# Particle Production of Carbon Target with 20Tto2T5m Configuration at 6.75 GeV (Updated)

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Target Studies
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# Target Setting

- 20Tto2T5m Configuration (initial beam pipe radius of 13 cm) and Fieldmap (20T➔2T) and no beam dump;
- Code: MARS15(2014) with ICEM 4=1;
- Proton beam: 6.75 GeV (KE) and launched at z = -100 cm,

  Focal beam with waist at z=0 m and emittance of 5μm;
- Production Collection: (1.2 m downstream, 40 MeV < KE < 180 MeV).
- Graphite density = 1.8

# Energy Card Setting

- ENRG E0 EM EPSTAM EMCHR EMNEU EMIGA EMIEL

  E0: The incident particle kinetic energy;

  EM: The hadron threshold energy (Default:0.0145 GeV);

  EPSTAM: The star production threshold kinetic energy (Default:0.03 GeV);

  EMCHR: The threshold energy applied collectively to muons, heavy ions and charged hadrons (Default: 0.001 GeV);

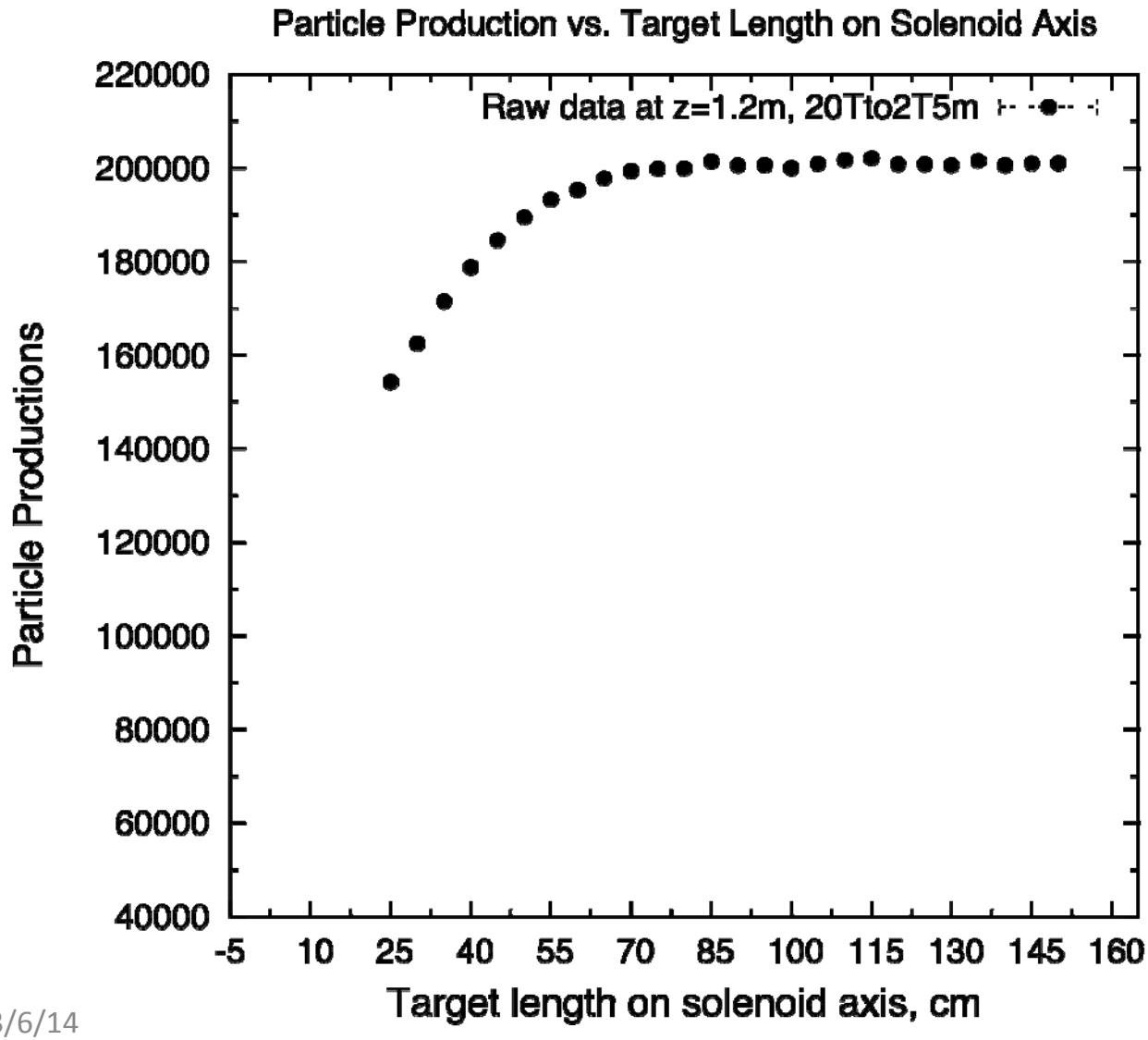
  EMNEU: The threshold energy for neutrons (Default:$10^{-4}$ GeV)

  EMIGA: The threshold energy for γ (Default:$10^{-4}$ GeV);

  EMIEL: The threshold energy for $e^{\pm}$ (Default: $5*10^{-4}$ GeV)

