Particle Production of Mercury Target with 20Tto2T5m Configuration at 6.75 GeV

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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);

- 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 5 μm;

- Production Collection: (50 m downstream, 40 MeV < KE < 180 MeV).

- Mercury target

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);

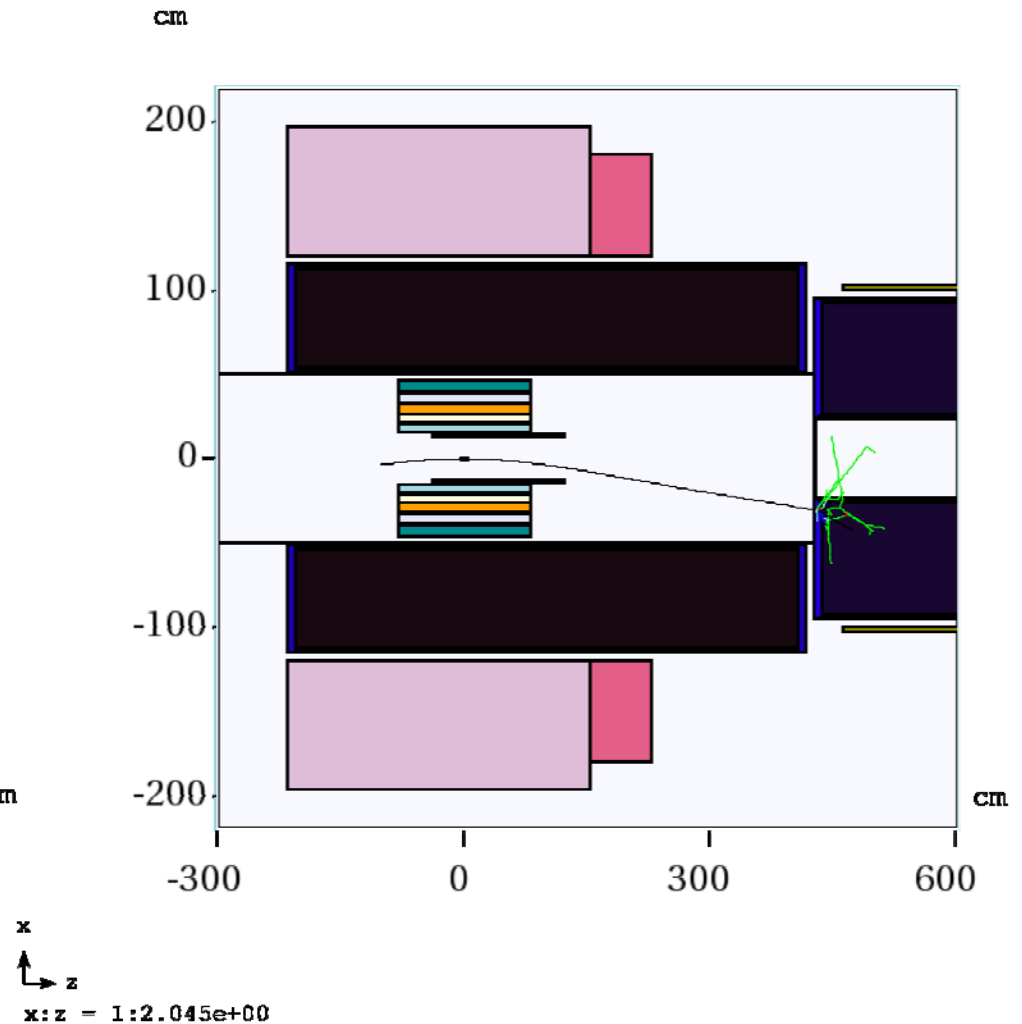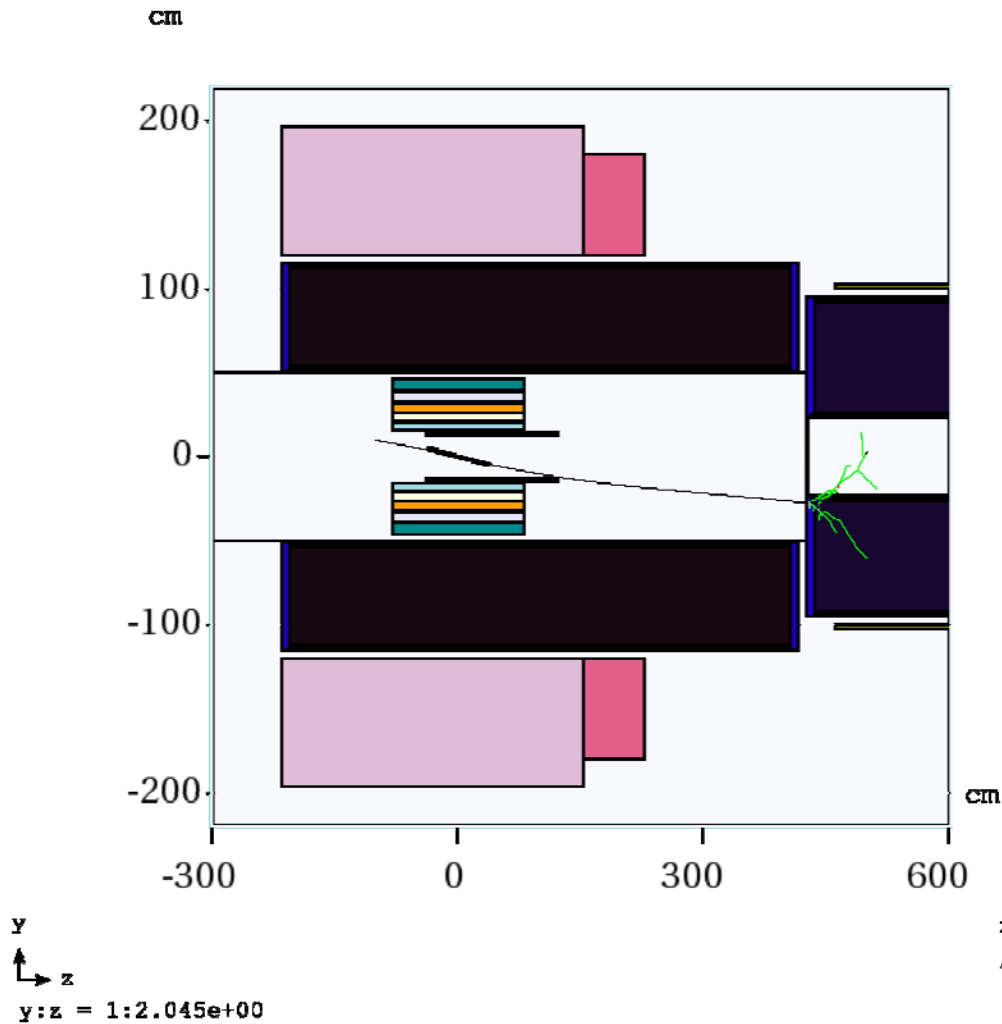 EMNEU: The threshold energy for neutrons (Default: 10^{-4} GeV)

