Dump for Carbon Target with IDS120h Configuration at 7 GeV

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Target Studies
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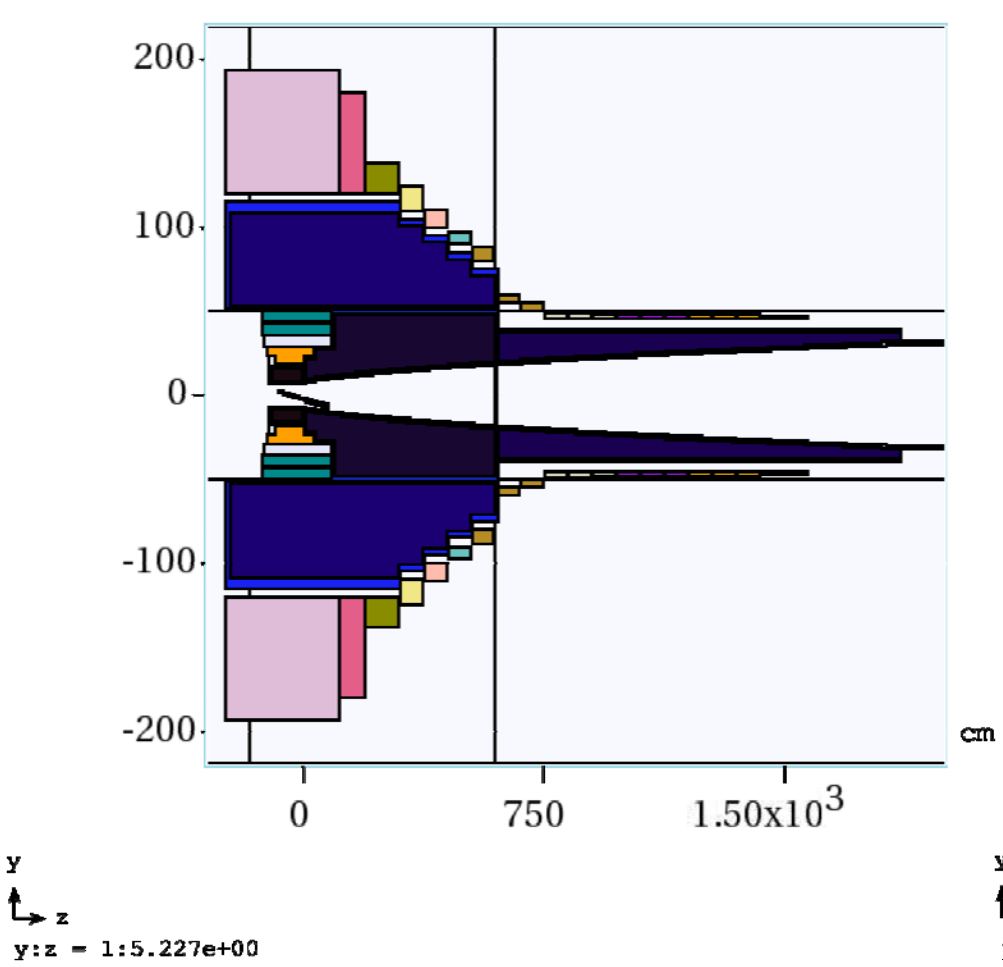
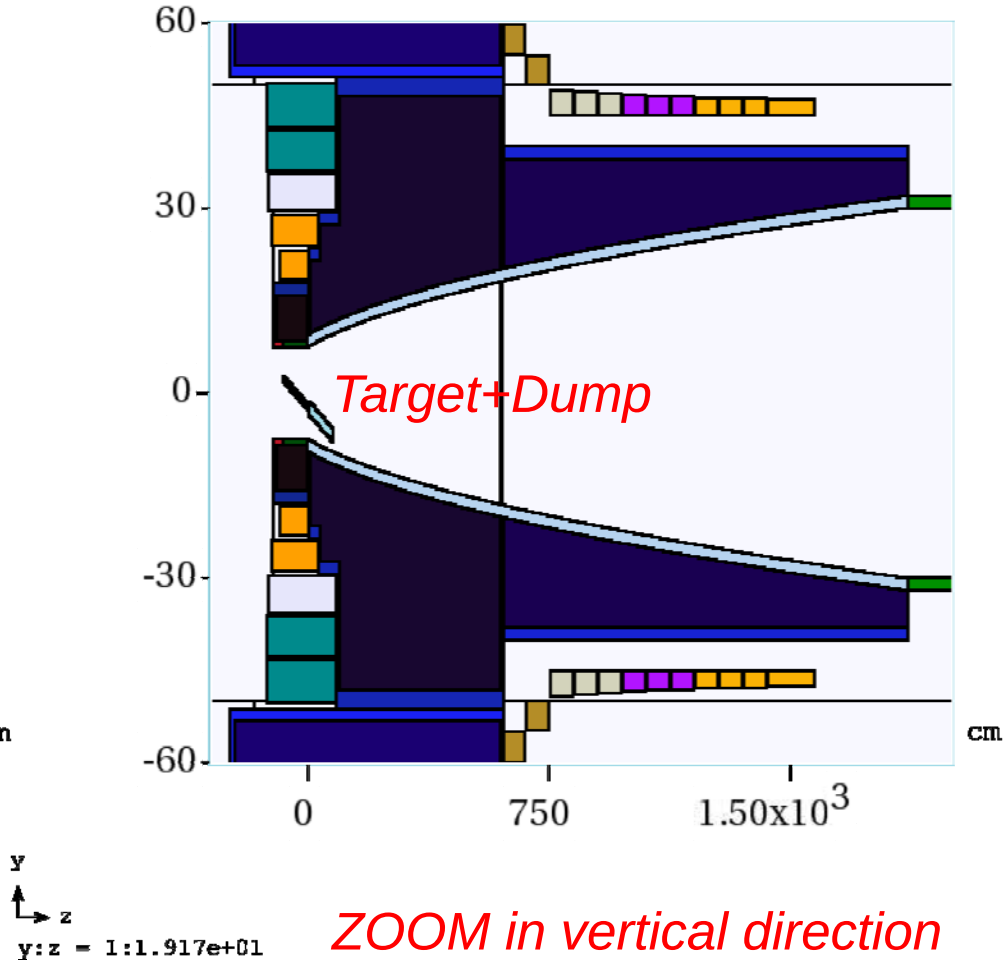
IDS120h Geometry