  Use non-default setting: ENRG 1=6.75 2=0.02 3=0.3 4=0.01 5=0.05 6=0.01 7=0.01

# Particle Production vs Target Length

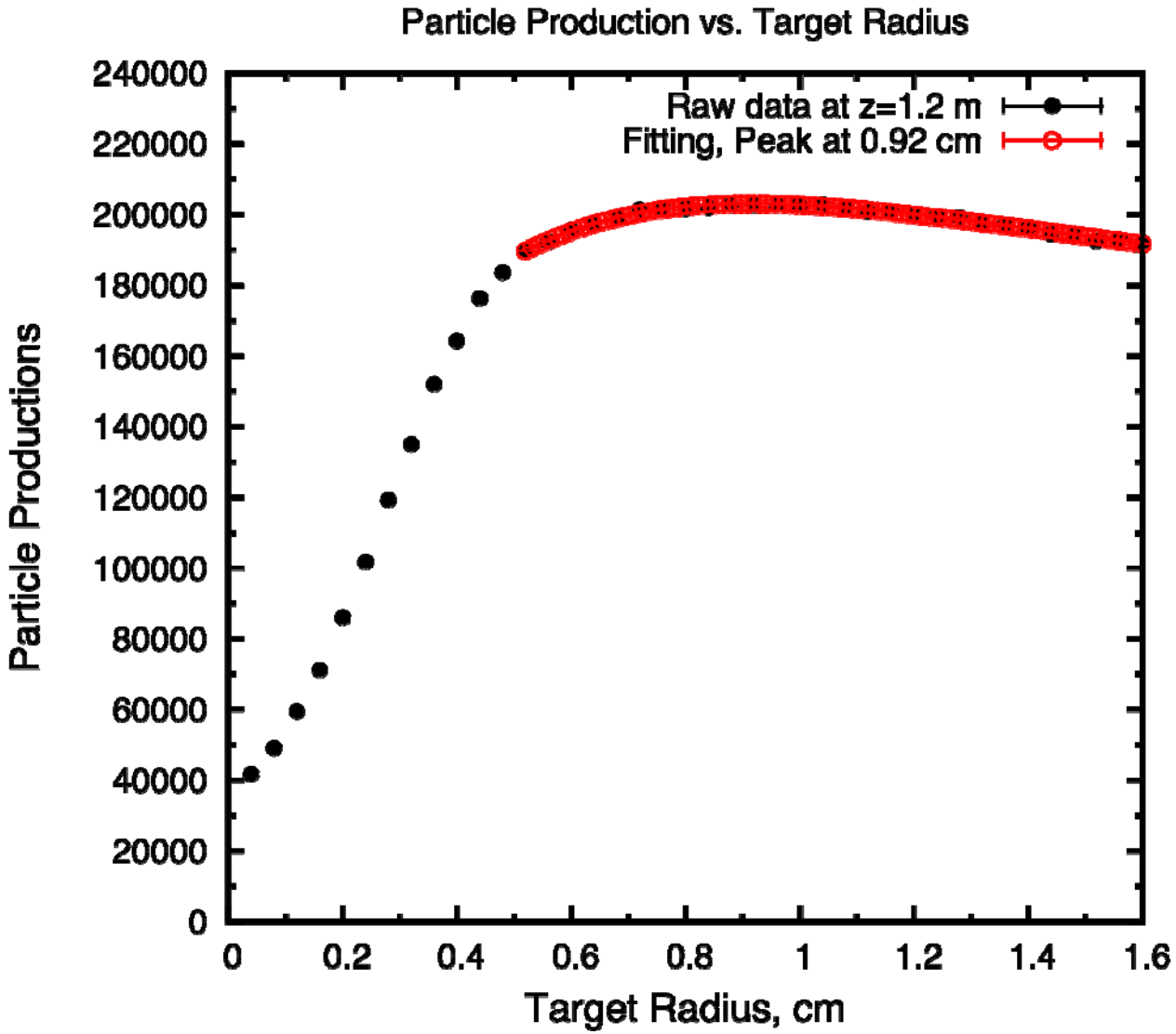



Co-linear of target and beam.