  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

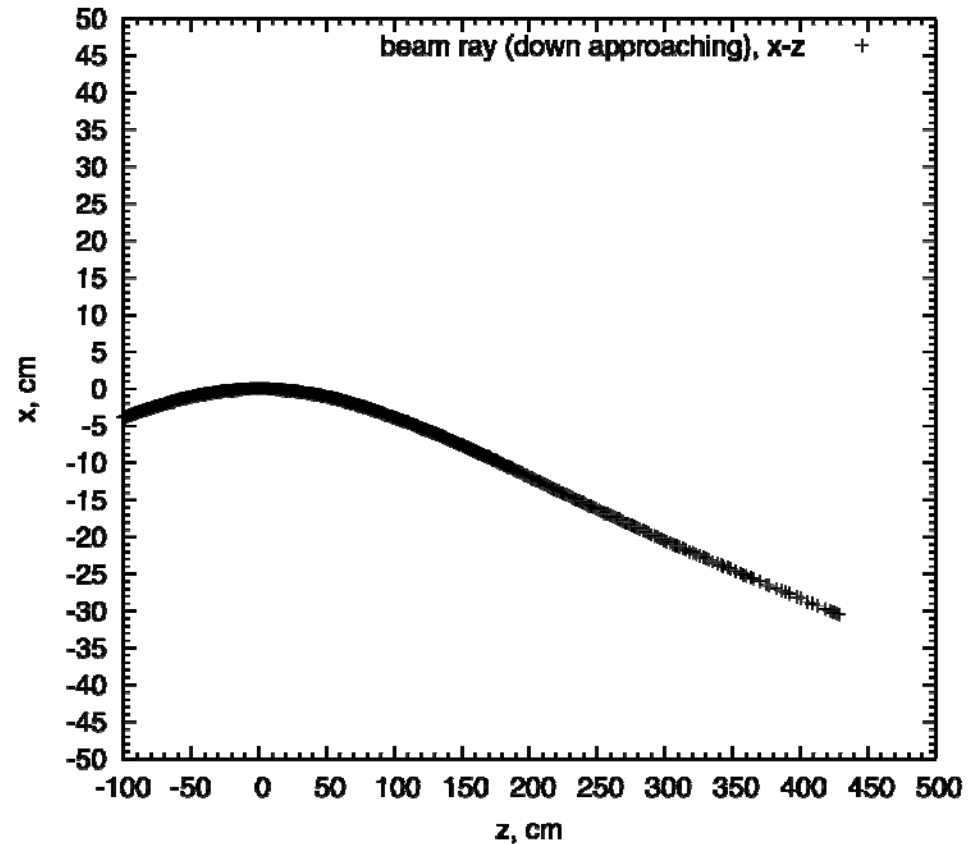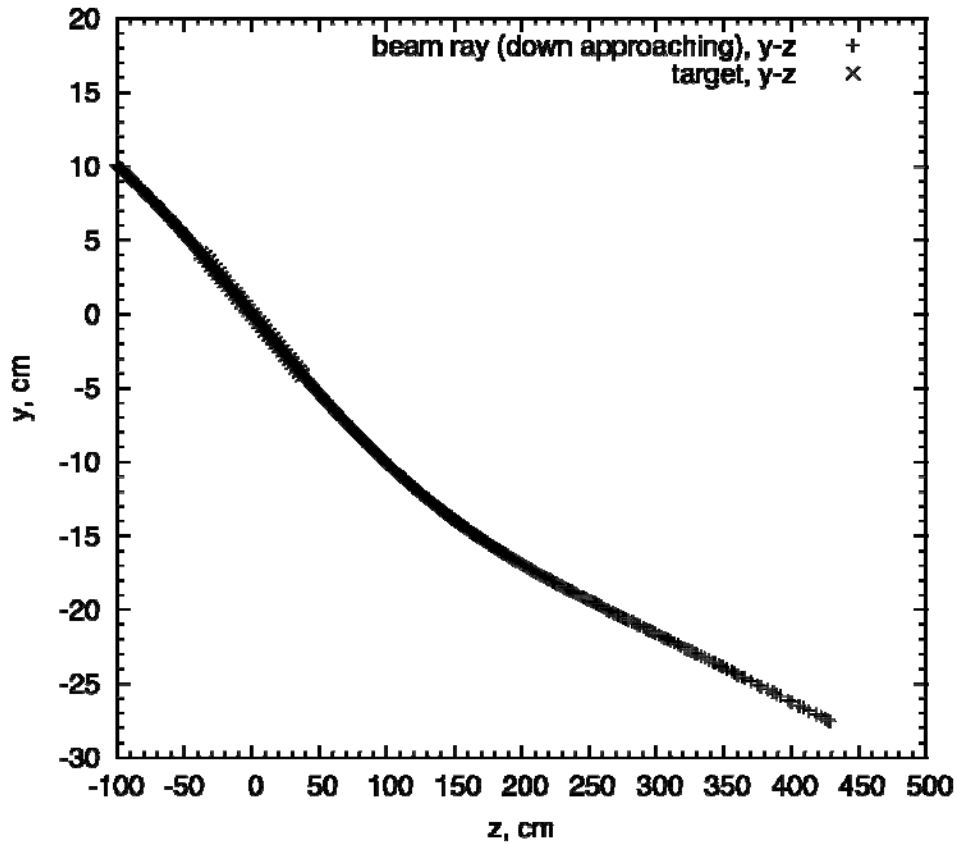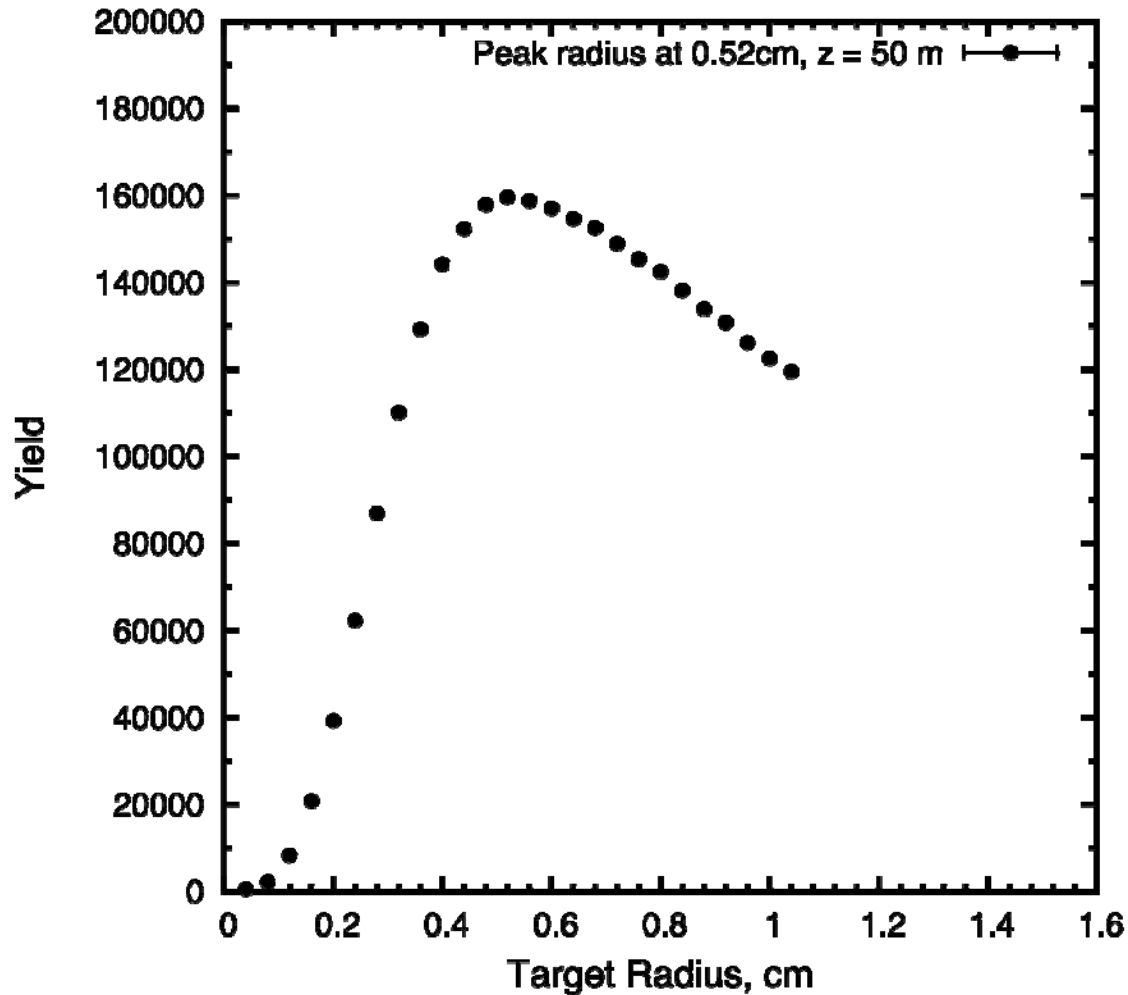# Configuration
(beam is below target)