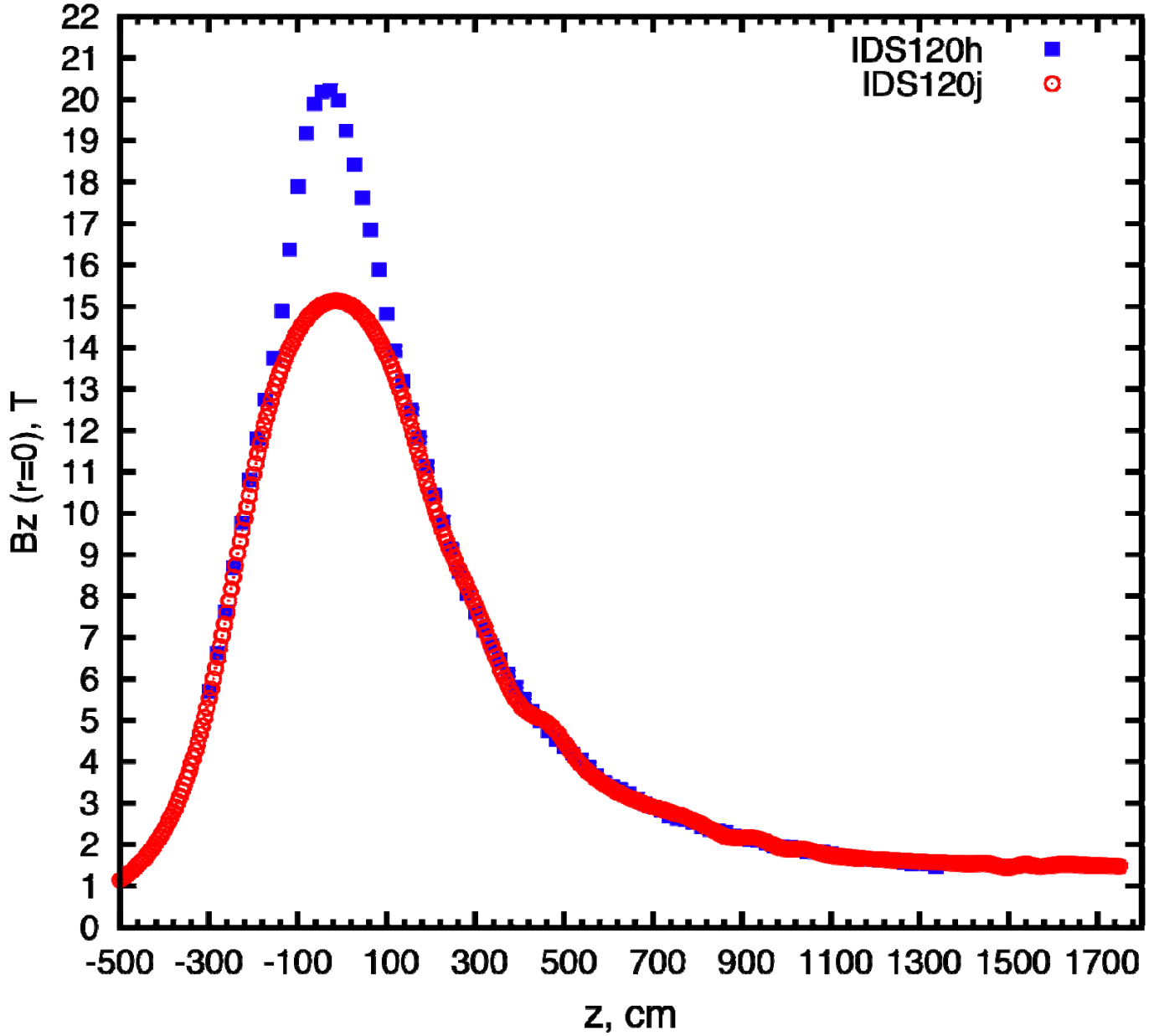




ZOOM in vertical direction

Fieldmap

(IDS120h: peak at 20 T)



Target Station Setting

- IDS120h Configuration (initial beam pipe radius of 7.5 cm) and Fieldmap (20T➔1.5T);
- Code: MARS15(2014) ICEM 4=1;
- Proton beam: 7 GeV (KE) and launched at z = -100 cm;
- Optimized Target Parameters:

  target length of 77 cm (from z = -76 cm to z = 1 cm with center at z = -37.5 cm)

  target radius of 0.56 cm, beam radius of 0.14 cm

  same beam and target angle (to SC axis) of 60 mrad.
- Production Collection: (50 m downstream, 40 MeV < KE < 180 MeV).

Dump Setting

Dump is located immediately downstream the target and co-linear with each other.

Case 1: Rod with length of 77 cm (from z = 1 cm to z = 78 cm), tilt angle of 60 mrad to SC axis and radius of 0.56 cm.

Case 2: Rod with length of 77 cm (from z = 1 cm to z = 78 cm), tilt angle of 60 mrad to SC axis and radius of 2*0.56 cm.

