

K^0 L CPS Meeting June 20, 2023

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Design Update – June 2023, “KLCPS70”

- Minor adjustments to the model
 - Correct length of the photon pipe (about 50 m)
 - Move CPS along Z (but probably need more)
 - Beam line windows (0.5 mm Al)
 - Nitrogen gas inside, over-pressurized at 1.01 atm
 - Vacuum photon line (5.e-6 Torr, to be implemented)
- Adjust the table of weights
- Ran the simulation in nominal conditions to demonstrate the photon beam properties in the Cave

June'2023 Conceptual Design Update

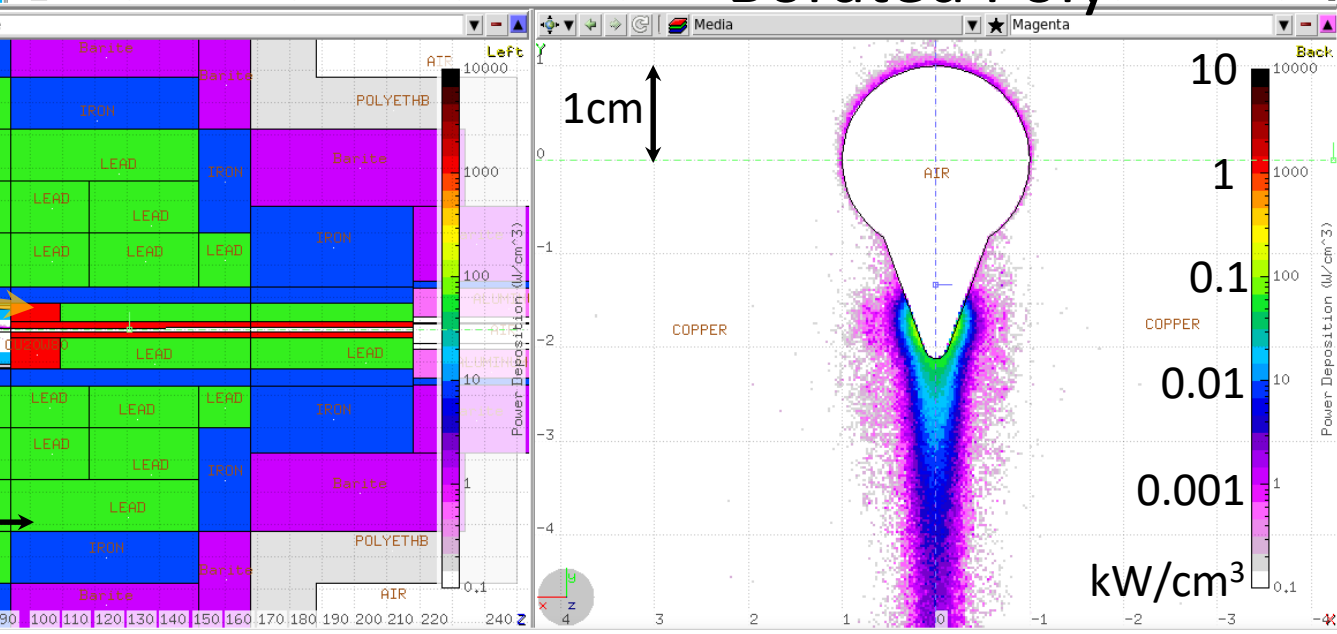
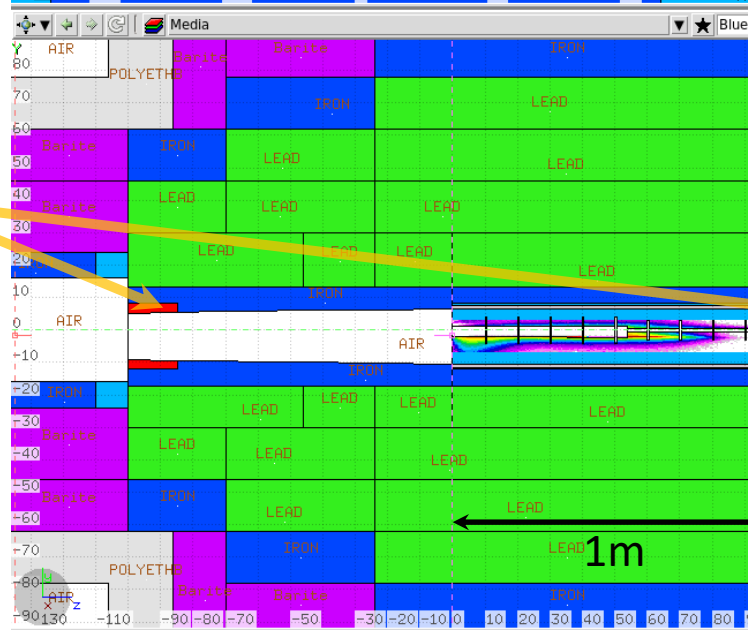
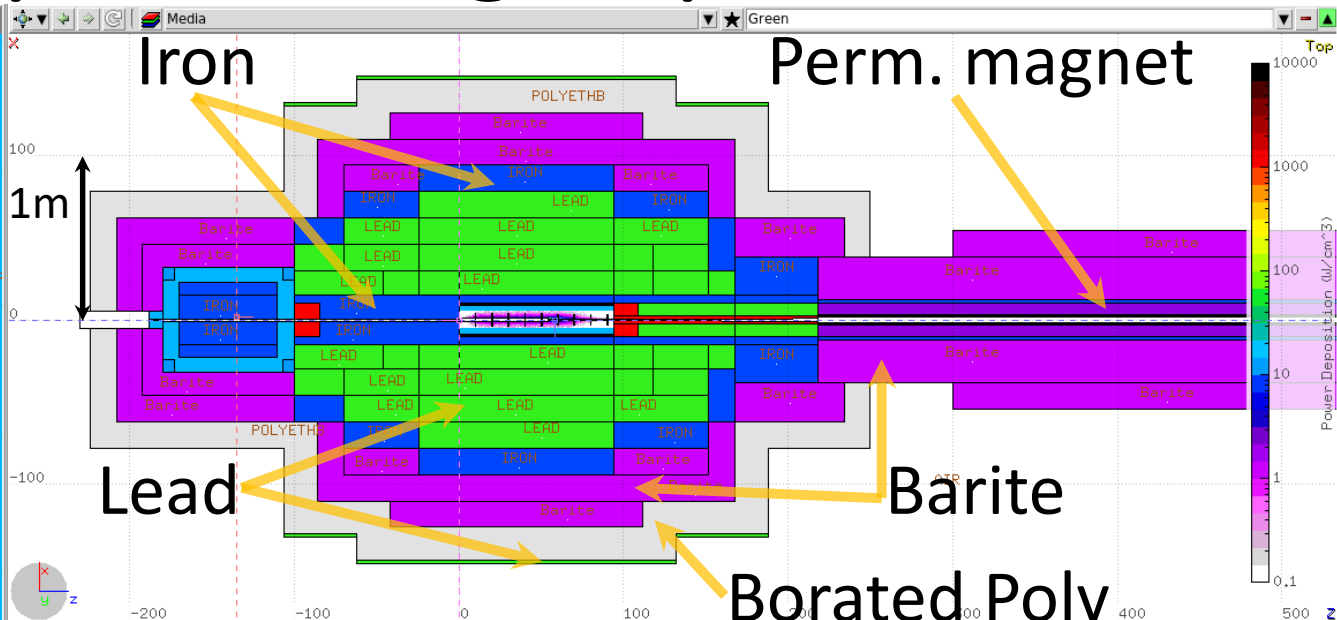
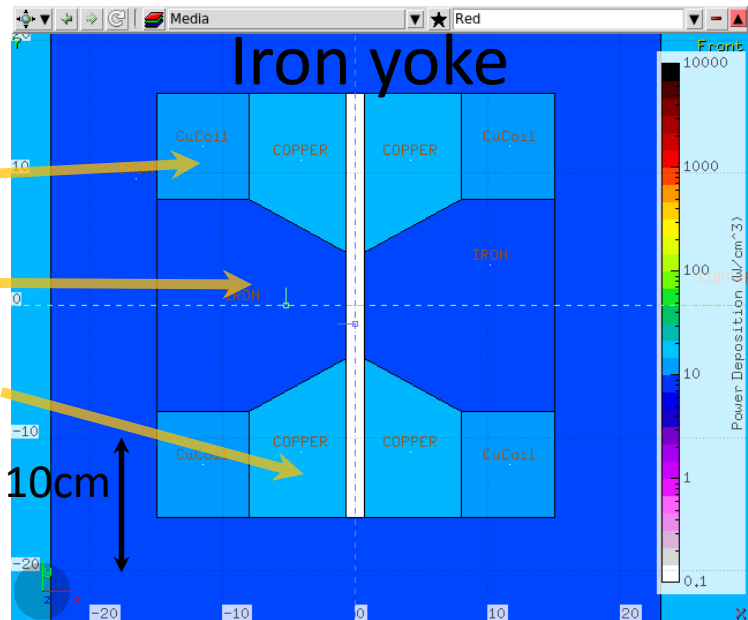
Density Color