Beam Ray Tracking
(beam is below target)

Particle Production *vs.* Target Radius
(10^6 events, no beam dump)
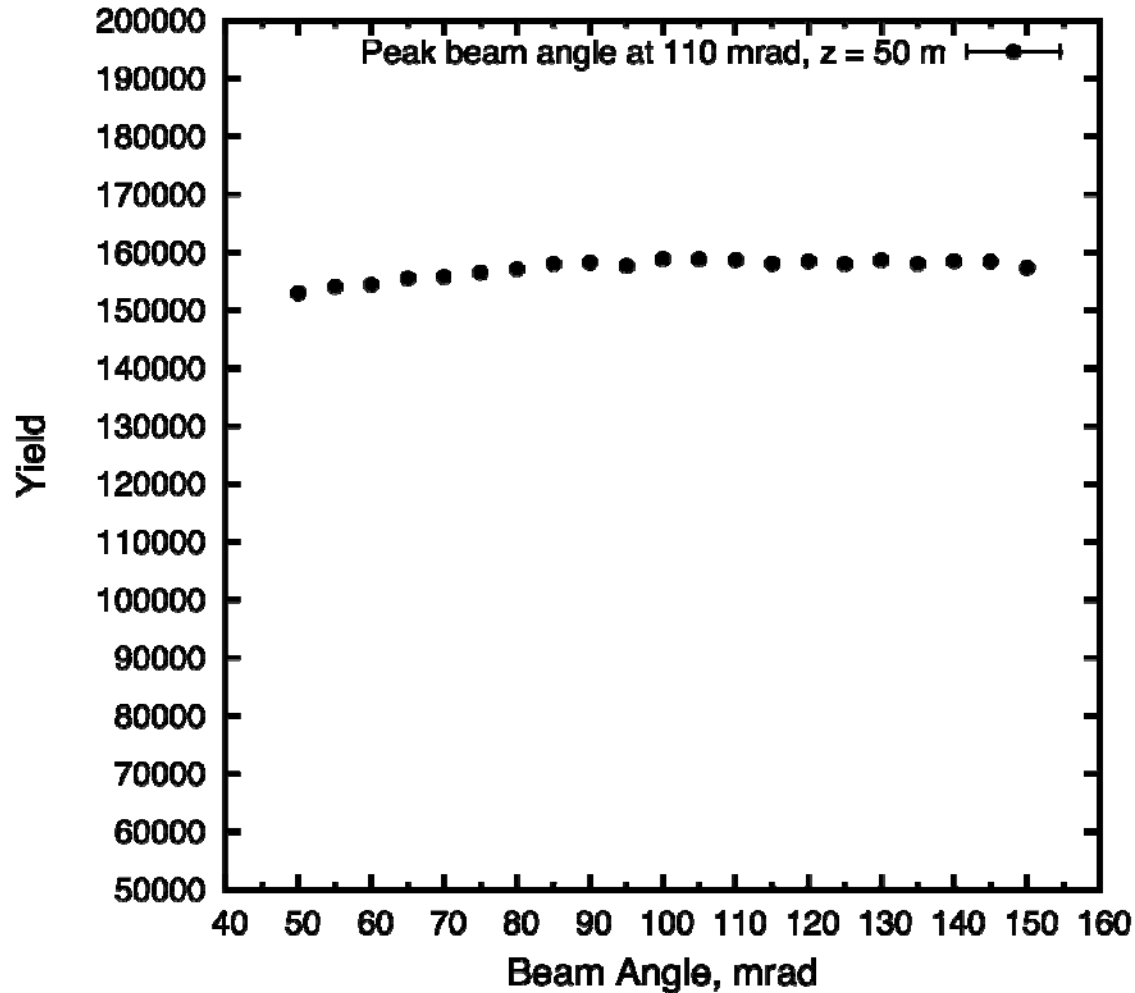

Peak radius at 0.52cm, z = 50 m

Beam angle to SC axis:
110 mrad

Beam/jet crossing angle: 26 mrad.

