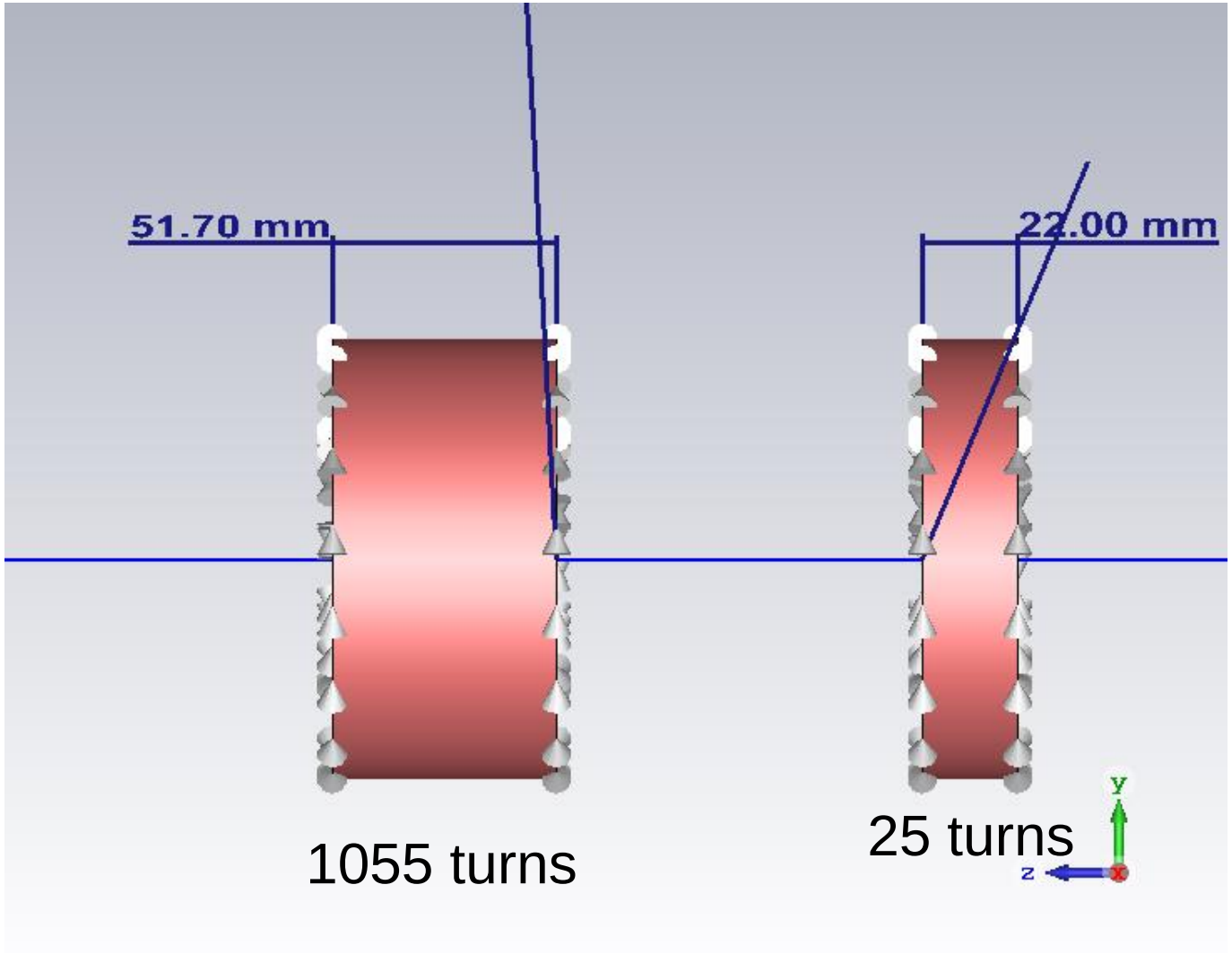
CST simulations: focusing coil

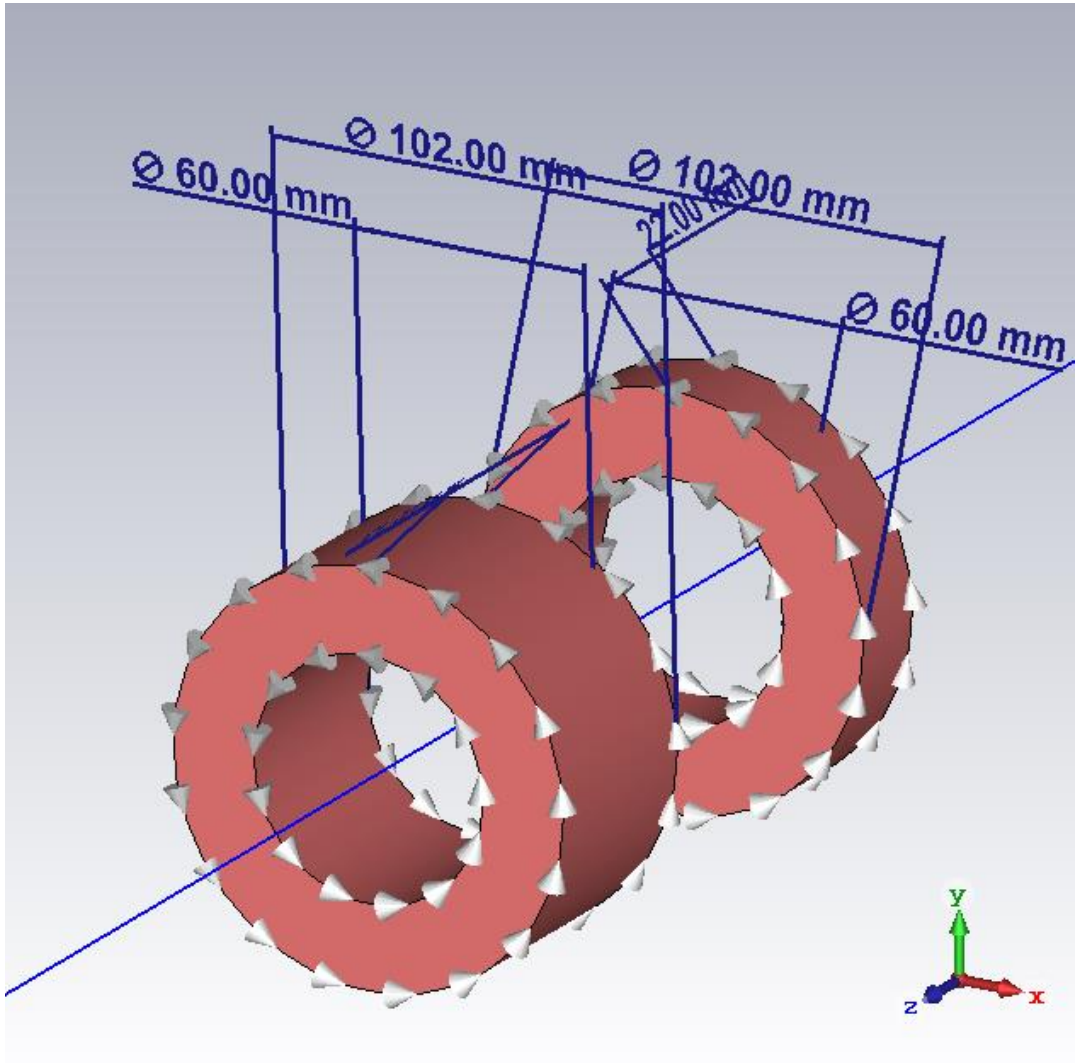




[Electron source for sub-relativistic single-shot femtosecond diffraction, Thijs van Oudheusden]