Magnet Coils

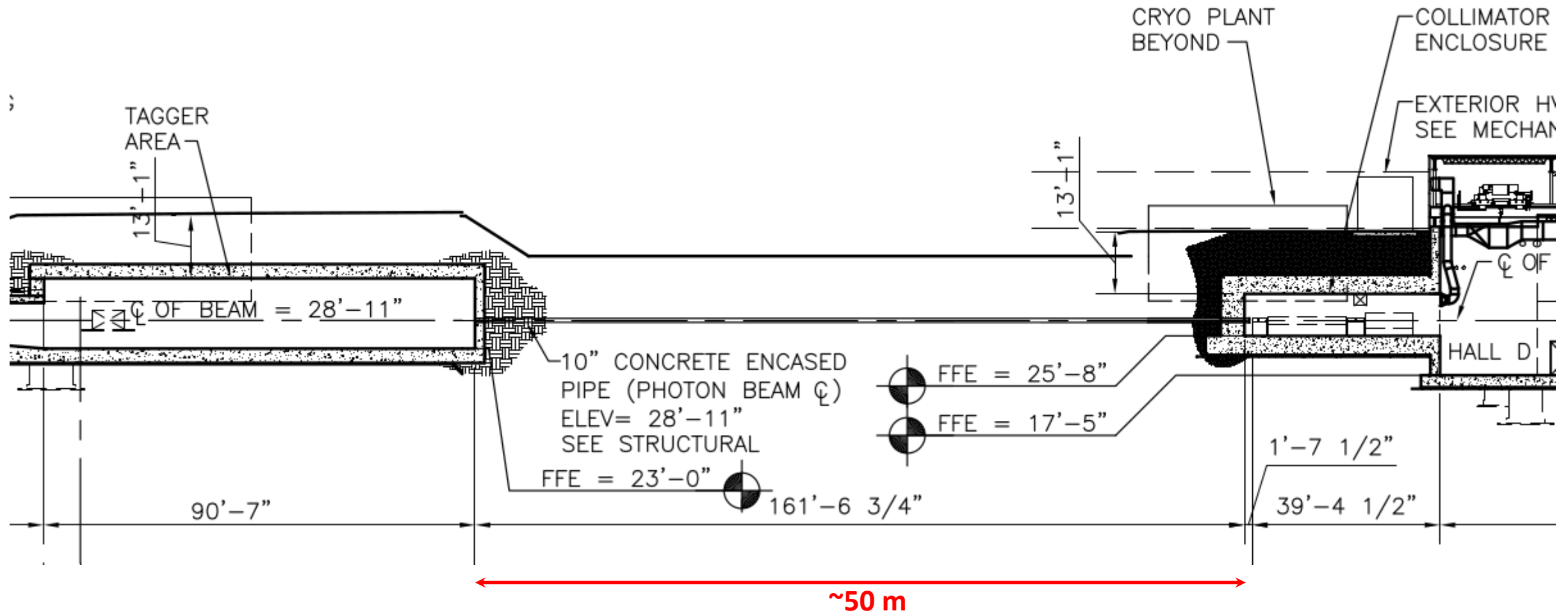
Magnet Poles

Copper shield

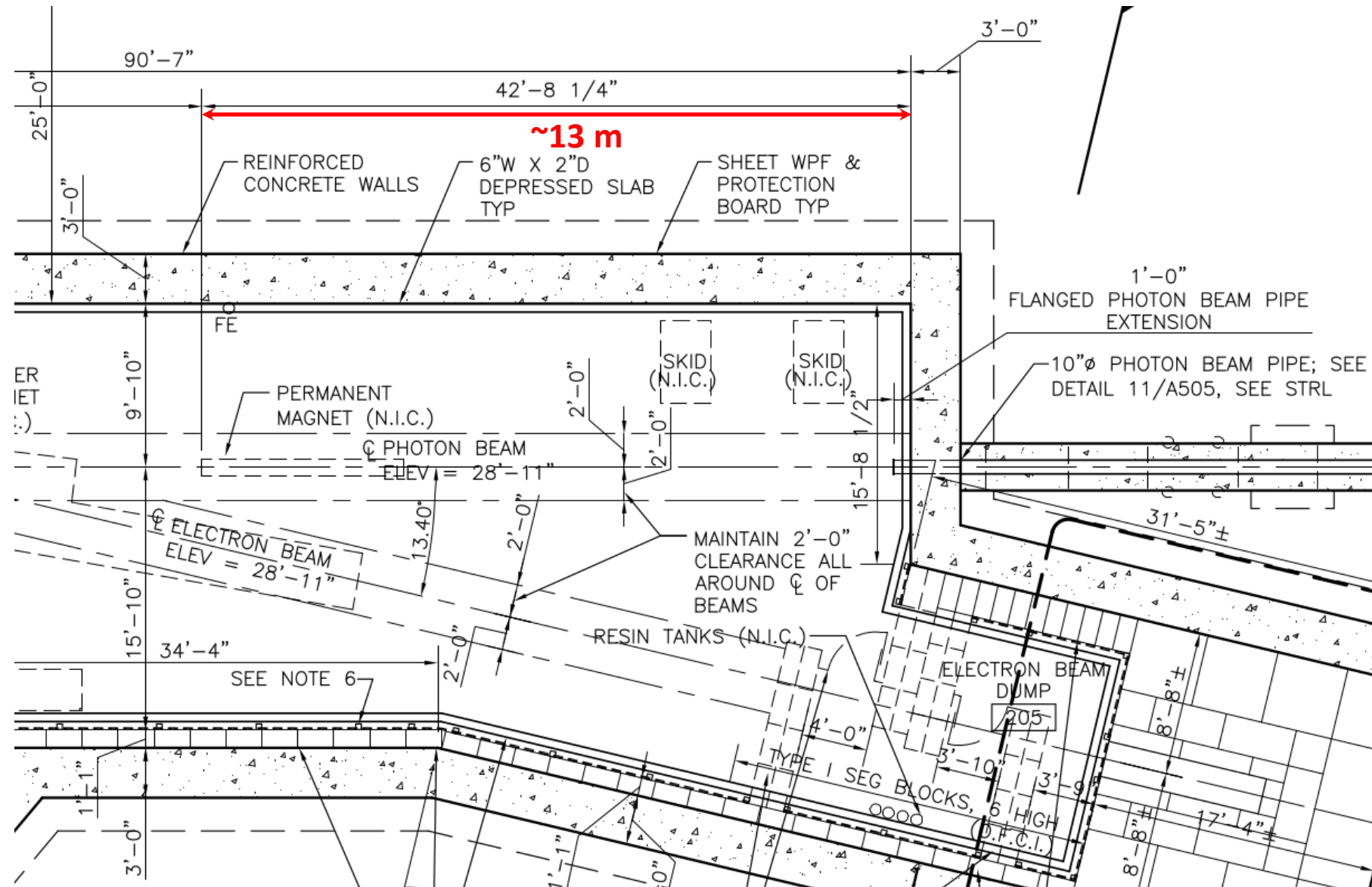
CuW alloy



Hall D Tagger and the Cave, Vertical Slice



Hall D Tagger and the Cave, Horizontal Slice



Al vacuum windows

KLCPS70 Geometry

Mat. Weights,
metric tons:

Magnet 1.0

Cu 1.5

WCu 0.23

FeCore 1.6

Pb 40.4

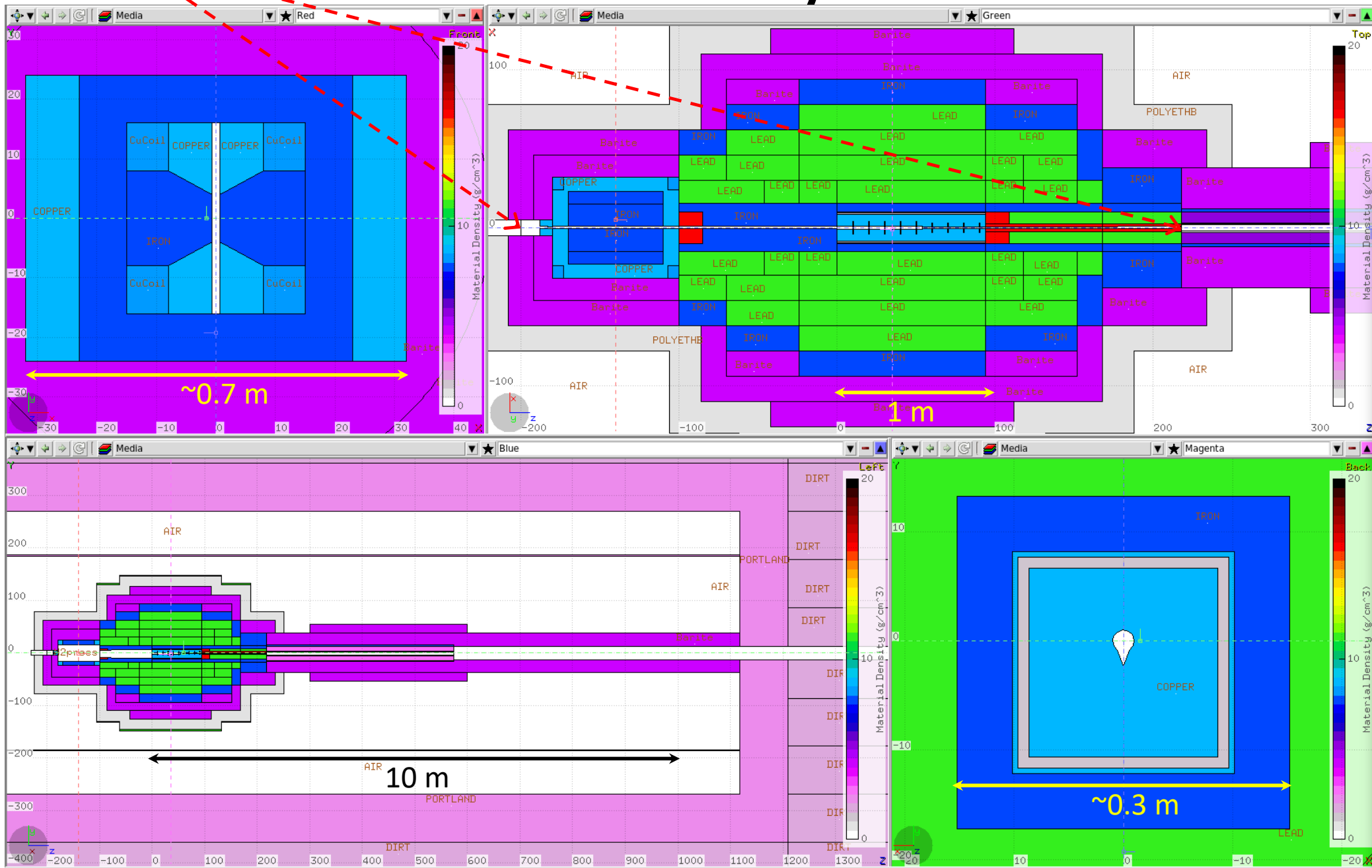
FeShield 17.6

CPS Barite 30

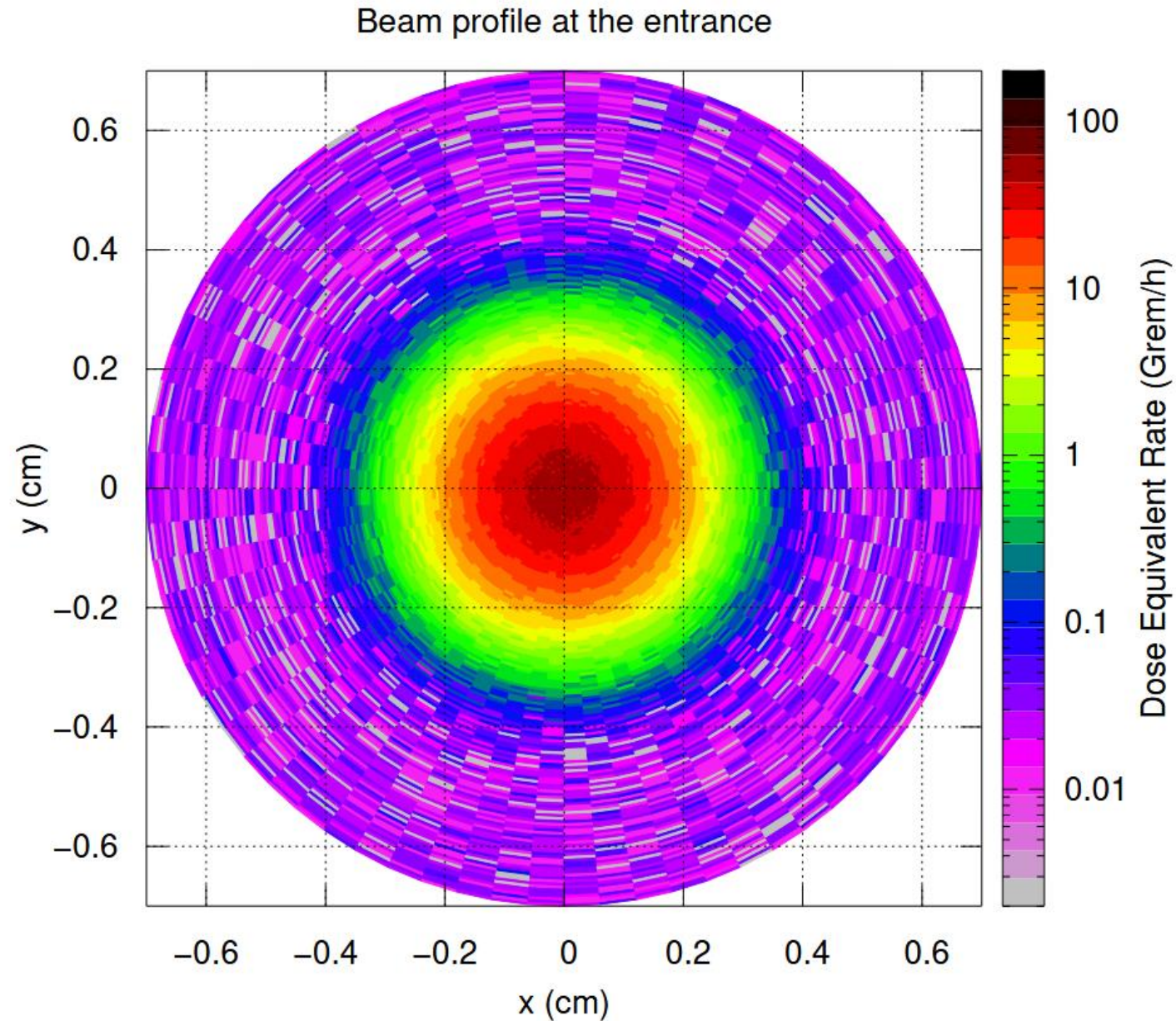
B.Poly 5.2

• CPStot 97.3

