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

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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). [$\Rightarrow$ higher $P_{\perp}$ particles accepted than in past.]

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);

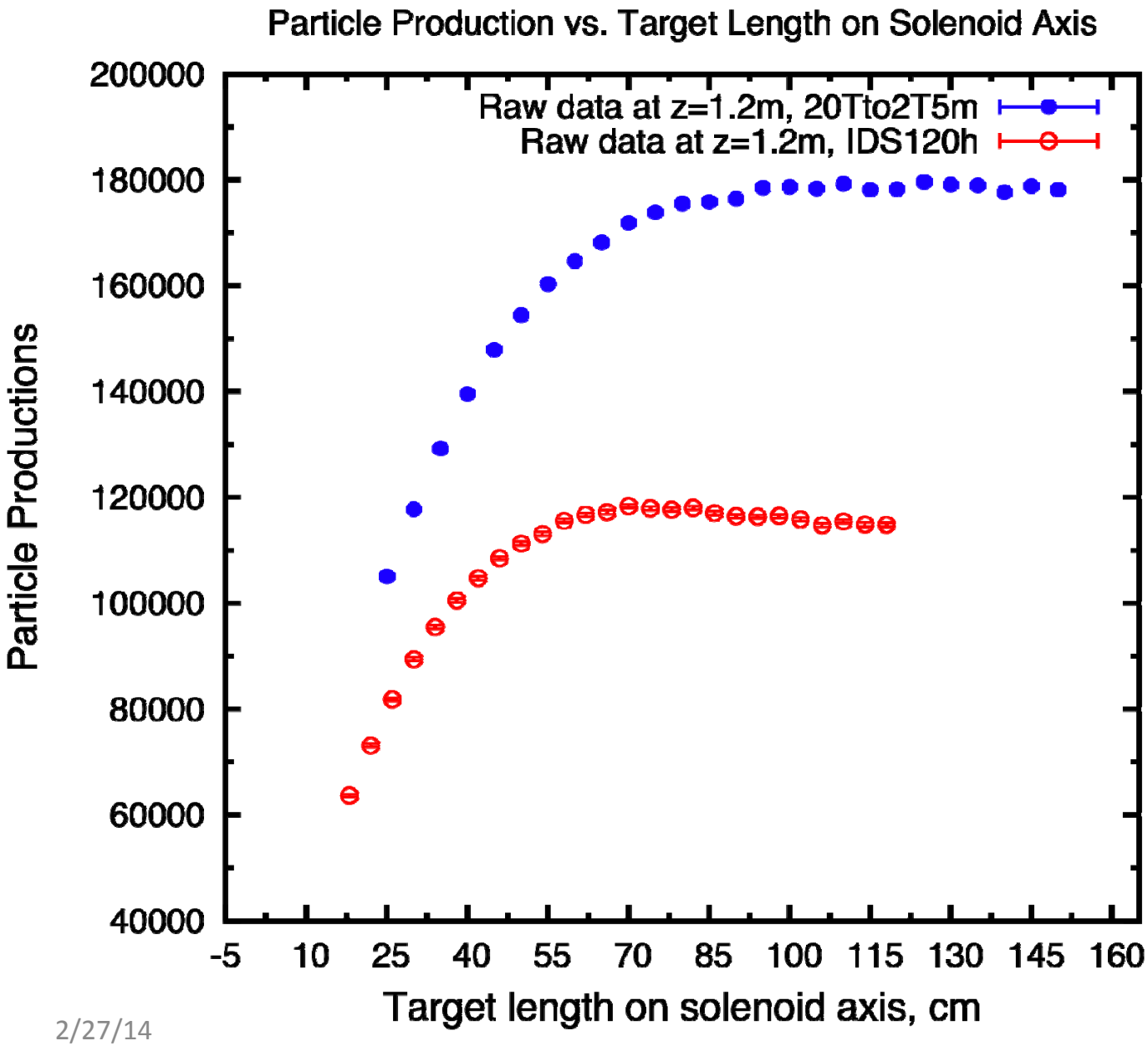
  EMNEU: The threshold energy for neutrons (Default:10^{-4} GeV)