TR/BR = 4

Peak radius at 0.52 cm

Particle Production *vs.* Beam Angle
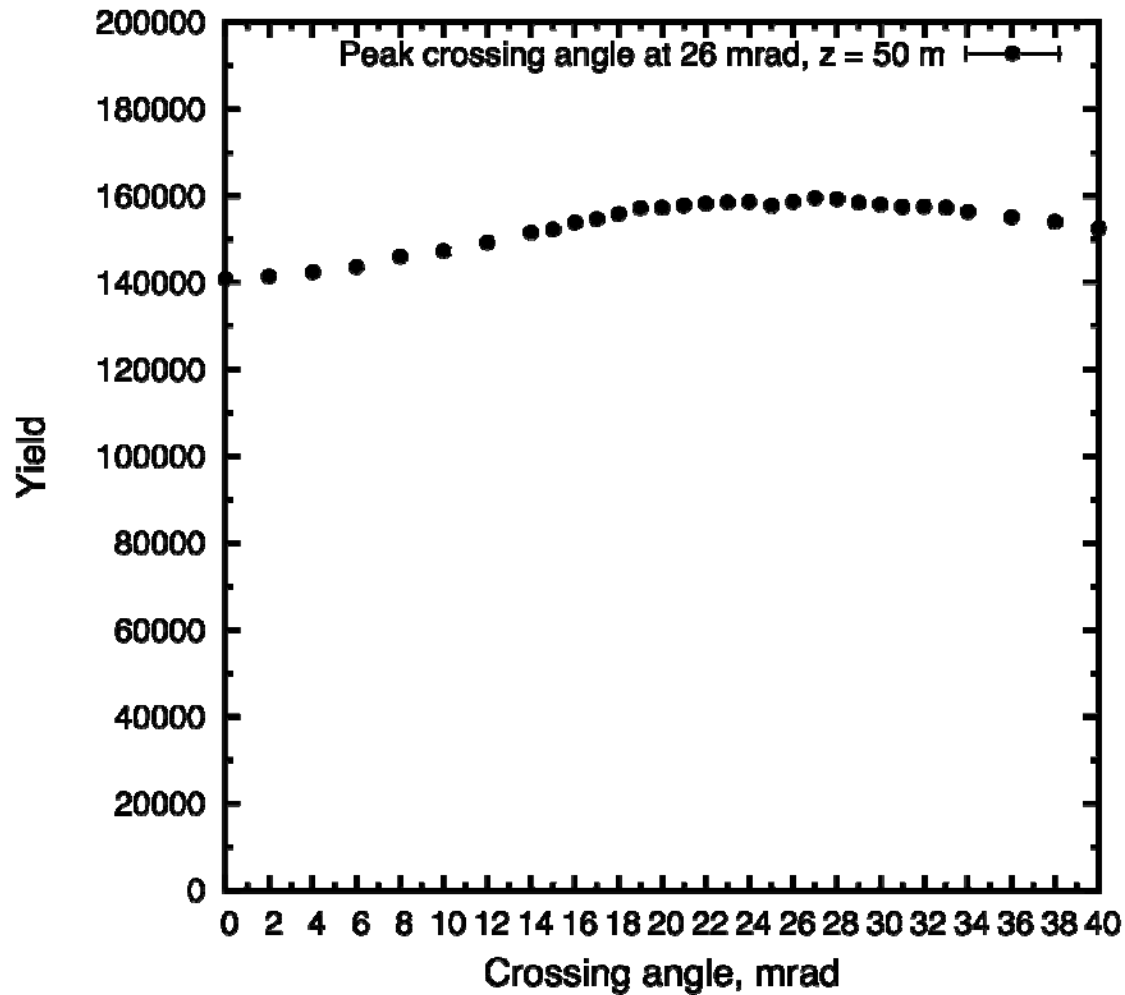## (10^6 events, no beam dump)

Target radius: 0.52 cm

Beam/jet crossing angle: 26 mrad.

TR/BR = 4

Peak beam angle at 110 mrad

Particle Production *vs.* Crossing Angle
(10^6 events, no beam dump)