CST simulations

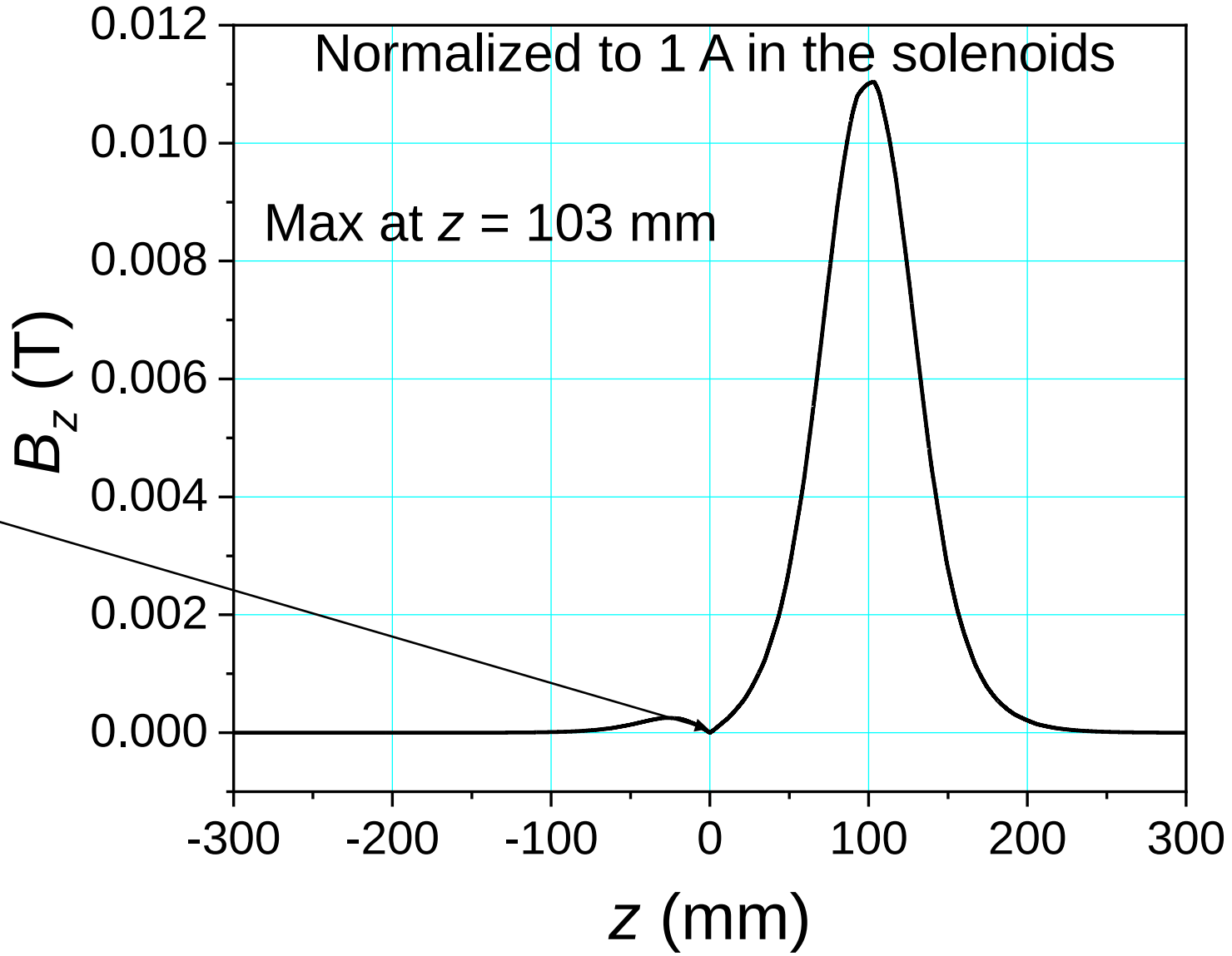




[Electron source for sub-relativistic single-shot femtosecond diffraction, Thijs van Oudheusden]

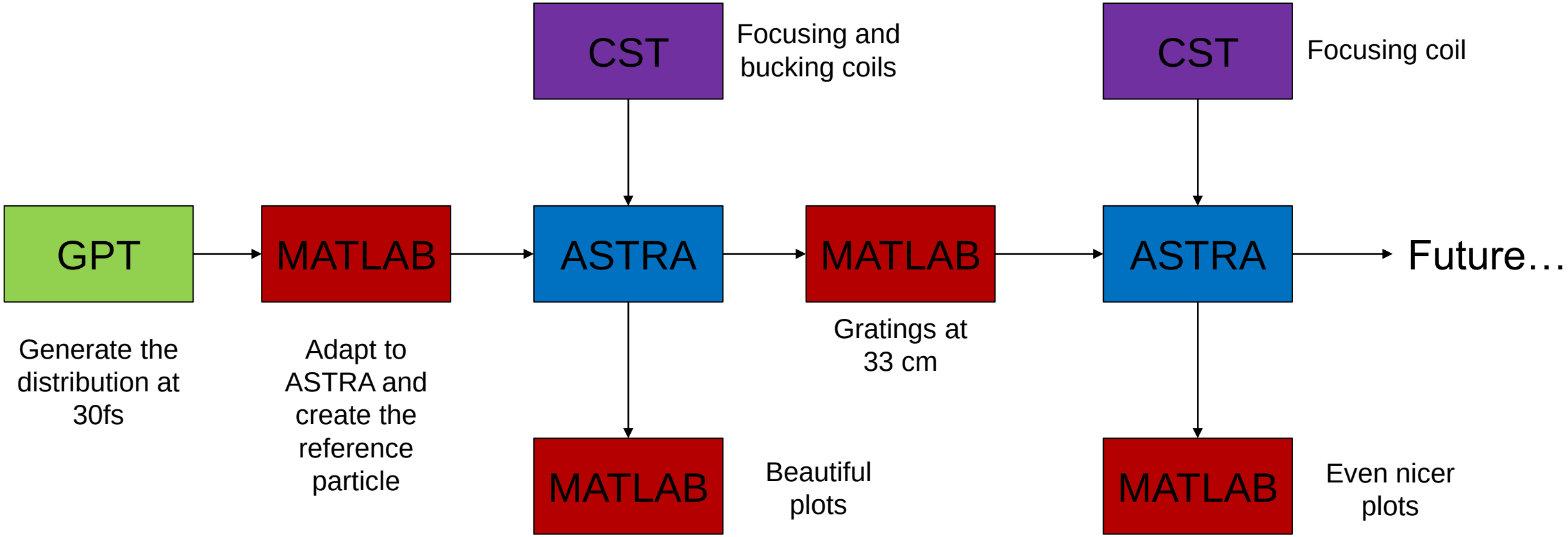
CST simulations bucking and focusing coils