  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



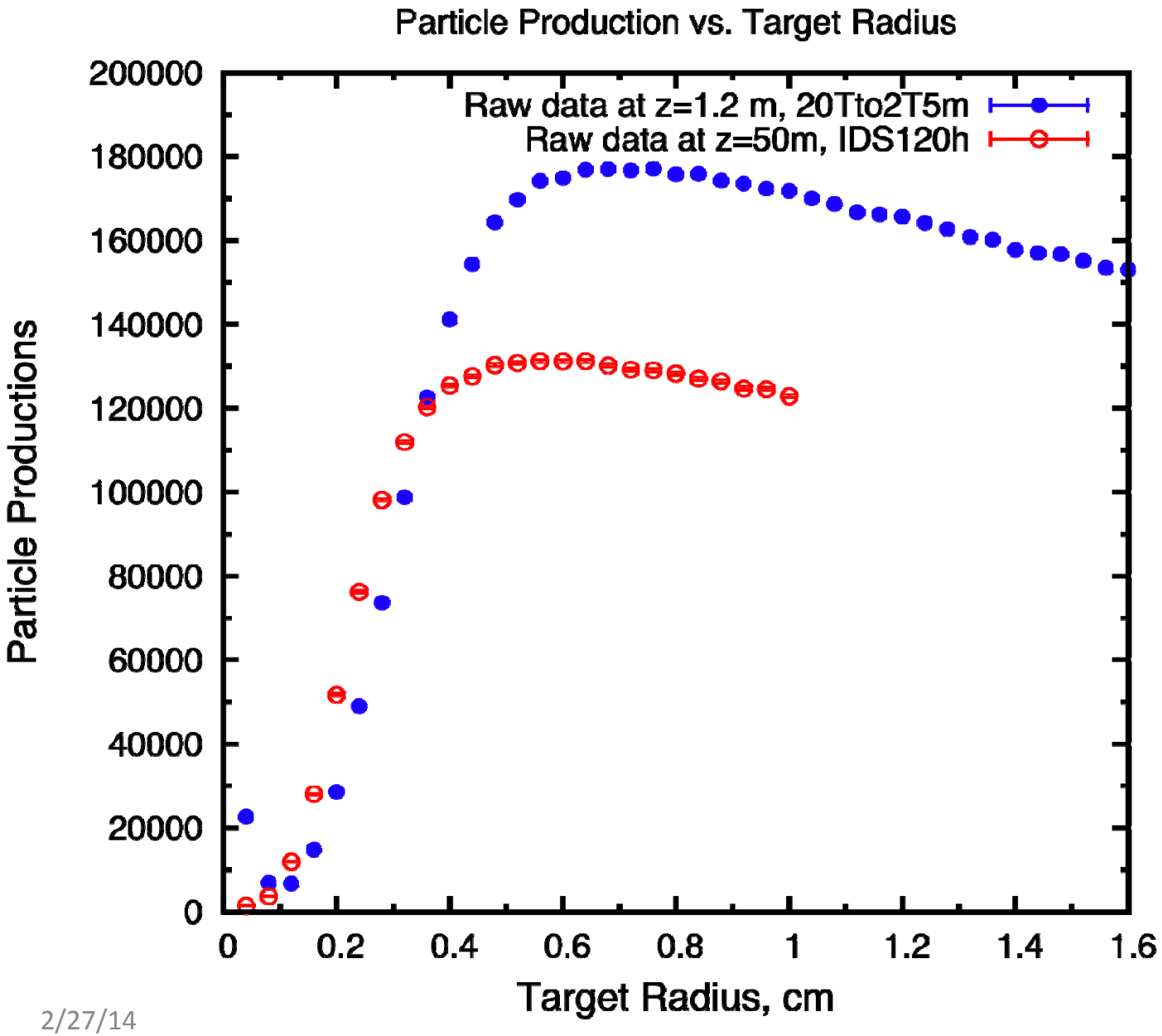
Co-linear of target and beam.

TR=0.58 cm and TR/BR=4

Target angle at 59 mrad

At target length of 75 cm: I20Tto2T5m gives about 50% higher in particle production than IDS120h.

Particle Production vs Target Radius



Co-linear of target and beam.