TR=0.7 cm and TR/BR=4

Target angle at 130 mrad

# Particle Production vs Target Radius



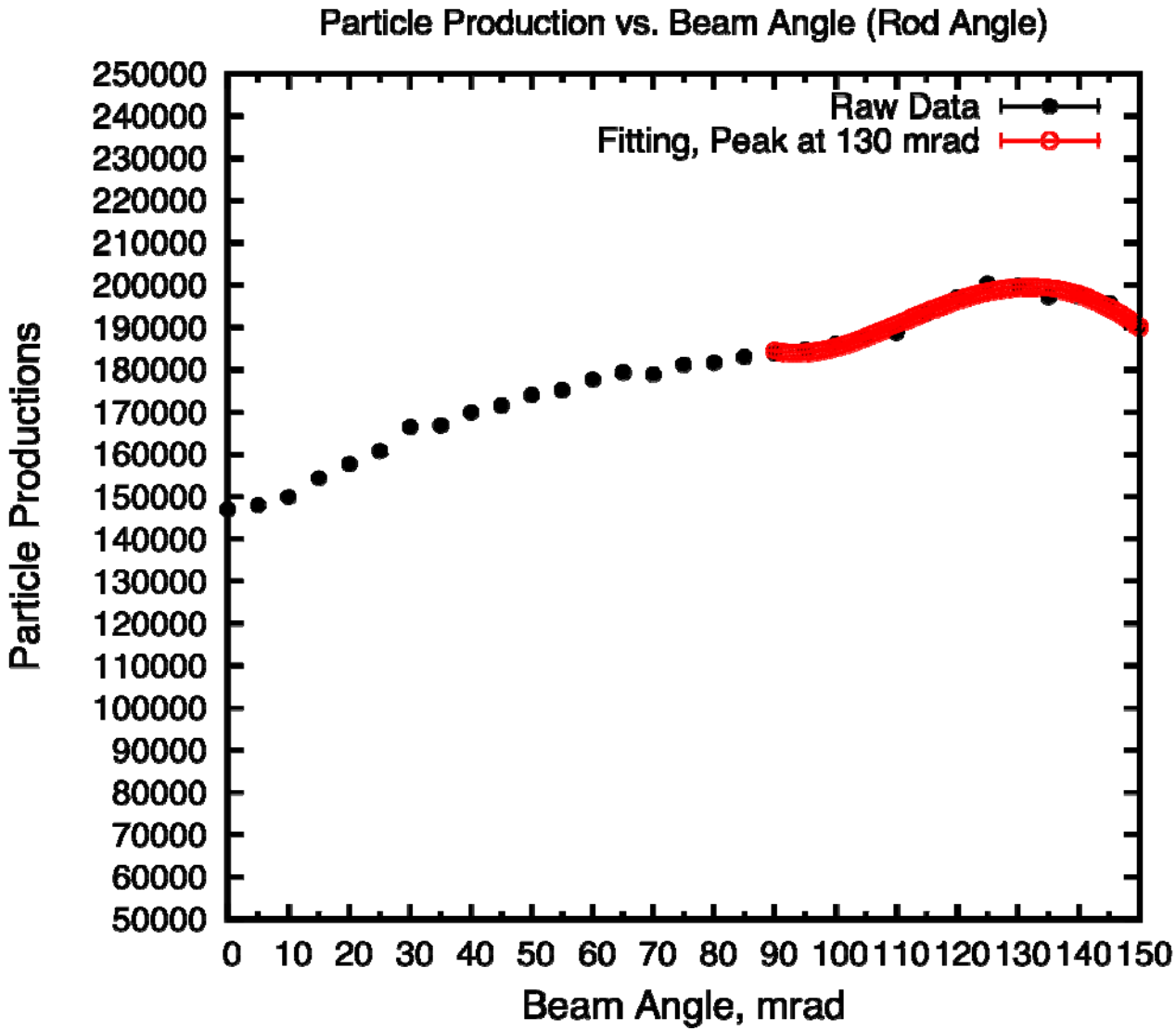

Co-linear of target and beam.