Target radius: 0.52 cm

Beam angle: 110 mrad.
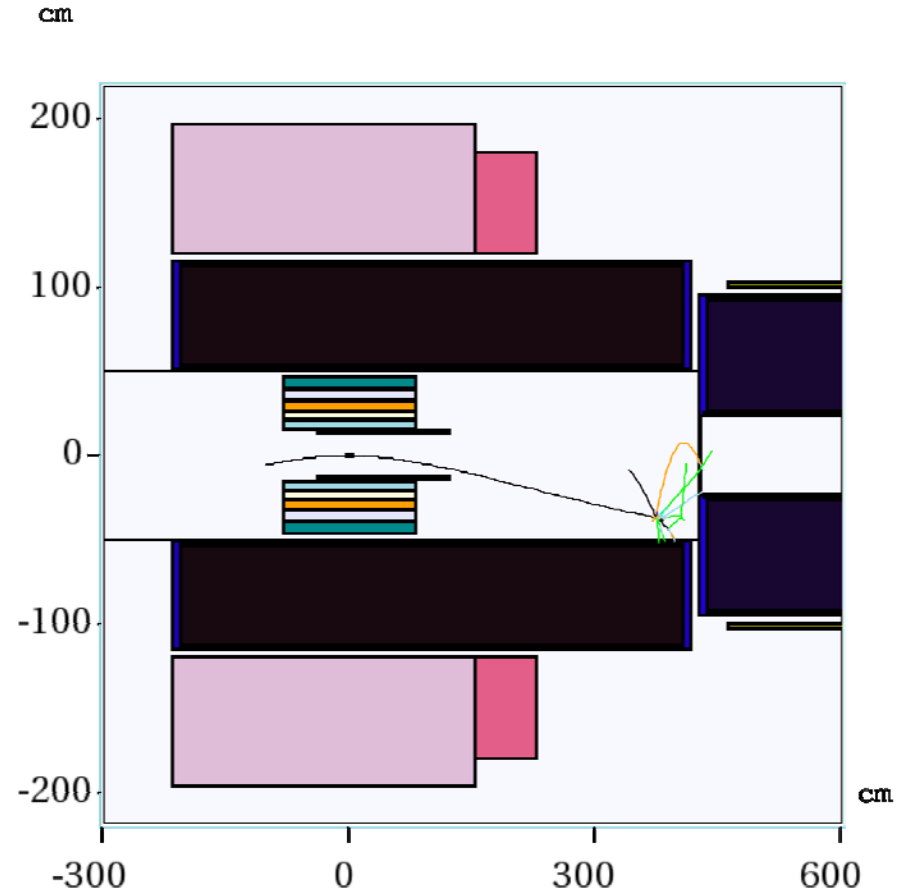
TR/BR = 4

Peak crossing angle at 26 mrad

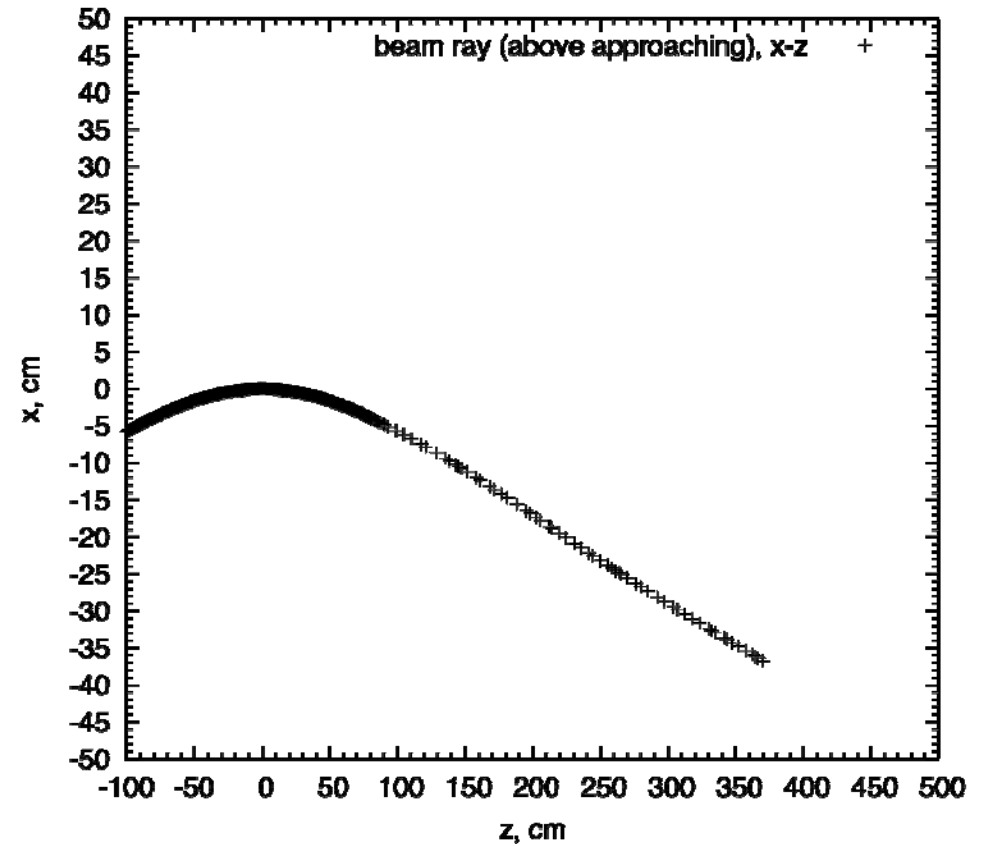# Configuration