Optimizations needed to have 0 magnetic field



Beam dynamics: ASTRA simulations

ASTRA simulations

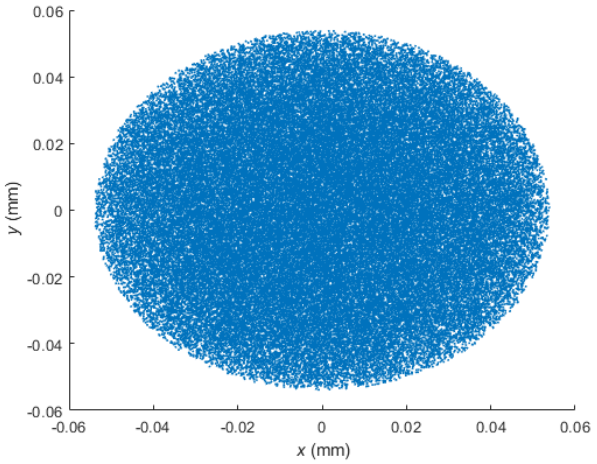


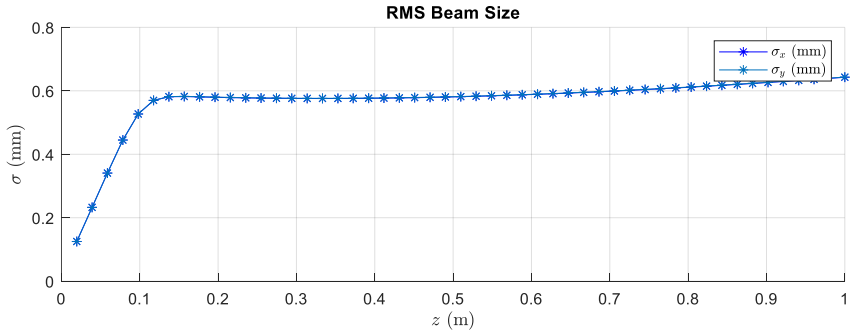
GPT and ASTRA simulations

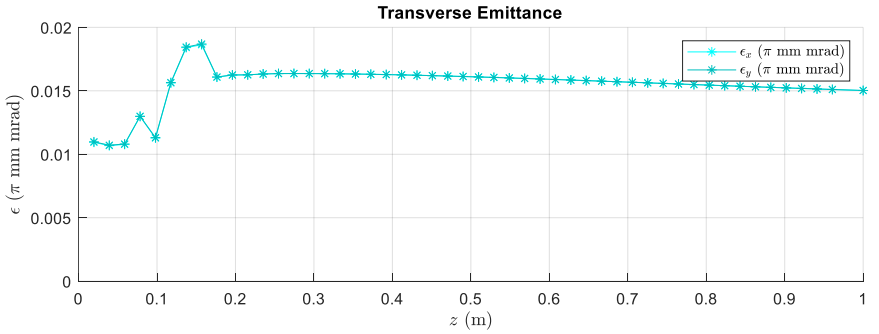
GPT

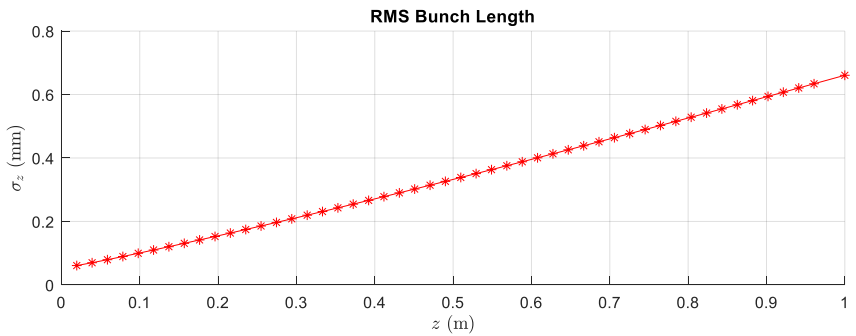
Circular distribution at 30 fs

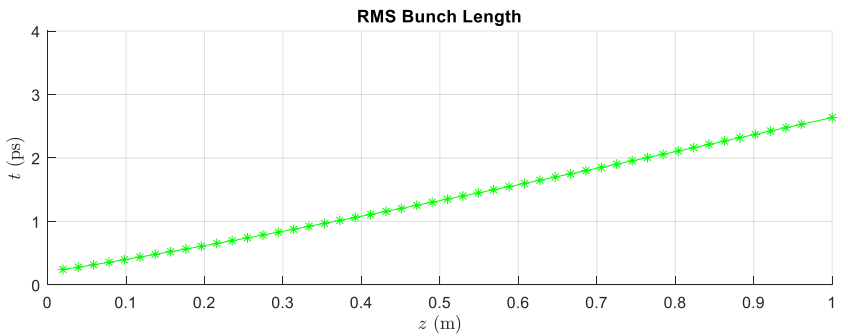
MATLAB

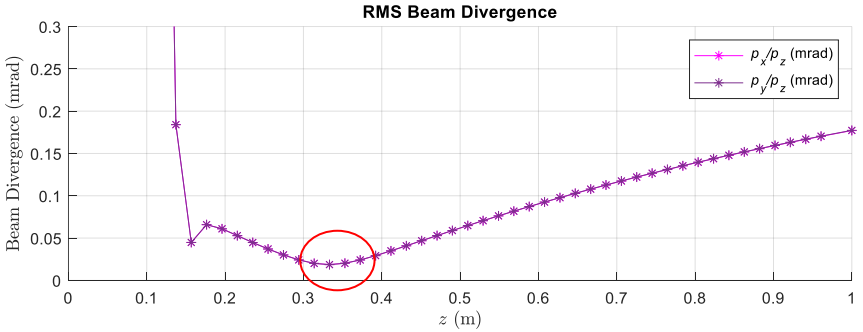


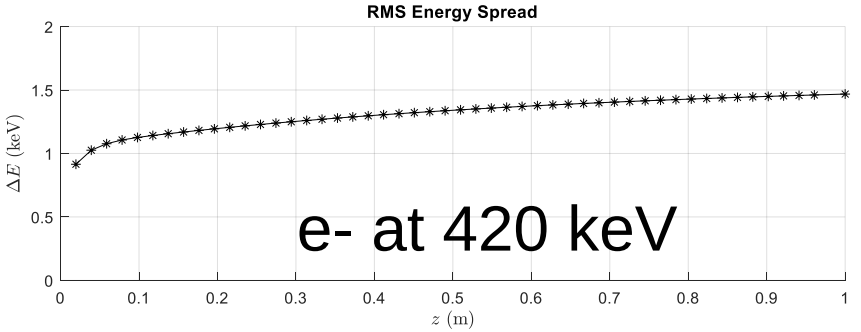








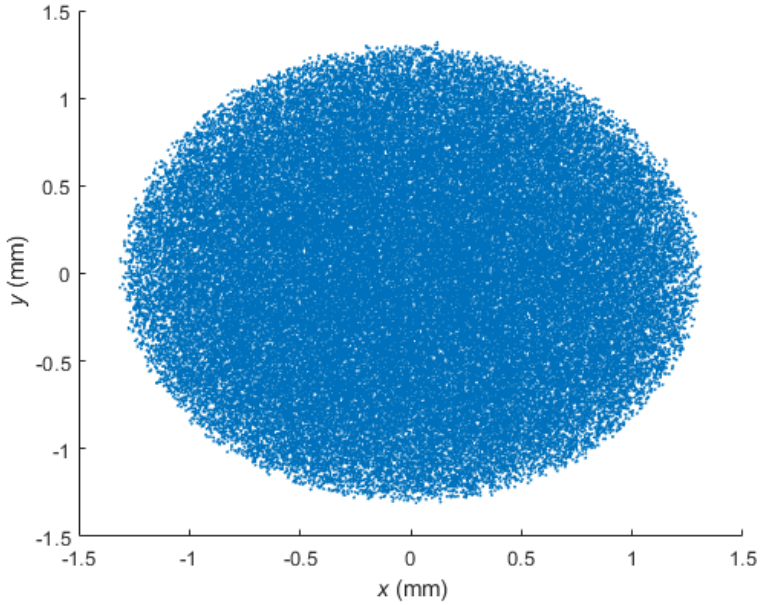