TR/BR=4

Target angle at 130 mrad

20Tto2T5m: target length at 80 cm

# Particle Production vs Beam Angle (20Tto2T5m Configuration)



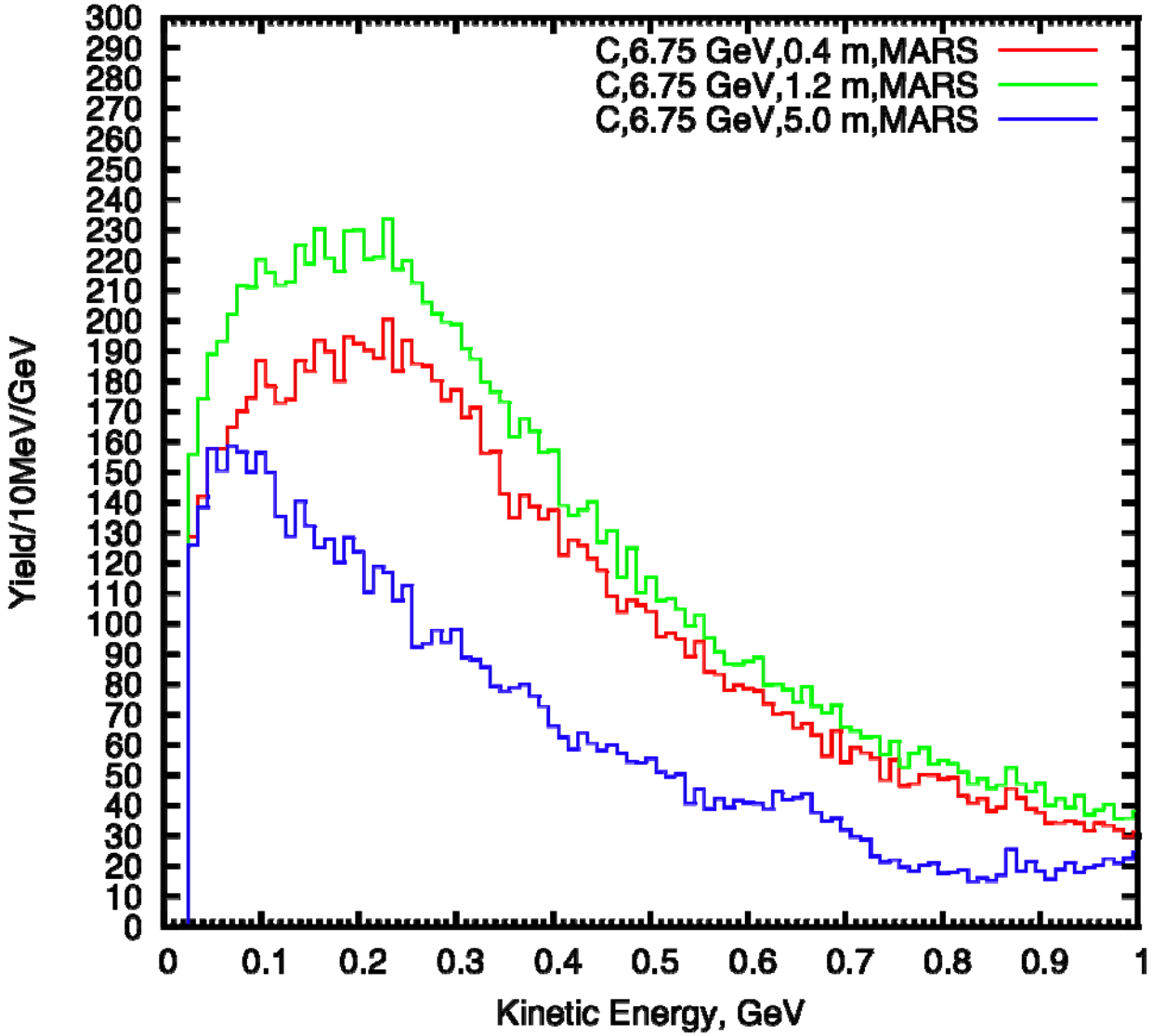

20Tto2T5m:
Co-linear of target and beam.

TR/BR=4

target length at 80 cm and target radius at 0.7 cm

[Optimization for radius 0.9 cm has not converged yet.]

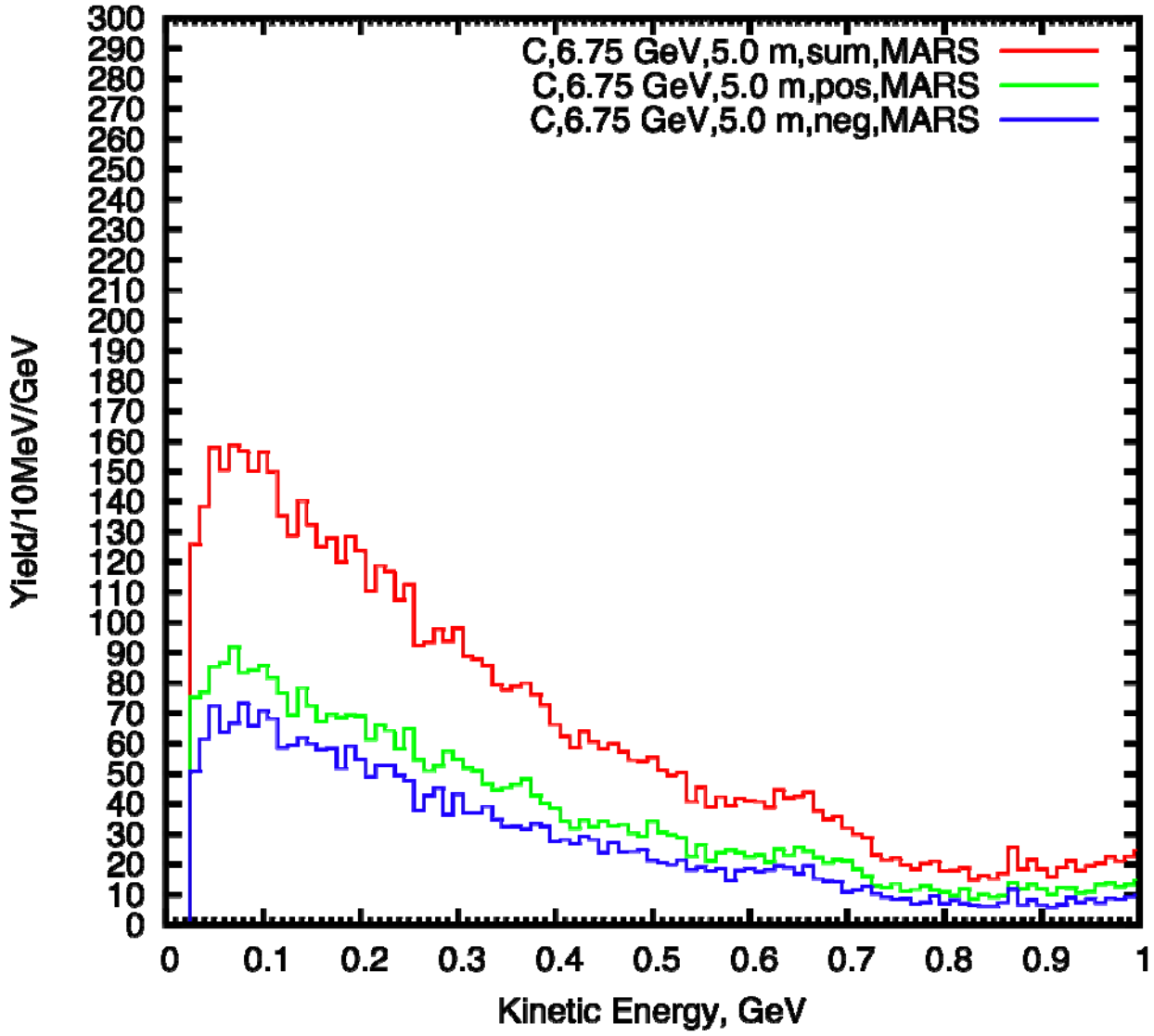
# Energy Spectra of $\pi^{\pm}$, $K^{\pm}$, $\mu^{\pm}$




Which KE range is used for particle collection at z=1.2m and z=5 m?