(beam is above target)
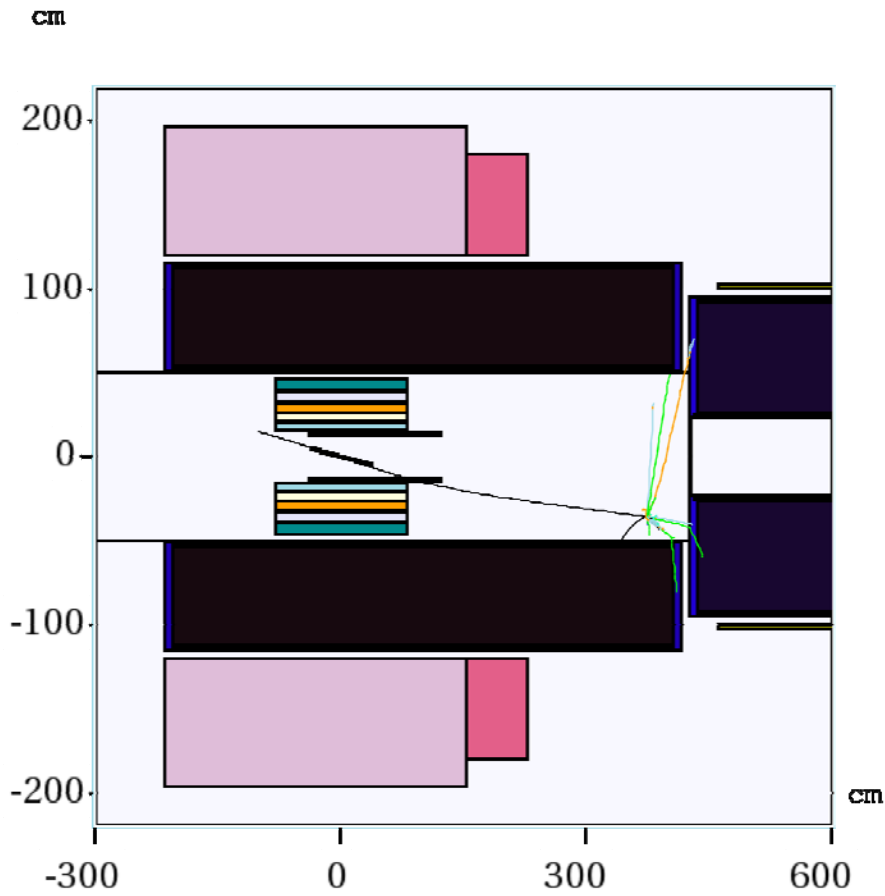
Beam Ray Tracking
(beam is above target)
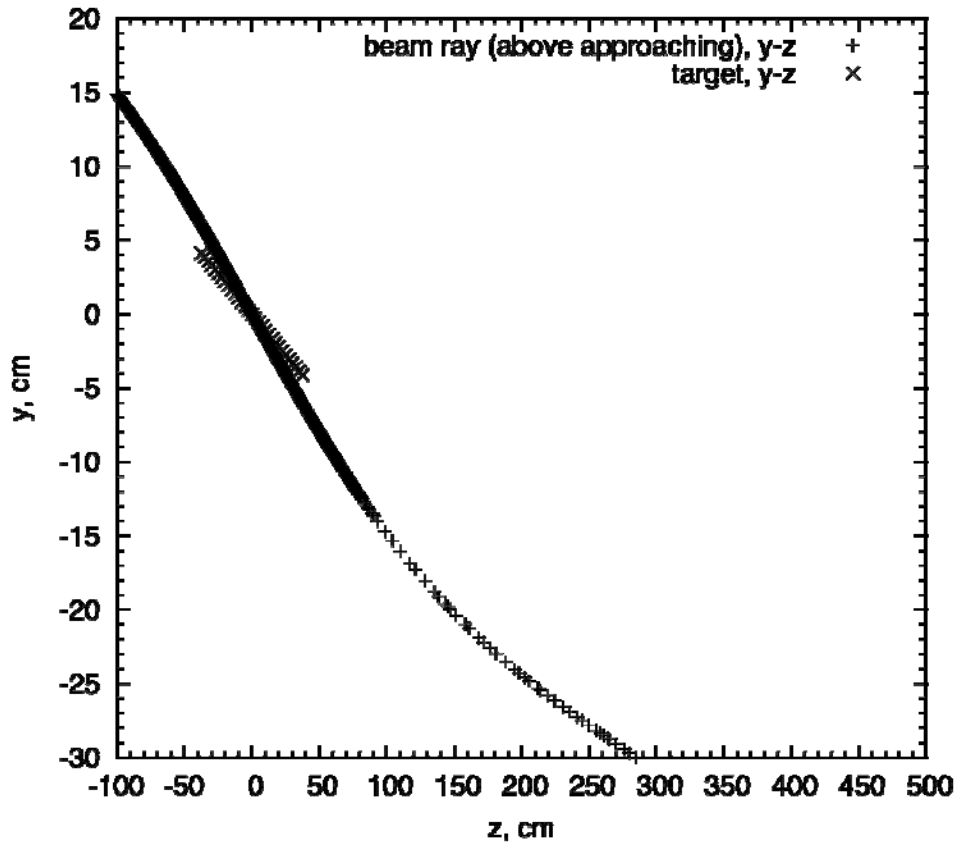
Configuration
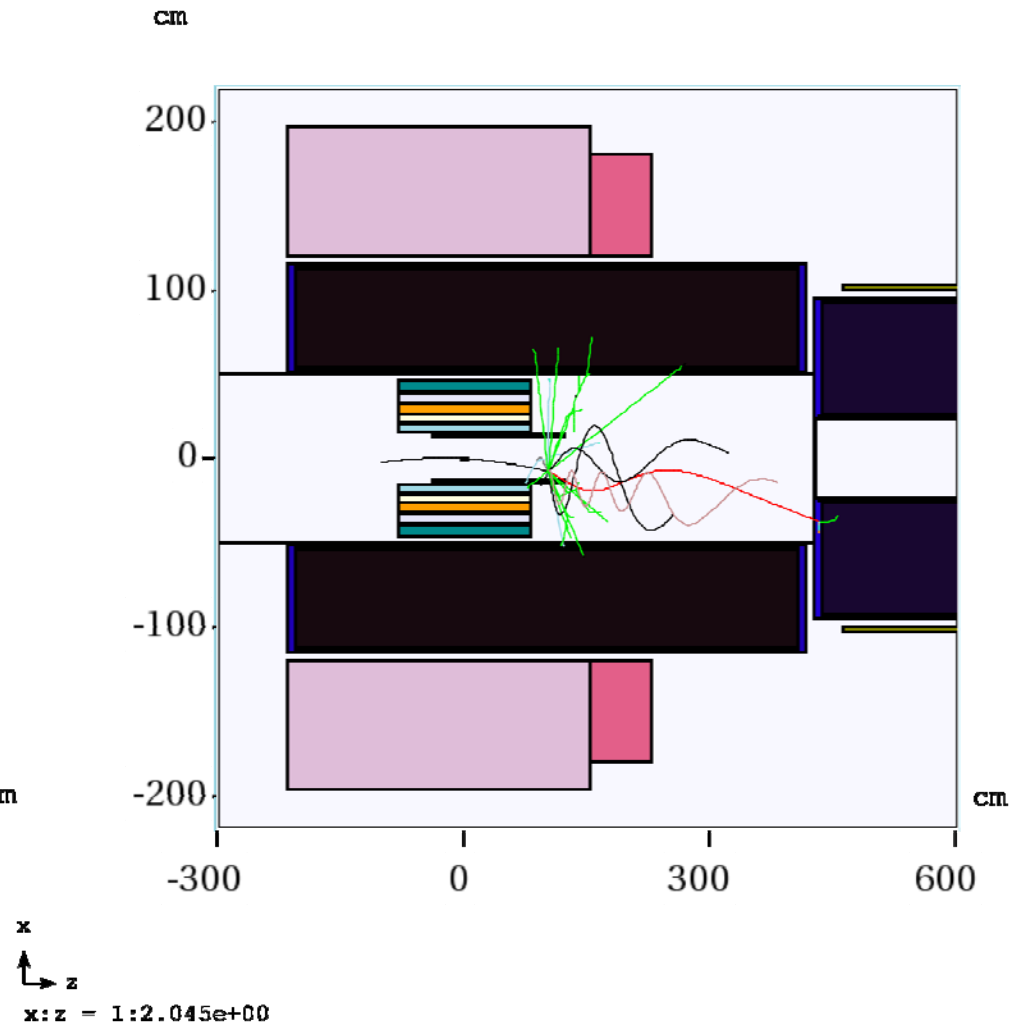