e- at 420 keV

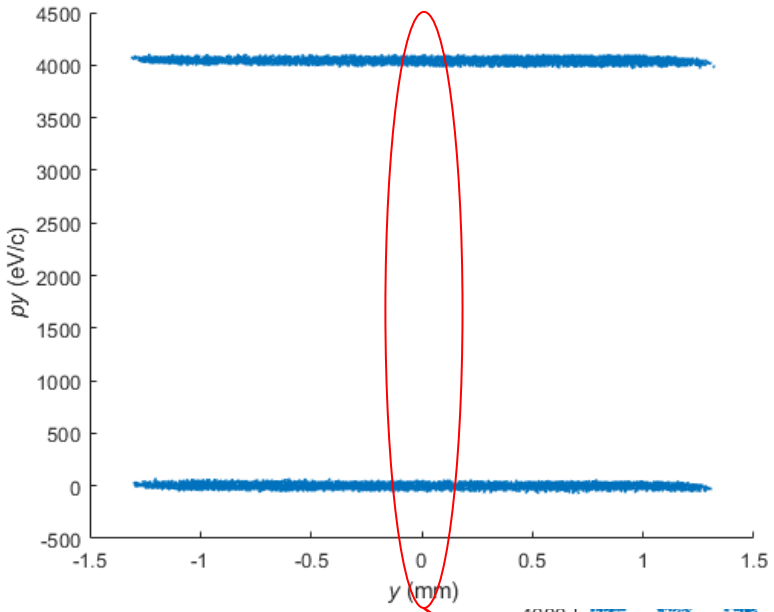
Max Bfield = 0.075 T at z = 10.3 cm

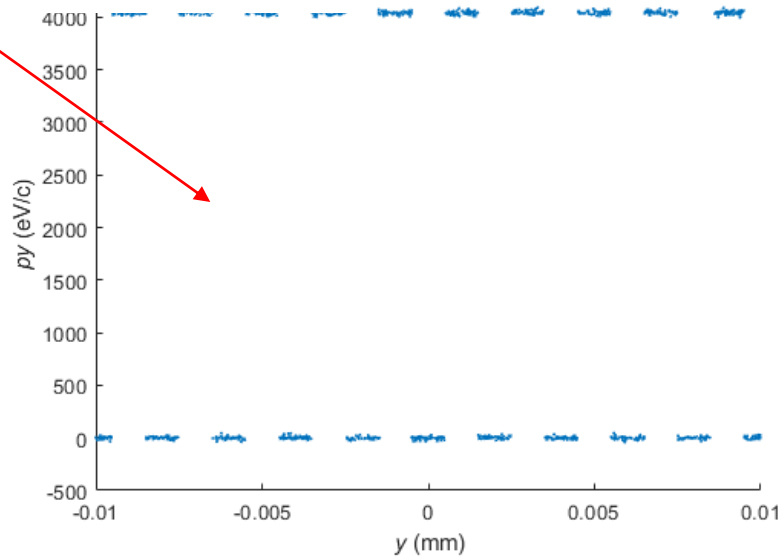
Distribution at 33 cm



MATLAB

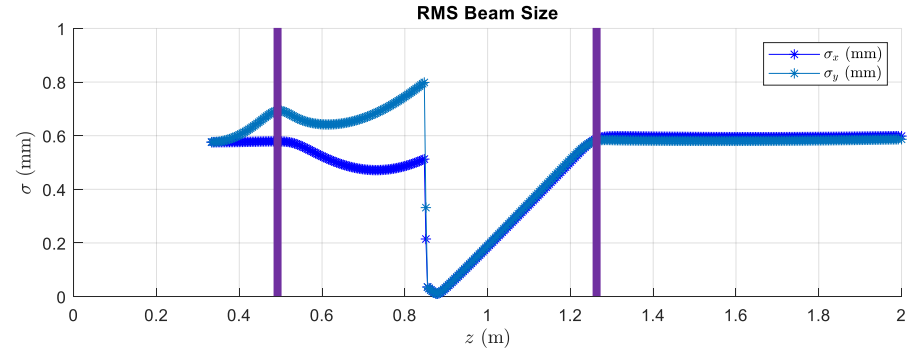
Gratings at 33 cm

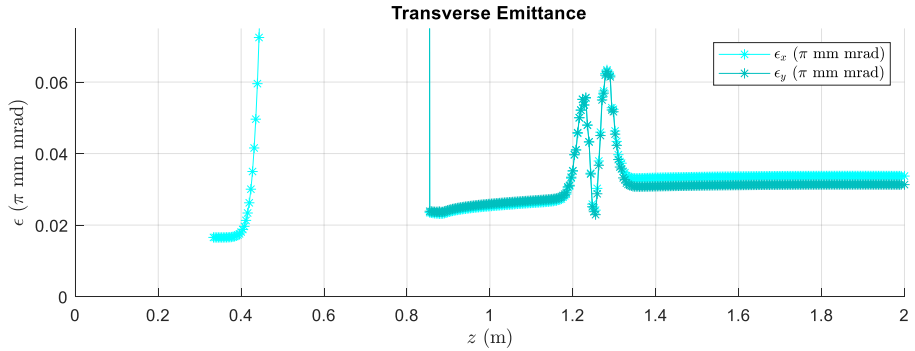


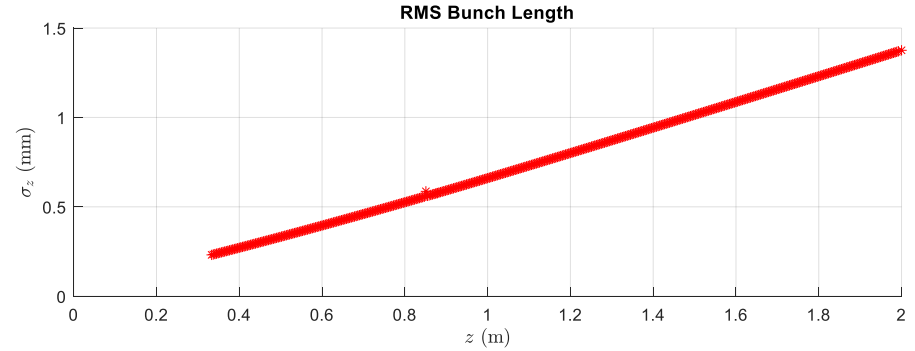


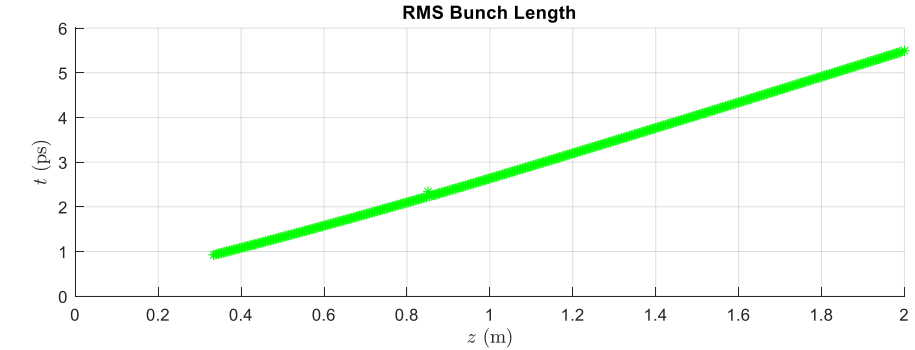
Extract: Positions, Impulsions, Time, Charge, Status

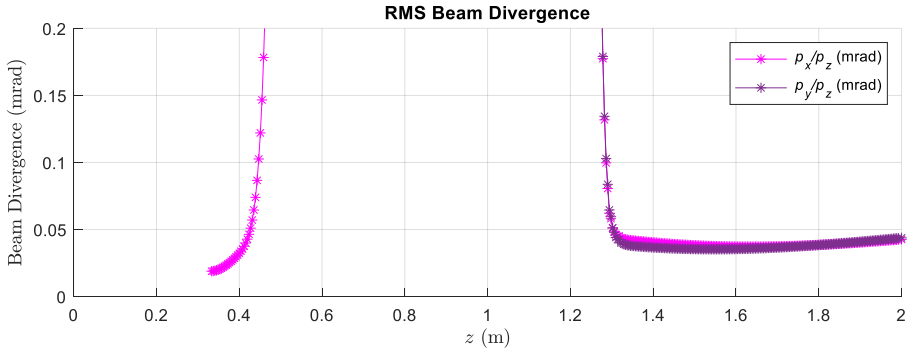
This is the “Even nicer plots”