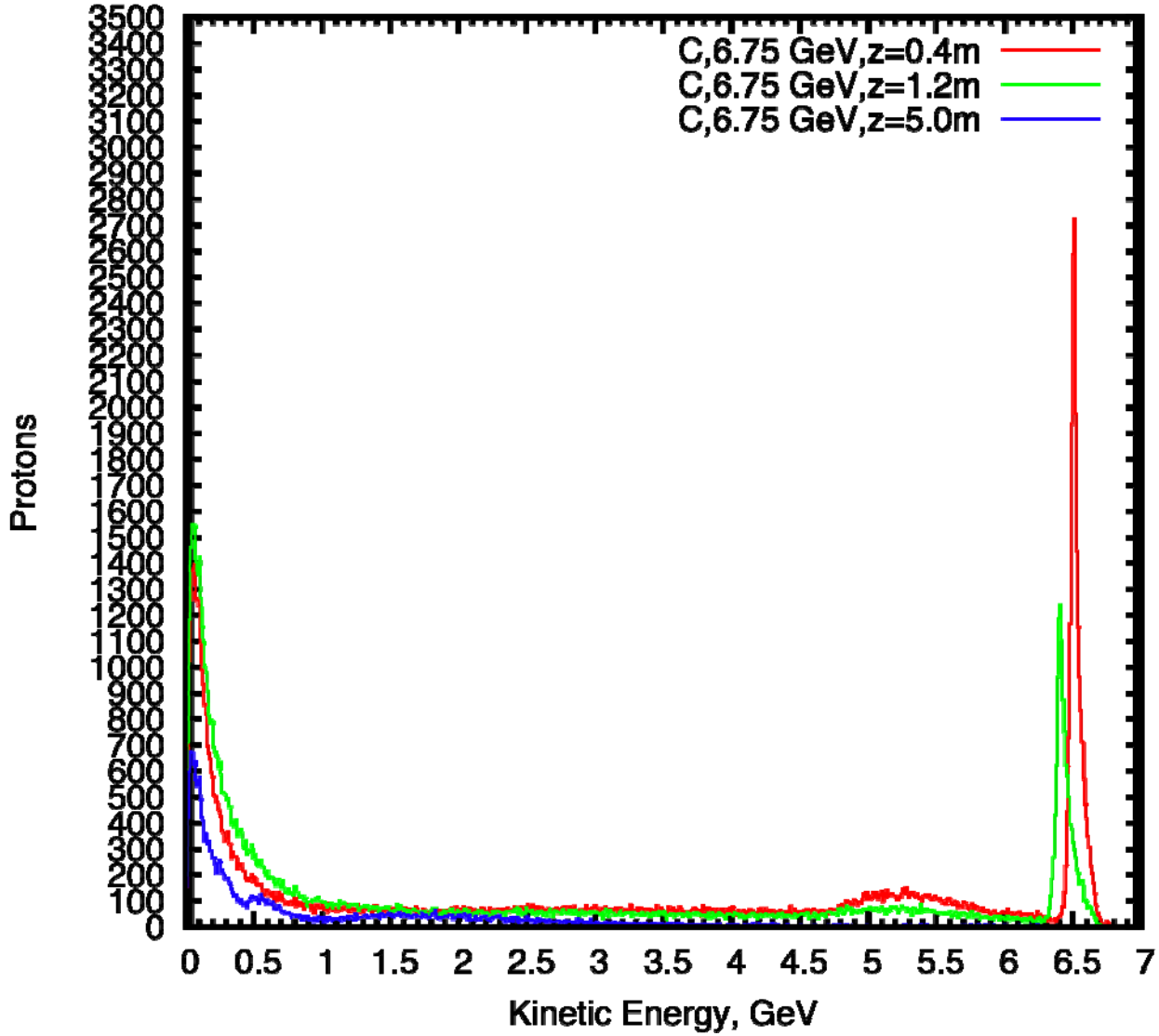
(1.2 m downstream, 40 MeV < KE < 180 MeV) seems not suitable.