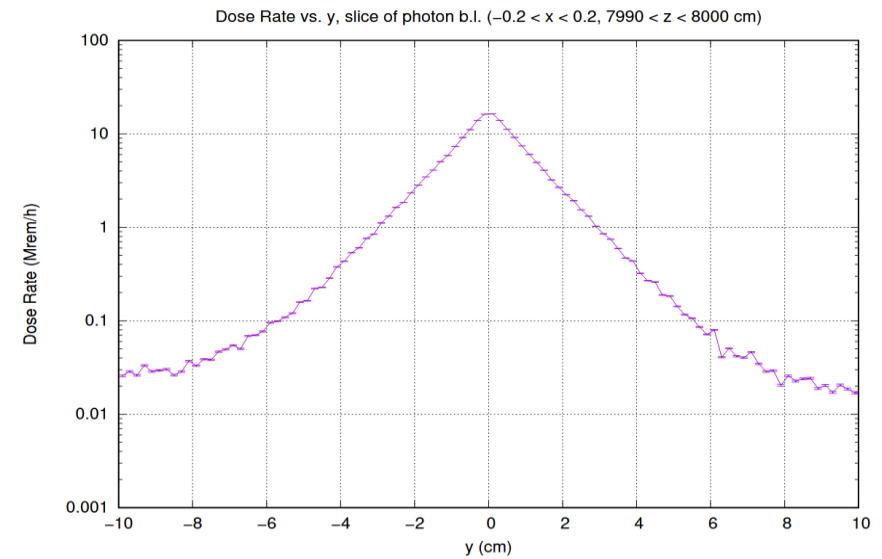
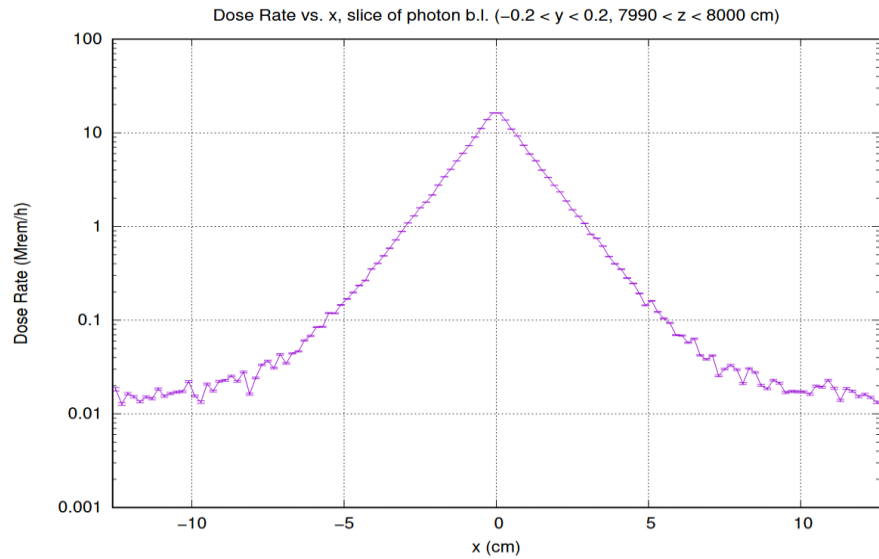
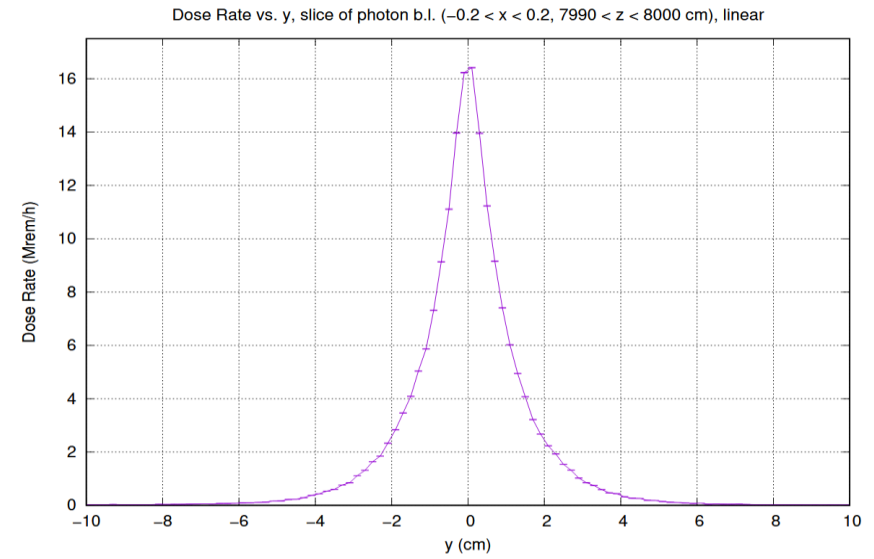
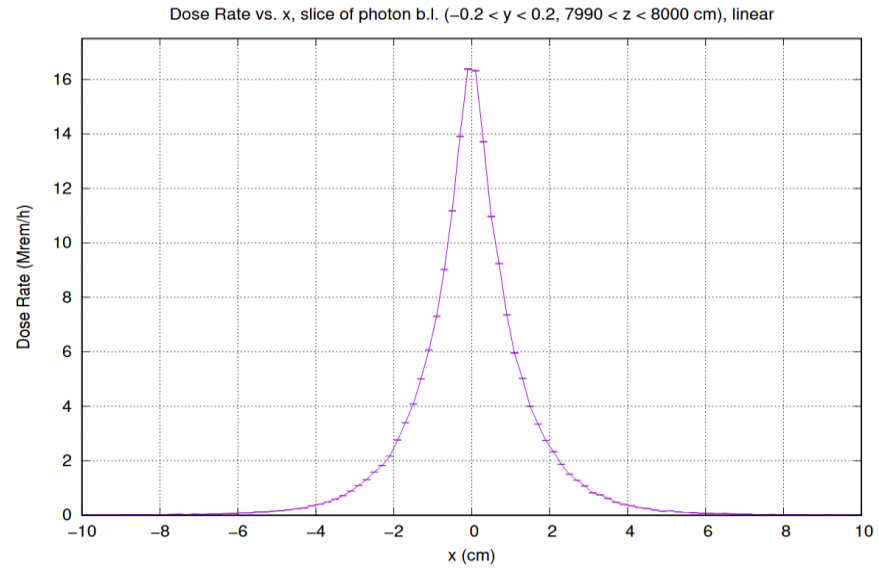
• BeamLine
Barite 21