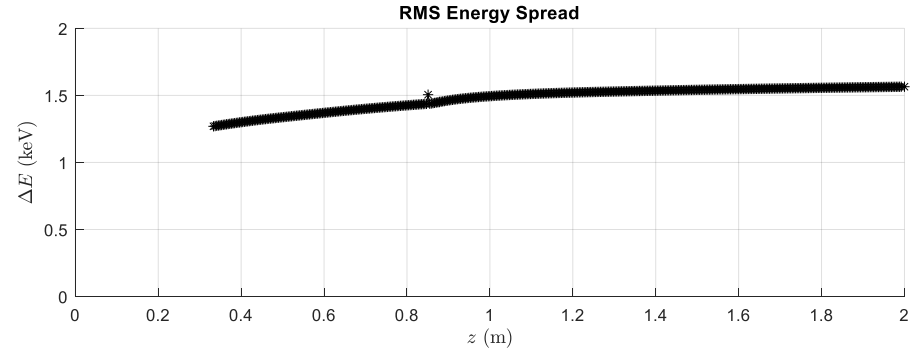






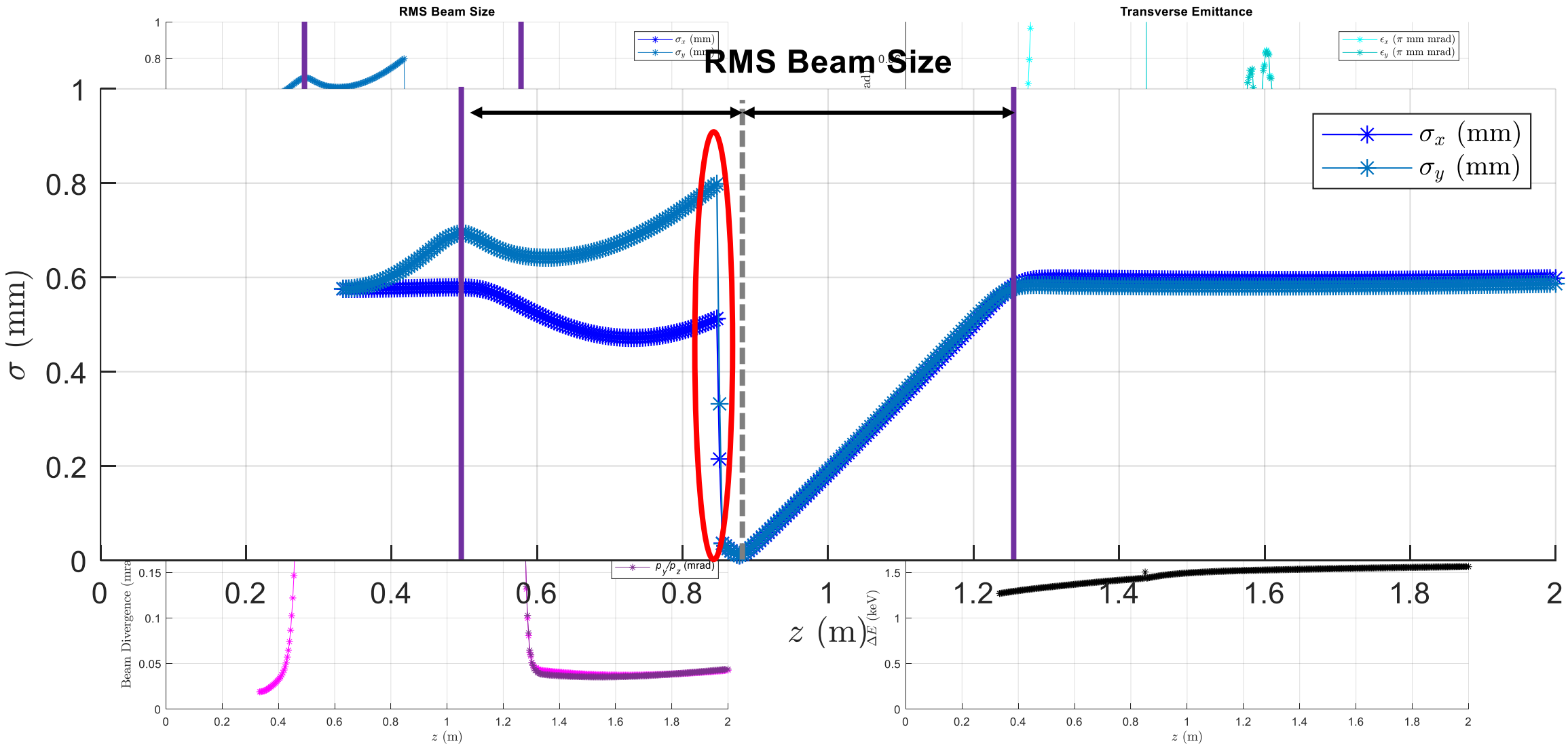






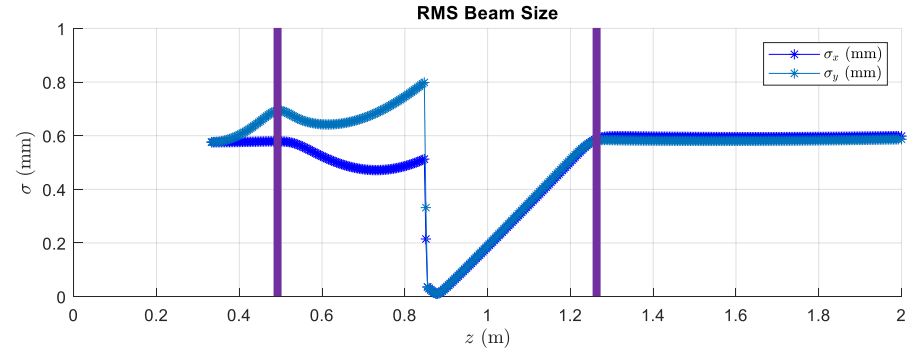
Max Bfield = 0.032 T at z = 50 cm and z = 125 cm

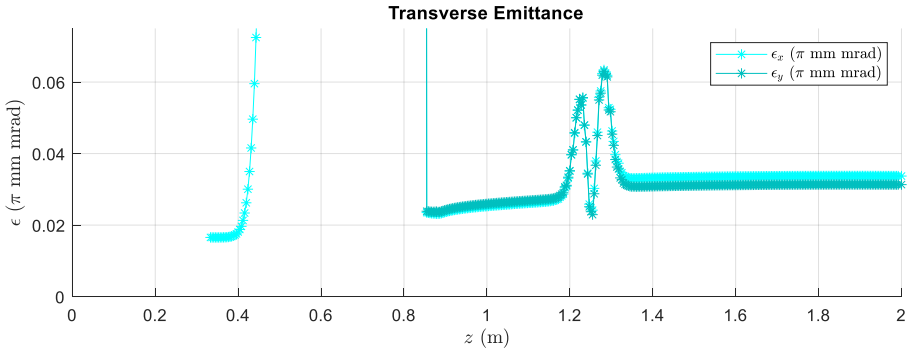
This is a zoom of the “Even nicer plots”

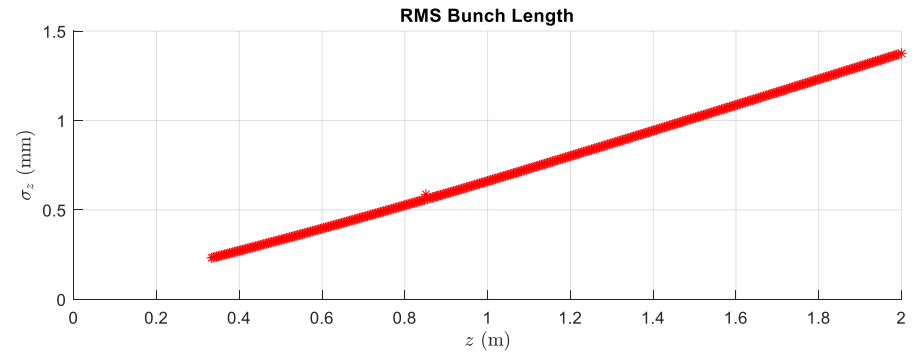


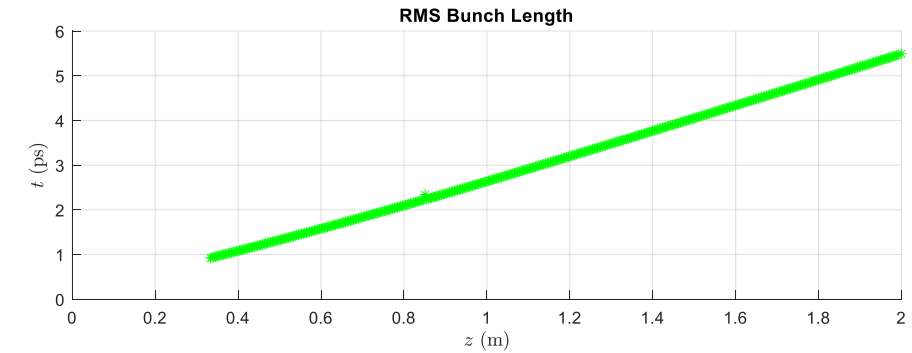
Max Bfield = 0.032 T at z = 50 cm and z = 125 cm

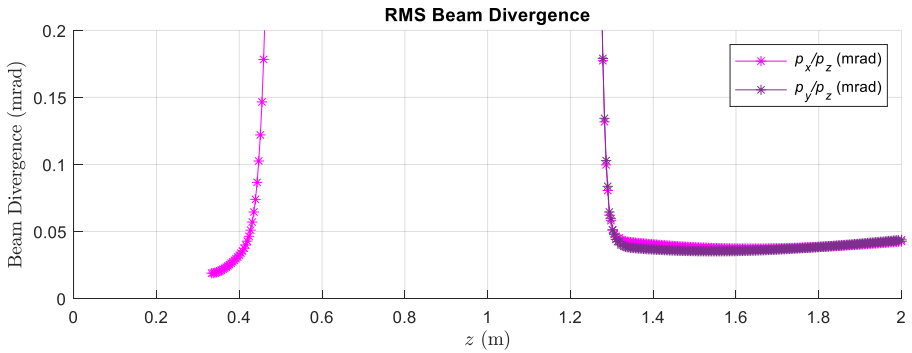
This is the “Even nicer plots”