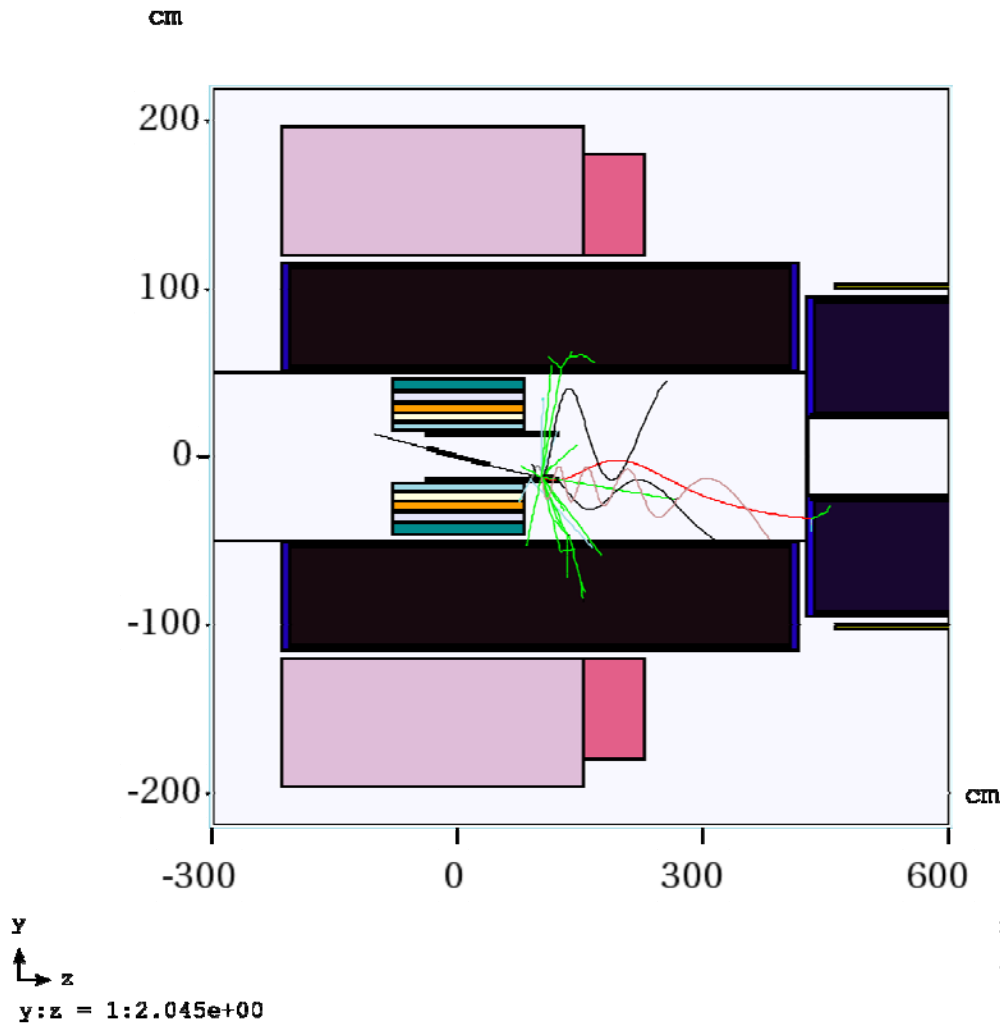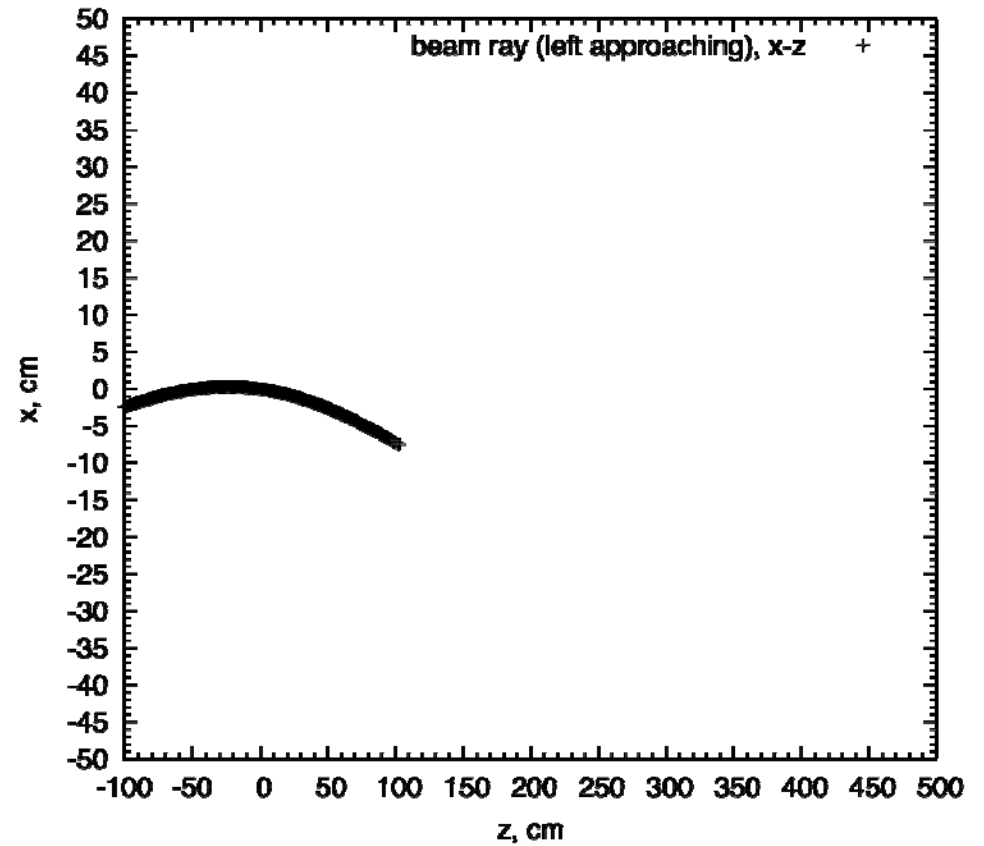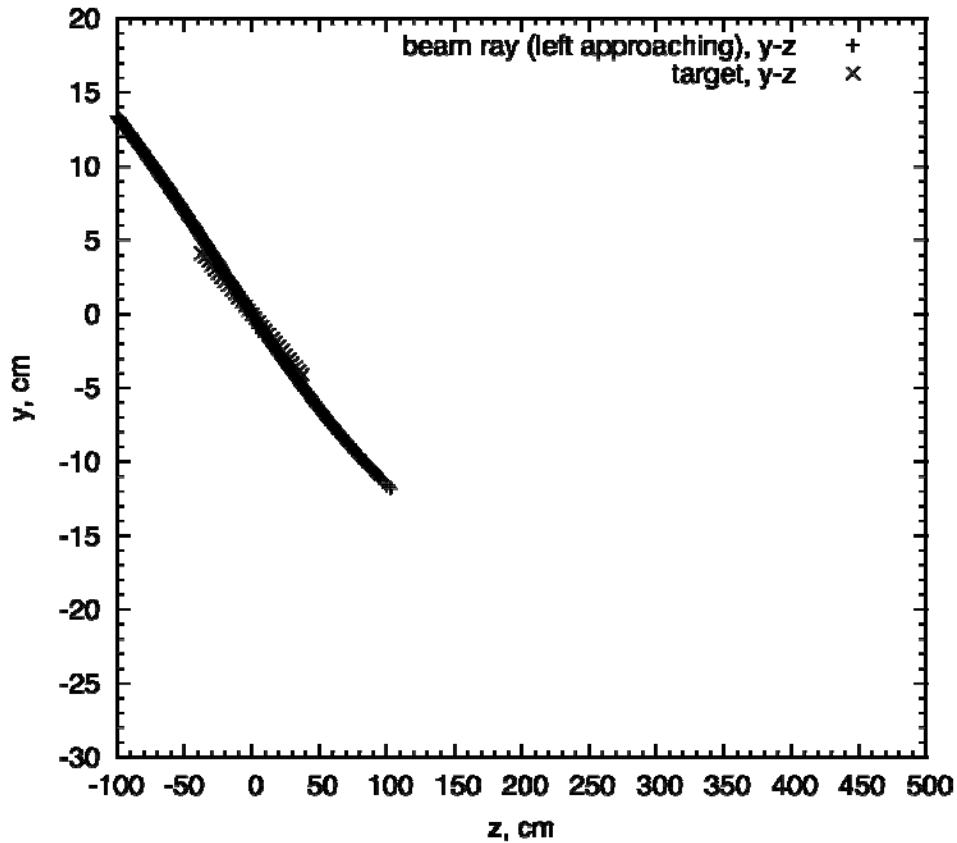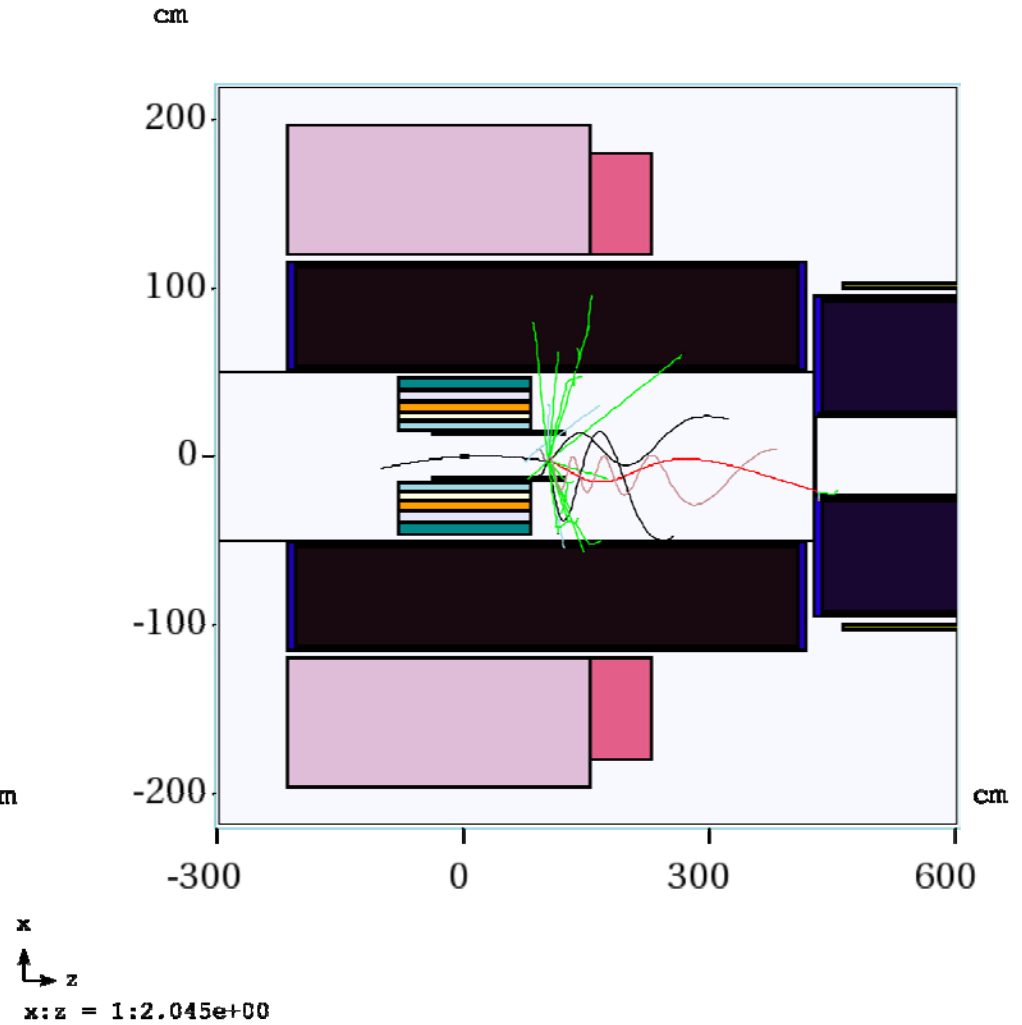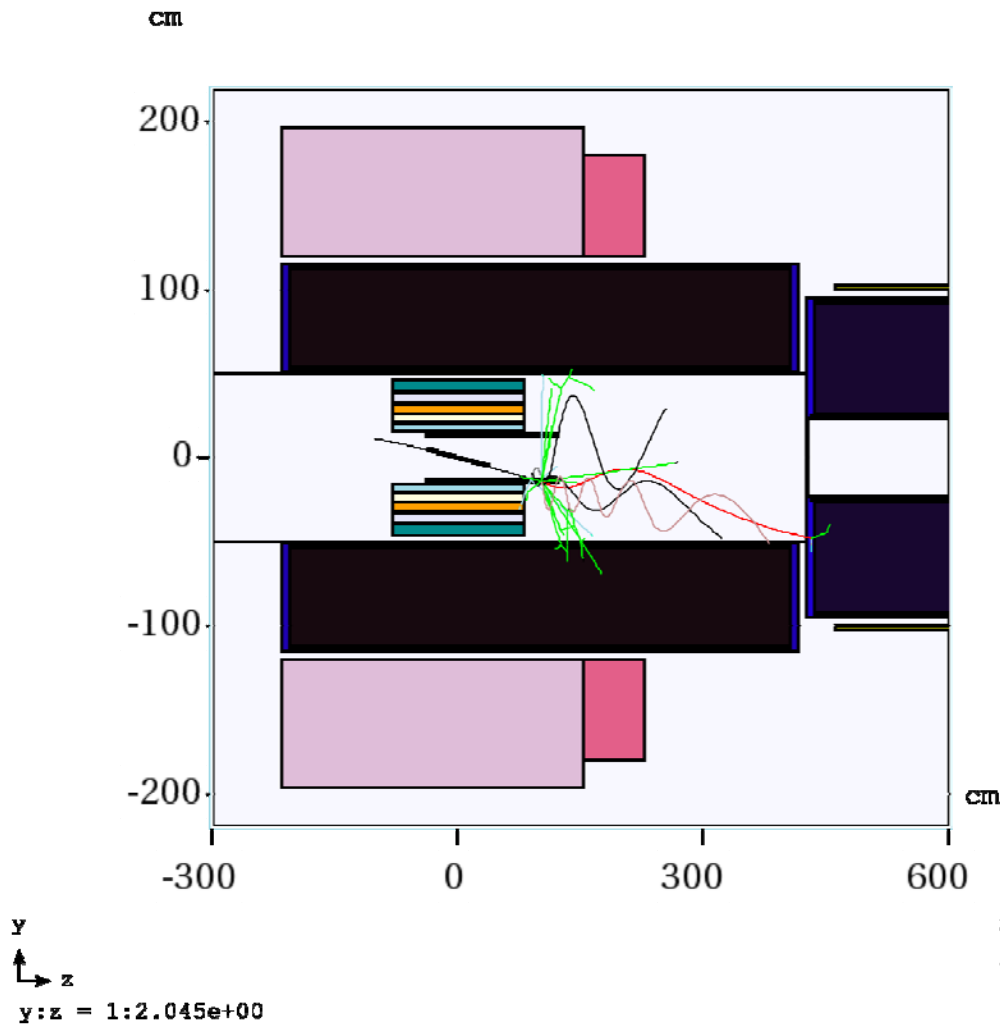## (beam is on the left of target)

Beam Ray Tracking
(beam is on the left of target)

Configuration
(beam is on the right of target)

Beam Ray Tracking
(beam is on the right of target)