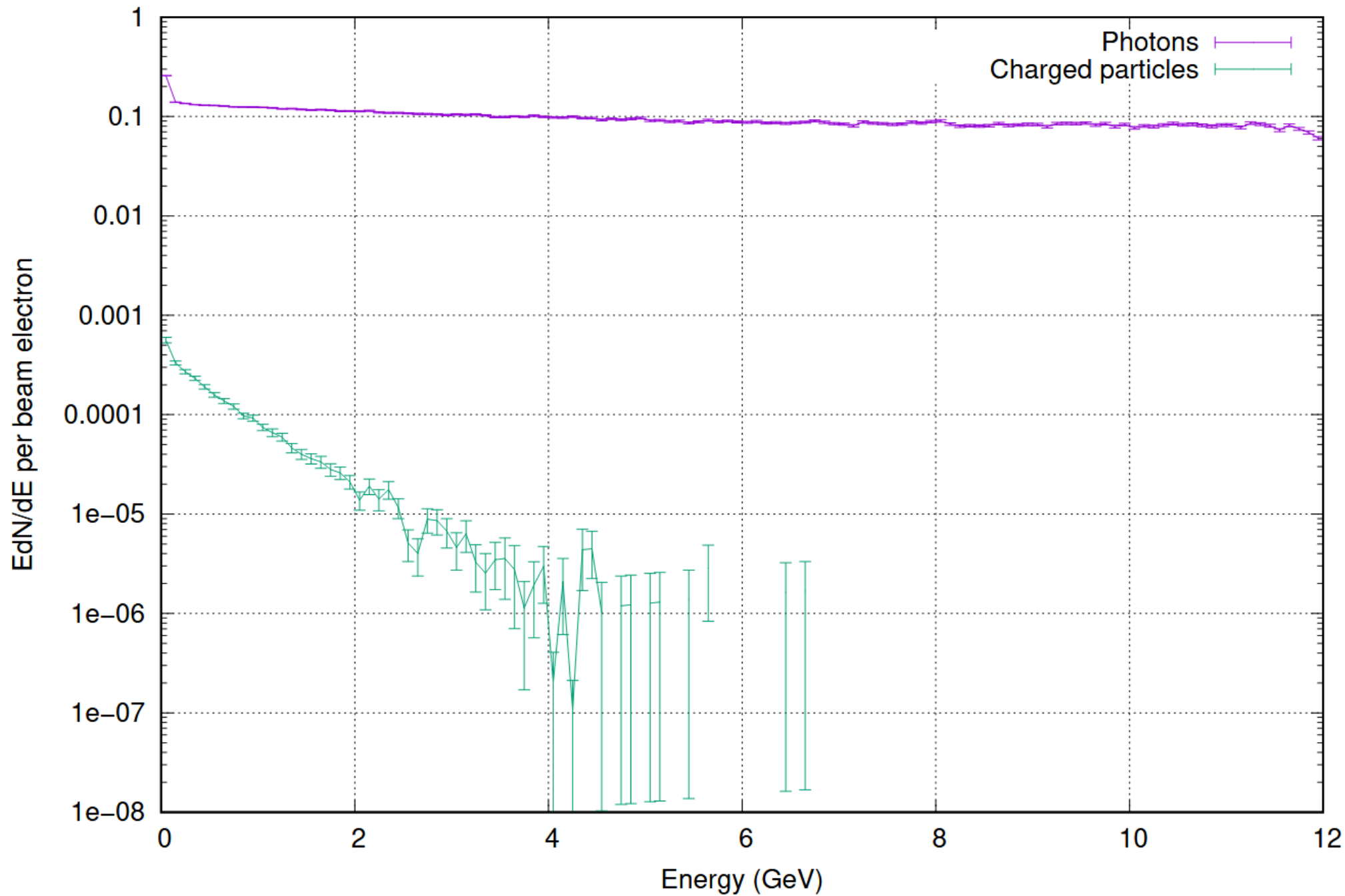
Incident Beam Profile (FWHM = 2.5 mm + Halo)