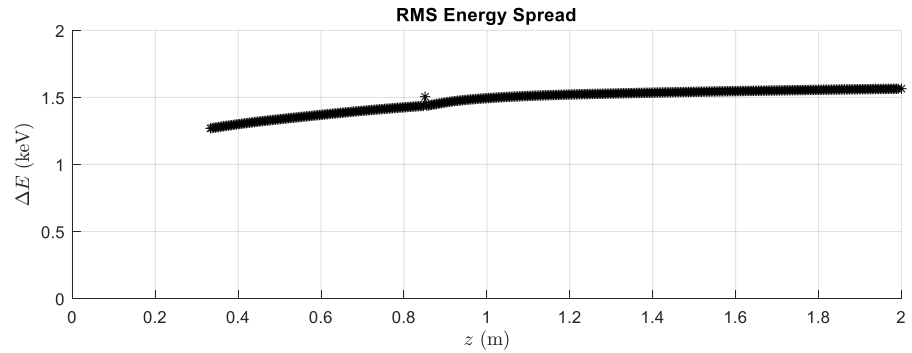












Max Bfield = 0.032 T at z = 50 cm and z = 125 cm

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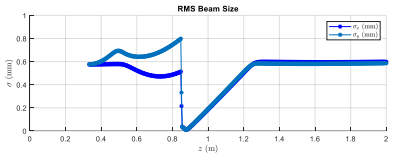
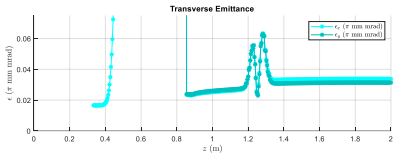
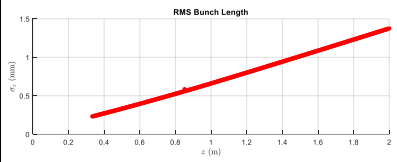
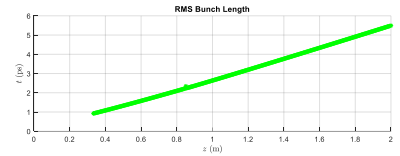
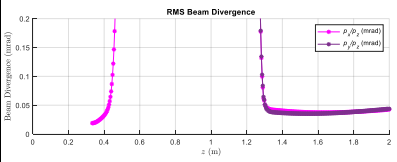
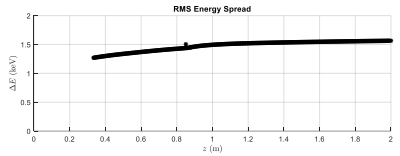