# Energy Spectra

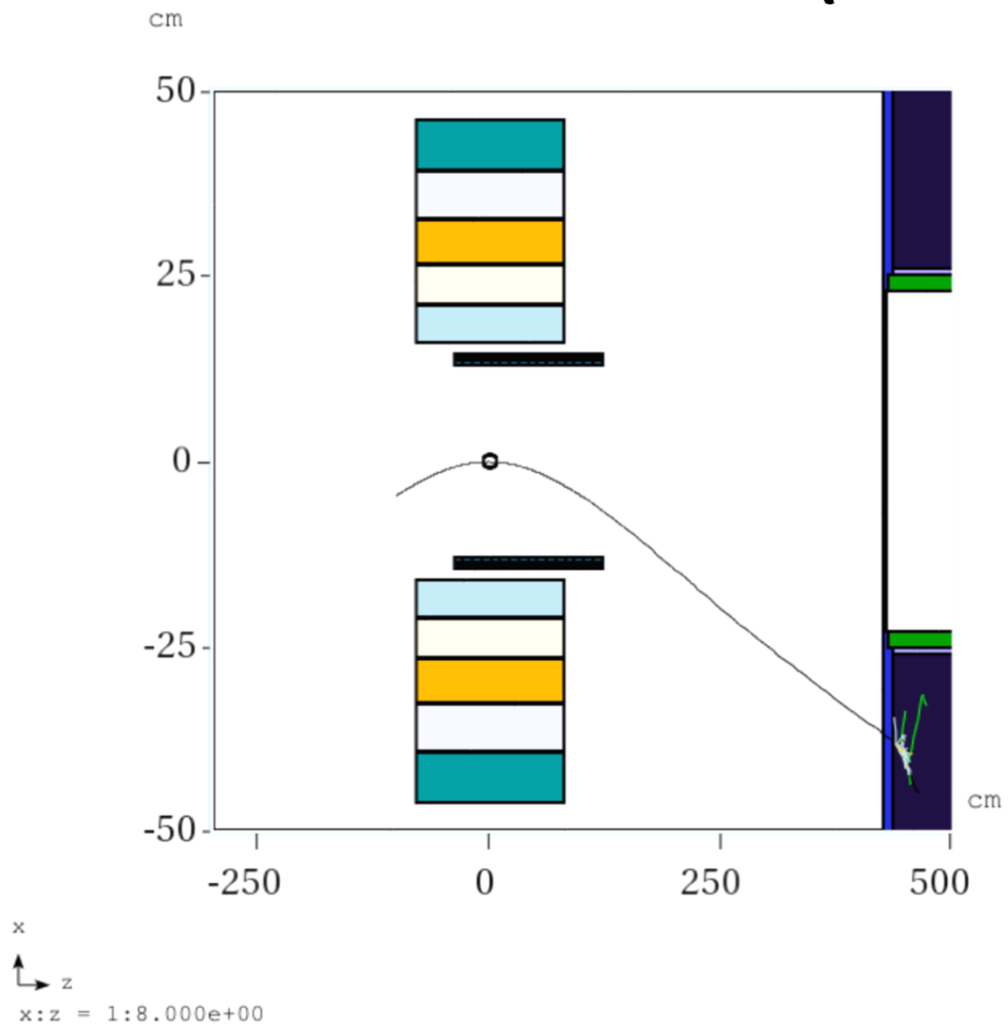


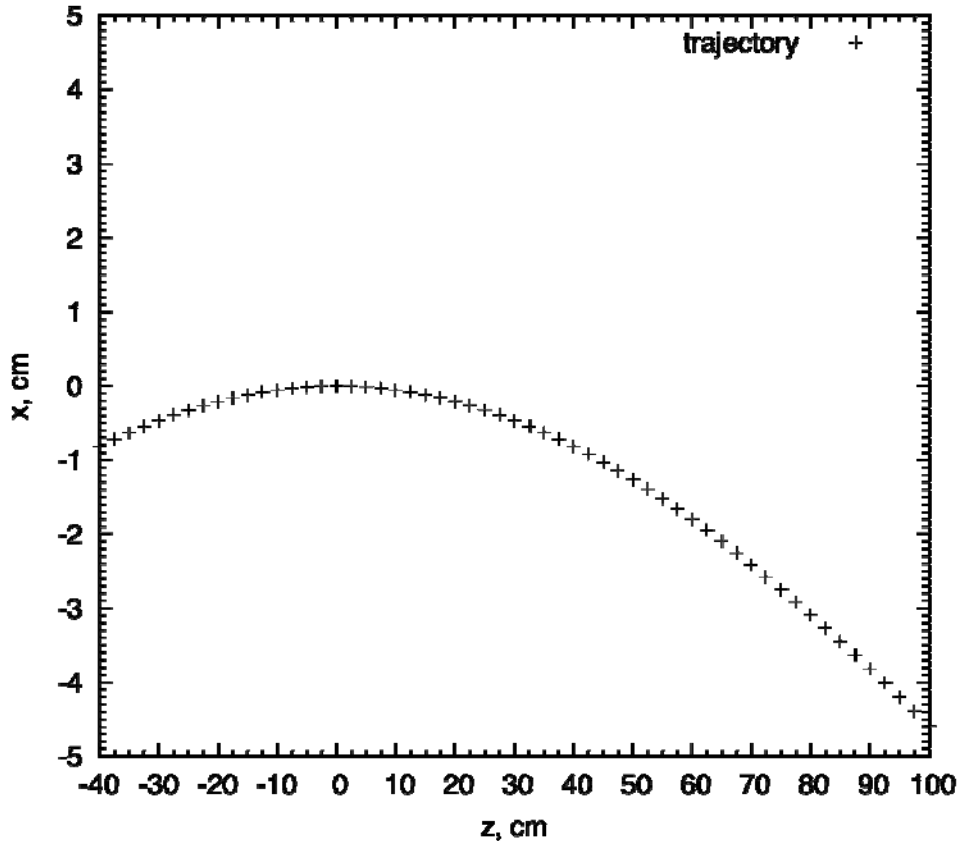

Positive yield is a little higher than negative yield.