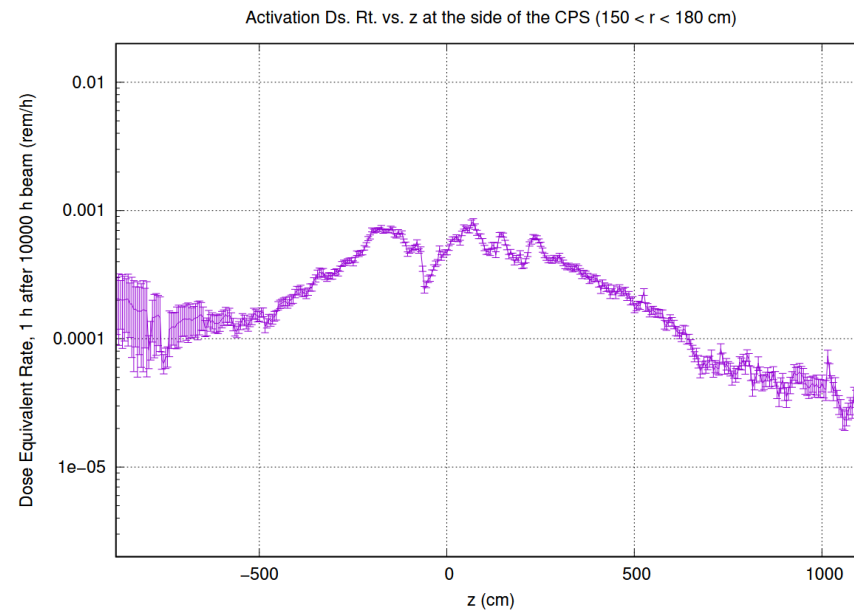
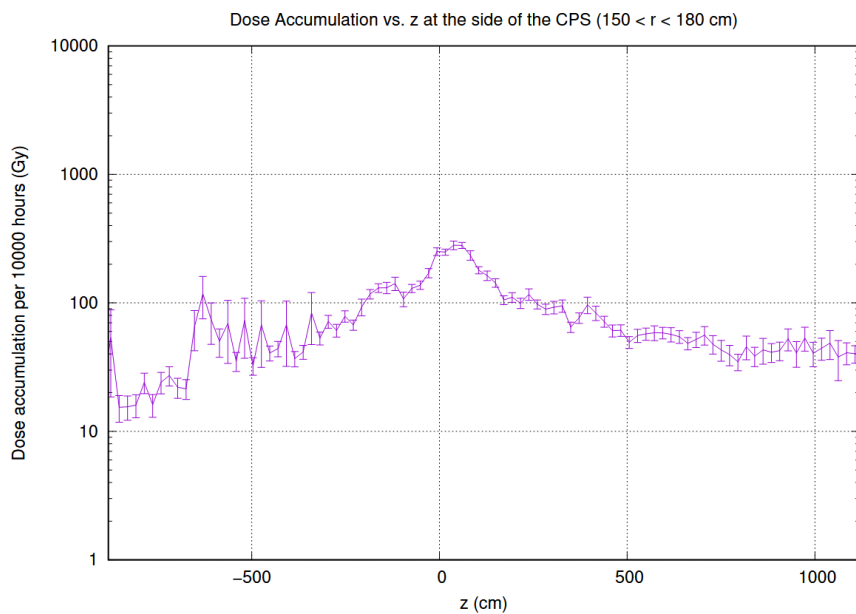
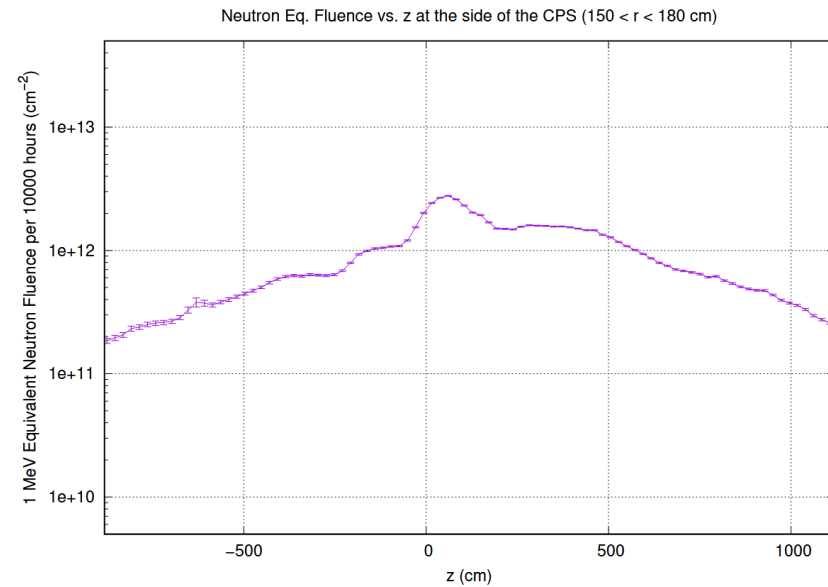
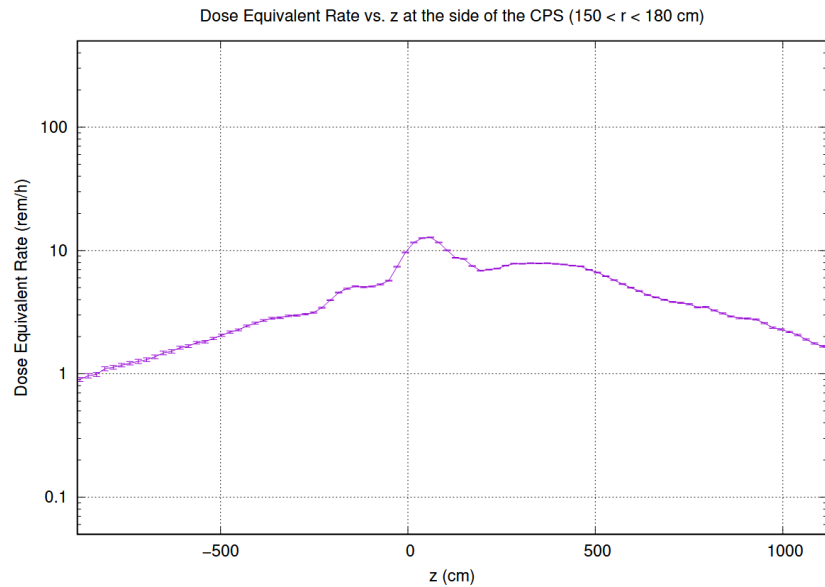
Beam Profiles at the Cave (units of the Dose Eq.)