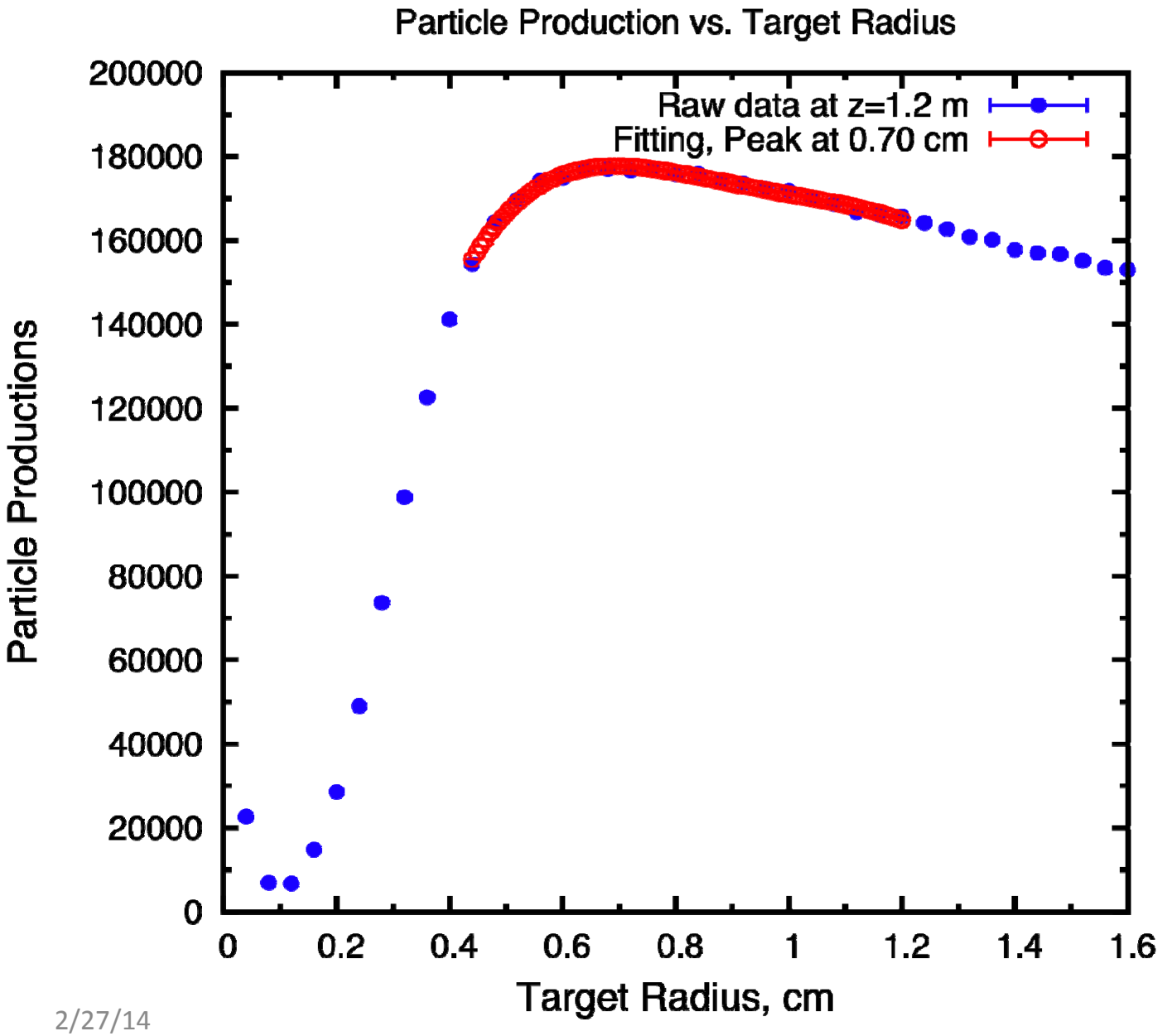
TR/BR=4

Target angle at 59 mrad

20Tto2T5m: target length at 80 cm

IDS120h: Target length at 75 cm

Particle Production vs Target Length (20Tto2T5m Configuration)



20Tto2T5m:
Co-linear of target and beam.

TR/BR=4

target length at 80 cm and target angle at 59 mrad

Peak (production) at target radius of 0.7cm.

Production at target radius of 1 cm is about 2.8% less than at 0.7 cm.