# Remaining Protons

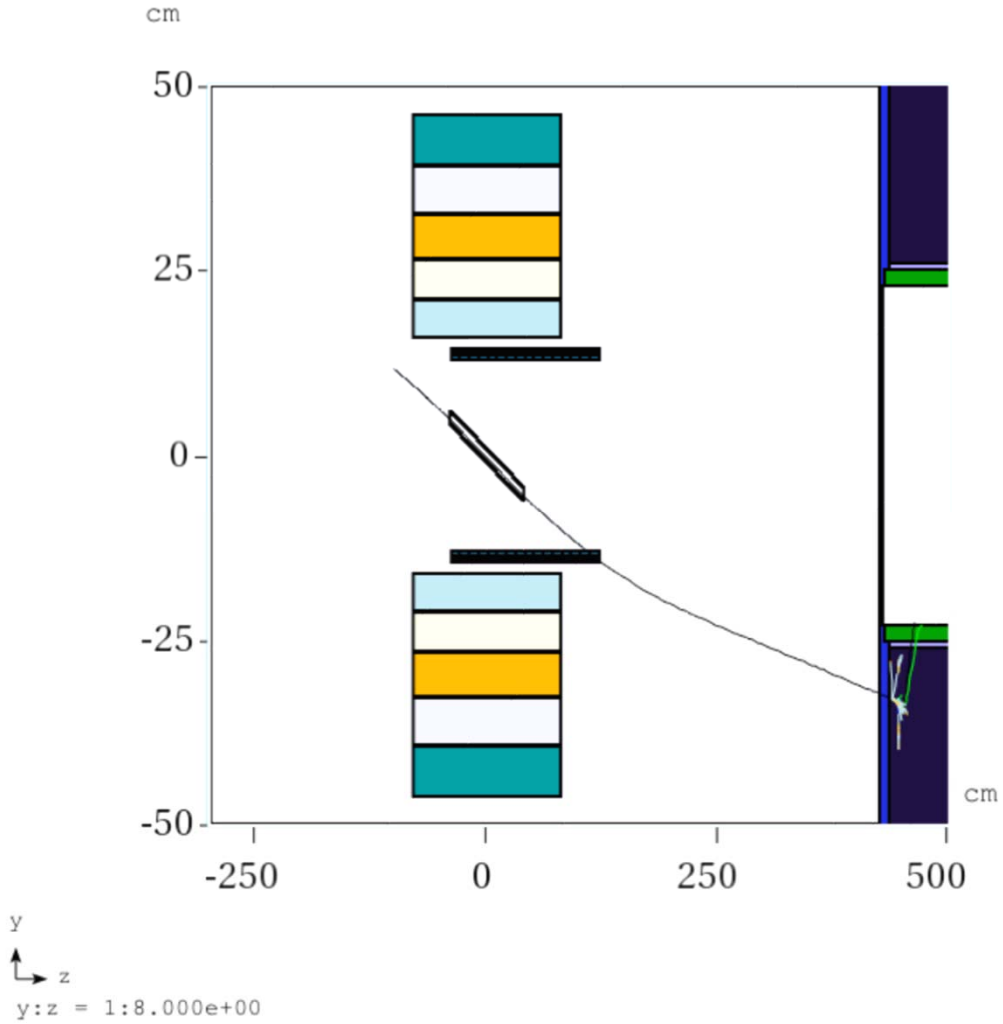


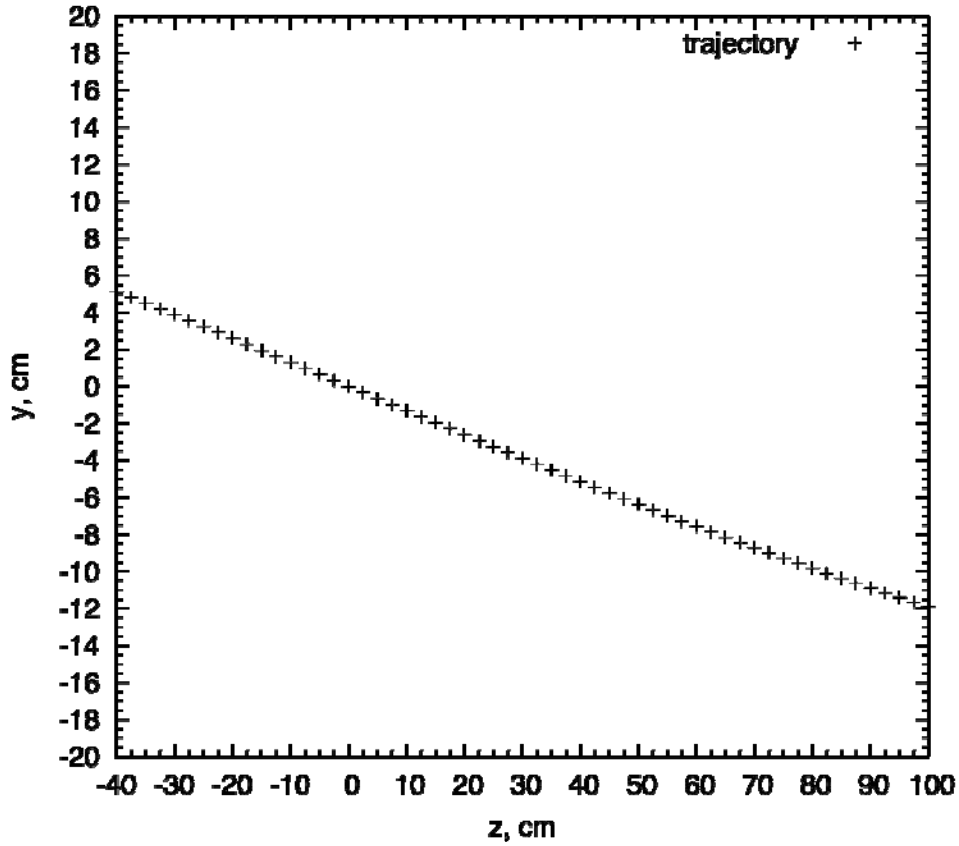
# Single Particle Tracking (no target) (XZ plot)