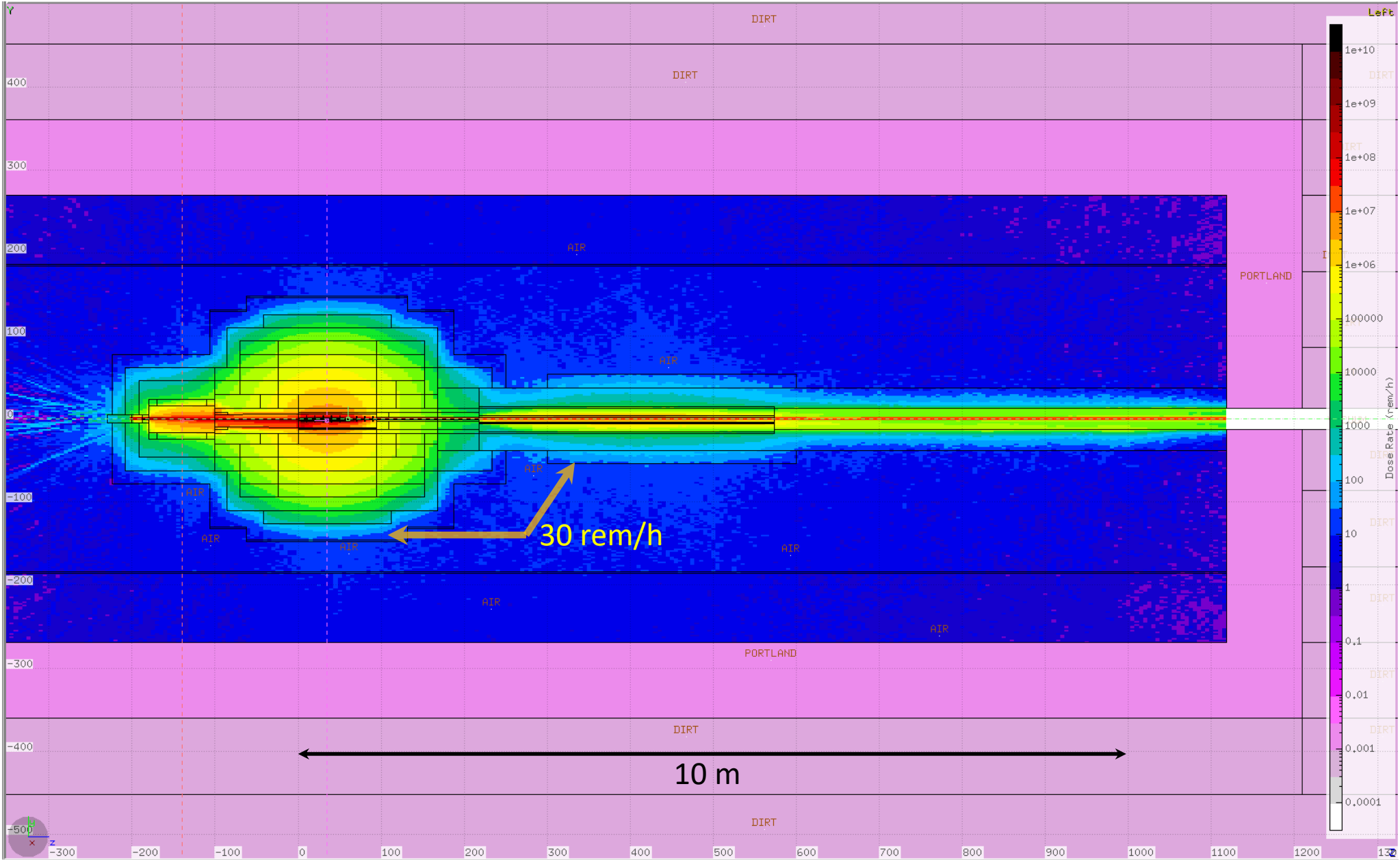
Energy weighted photon and charged particles energy spectra (particles entering the Cave)



Radiological Values along Z (at $150 < r < 180$ cm)



Prompt Dose Equivalent Rate (rem/h)



1 MeV Equivalent Neutron Fluence per 10000h