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=7 2=0.02 3=0.3 4=0.01 5=0.05 6=0.01 7=0.01

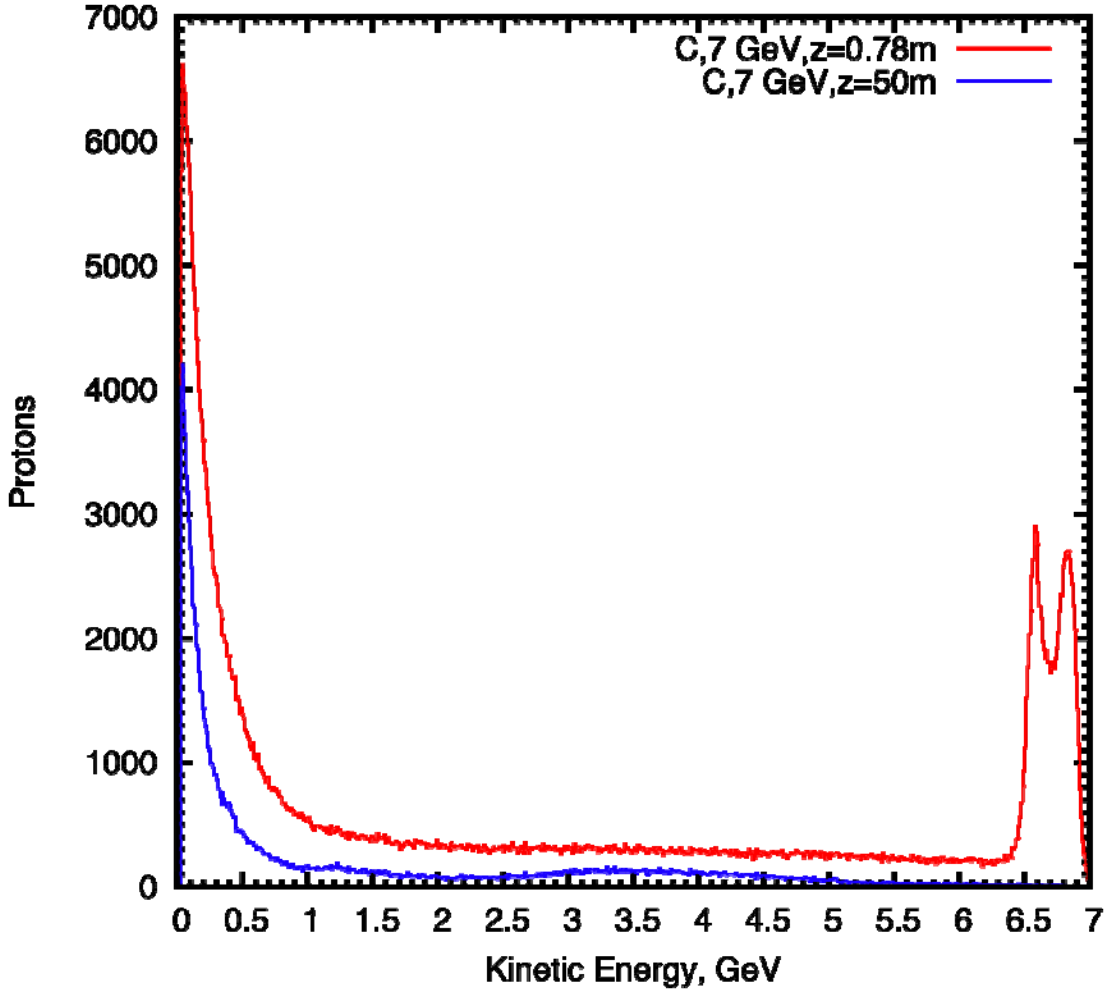
Particle Production and Protons

(1000,000 events)

	Z (m)	Yield (pos)	Yield (neg)	Yield (sum)	Protons
Target (No Dump)	0.78	85921.3	70736.1	156657.4	495745
	50	75878.8	61336.5	137215.3	137078
Target+Dump (Case 1)	0.78	86357.9	71401.0	157758.9	480855
	50	76196.0	62108.1	138304.1	132260
Target+Dump (Case 2)	0.78	84981.8	68882.0	153863.8	460672
	50	75078.7	59773.6	134852.3	127615

Energy Spectra of Protons

(Dump-Case 2)



z=0.78 m: E(total)=233739 GeV, E(ave)=3.3396 GeV, KE(ave)=2.4 GeV
z=50 m: E(total)=1548480 GeV, E(ave)=1.8316 GeV, KE(ave)=0.89 GeV