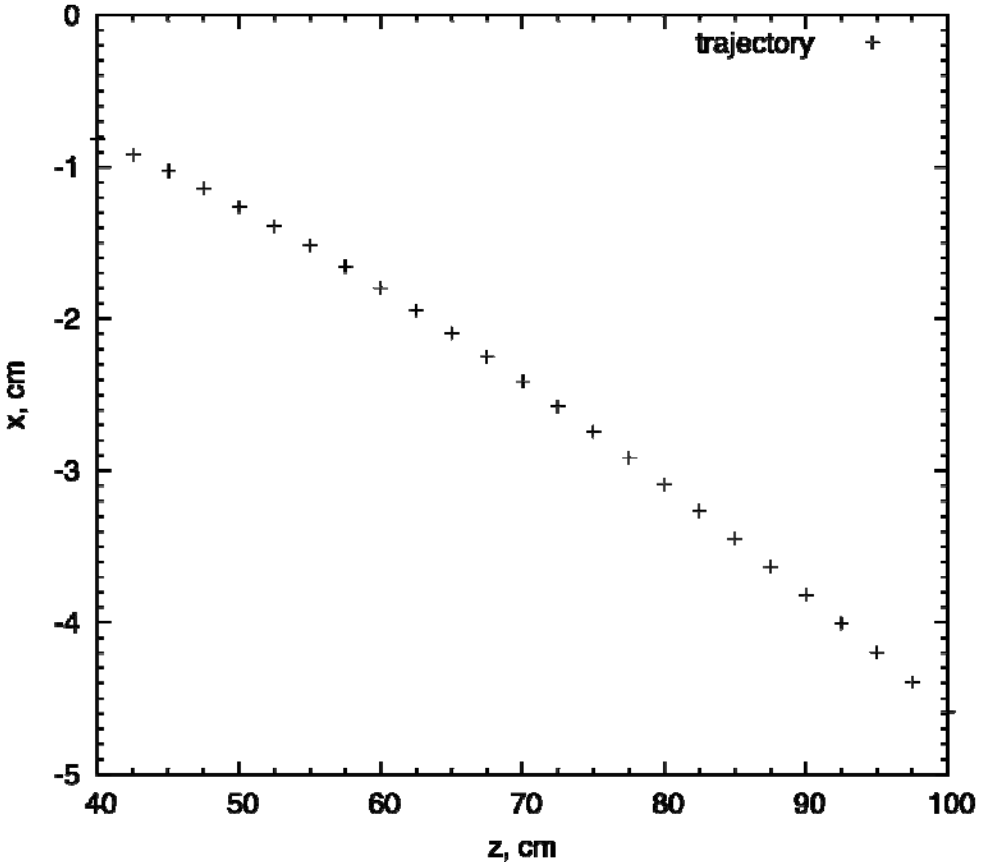



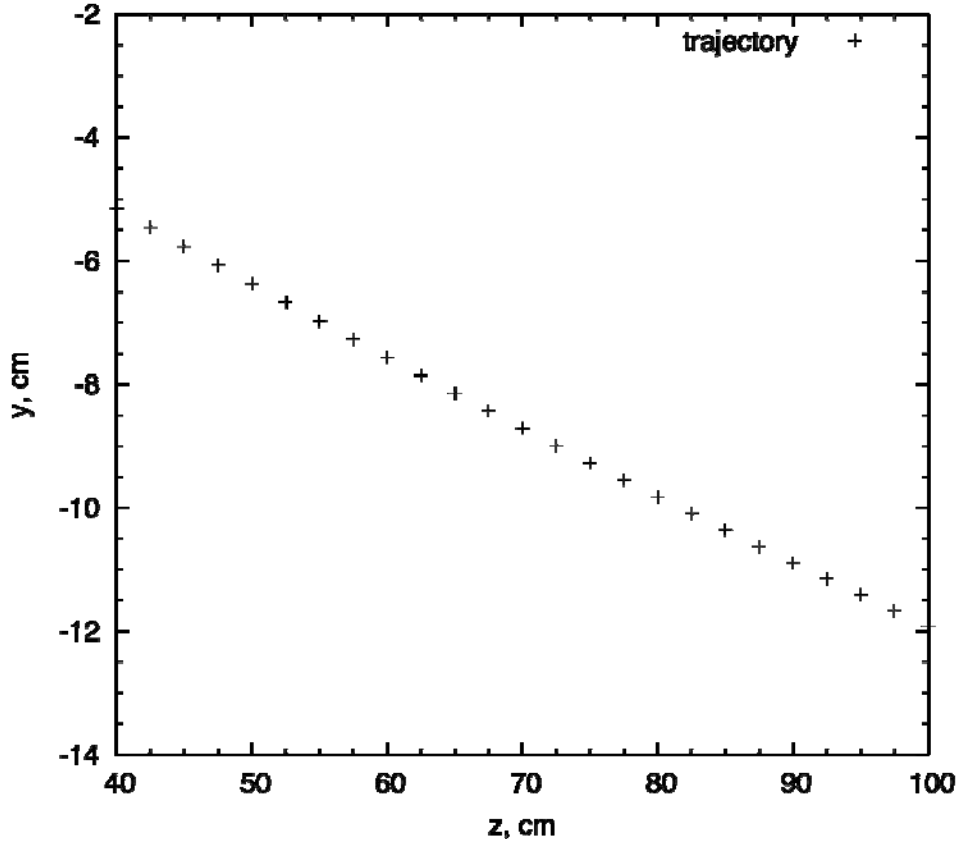
# Single Particle Tracking (no target) (YZ plot)



# Beam Dump (z range: 40-100 cm?)




Z=40 cm, x=-0.814 cm, y=-5.144 cm; Z=100 cm, x=-4.58 cm, y=-11.918 cm
X=-tan(0.062)*(z-40)-0.814; Y=-tan(0.1124)*(z-40)-5.144
Beam Dump (same radius to target radius?)