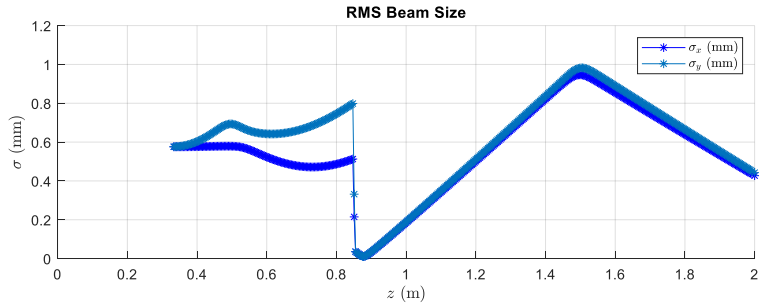


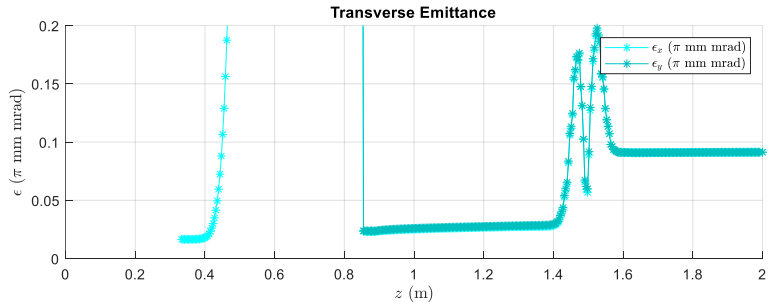


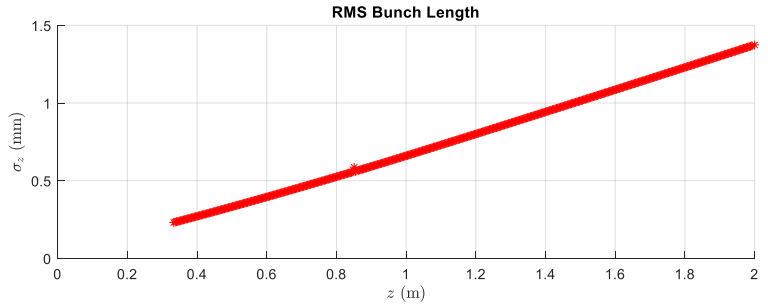


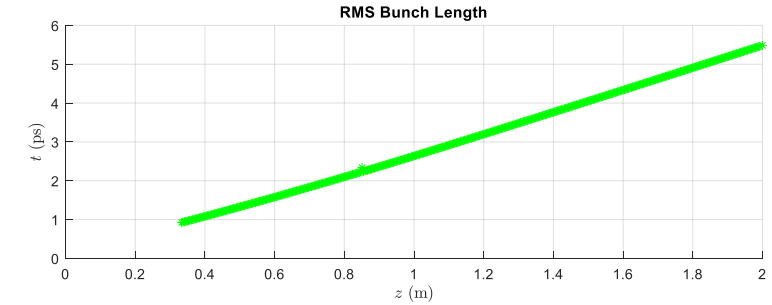


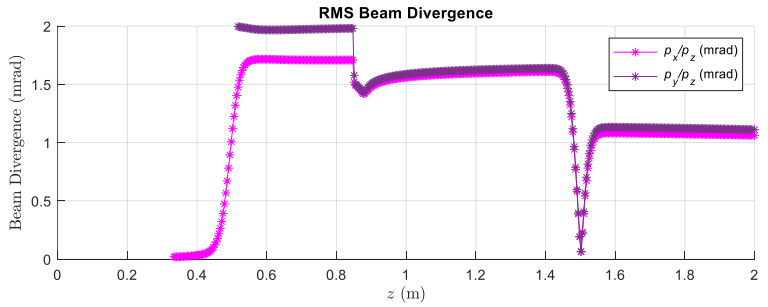


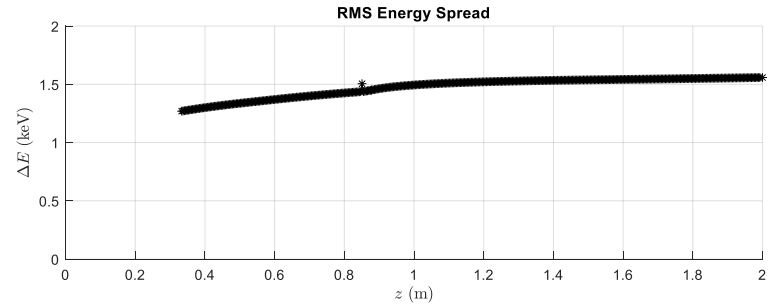




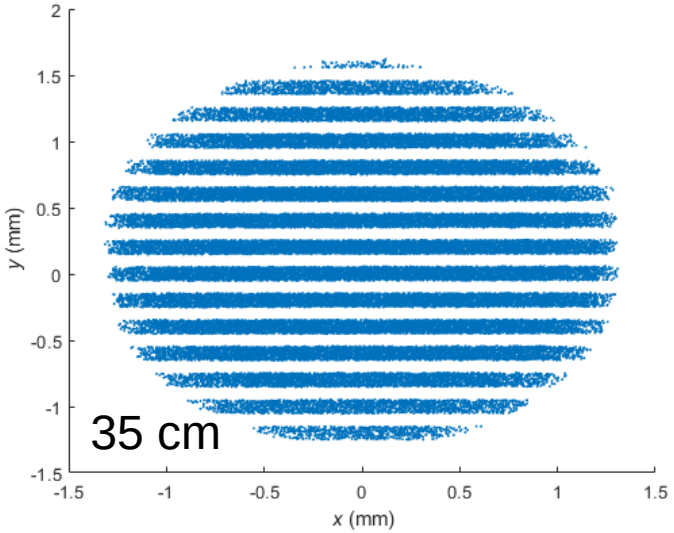


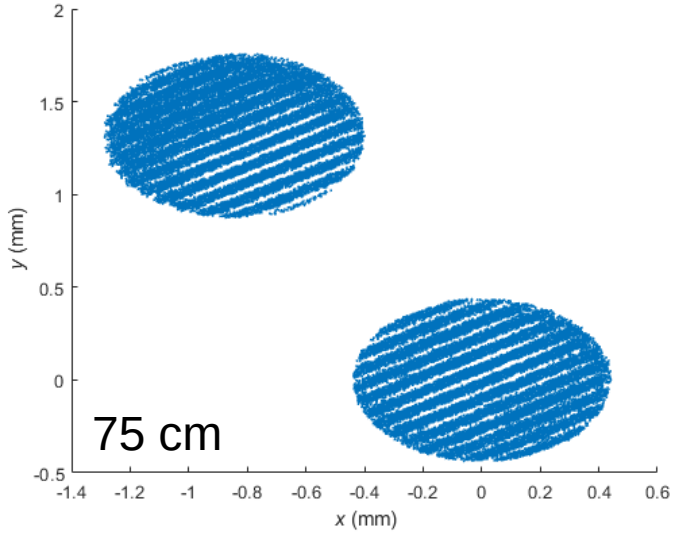


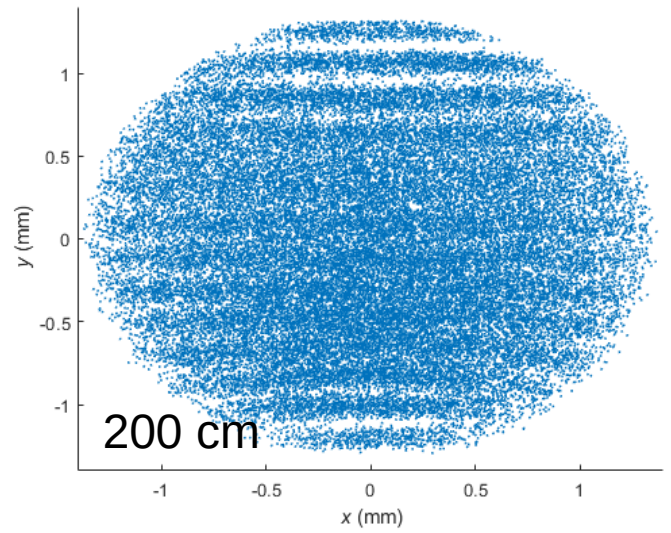


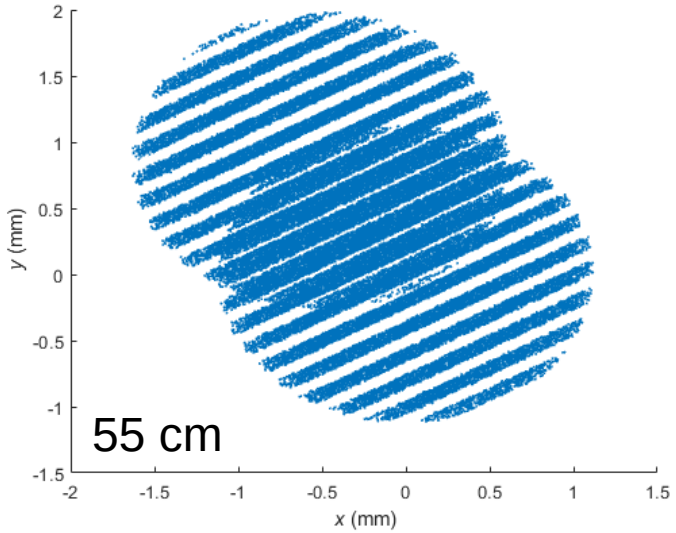


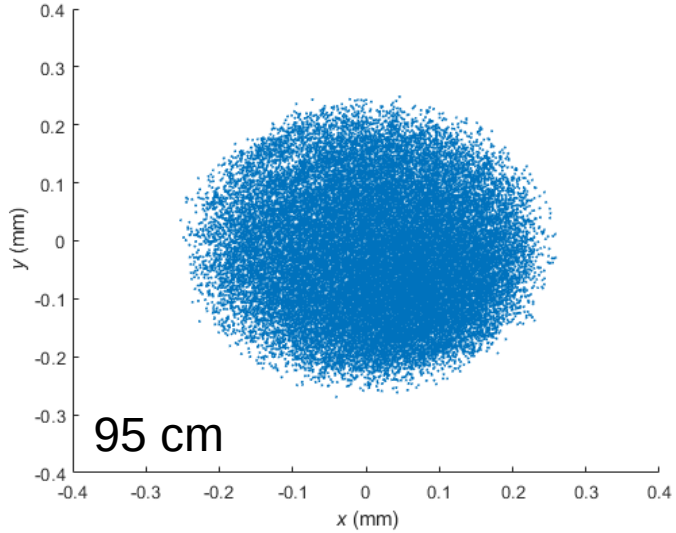
Max Bfield = 0.038 T at z = 50 cm and z = 150 cm


35 cm
y (mm)
x (mm)


75 cm
y (mm)
x (mm)


200 cm
y (mm)
x (mm)


55 cm
y (mm)
x (mm)


95 cm
y (mm)
x (mm)