

K^0 L CPS Meeting June 5, 2023

P. Degtiarenko

Design Update – June 2023, “KLCPS69”

- Modification of the absorber wedge cavity and photon beam channel
 - Widening wedge to accommodate larger horizontal movements of the beam
 - Flattening the bottom of the wedge to match the nominal beam Gaussian
 - Make the bottom wedge inclined, increasing the beam grazing area
- Slight (15%) increase of the magnetic field to match the somewhat deeper wedge bottom
- Re-introduce intermediate iron outer shielding layer to achieve the goal of having the prompt dose rates below 10 rem/h 1 foot from the CPS
- Slight modification of the lead skin at the outer surface to limit the dose rates due to activation to the level below 1-5 mrem/h
- Ran few simulations to check the power deposition pattern as a function of magnetic field and beam position and angle variations

June'2023 Conceptual Design Update

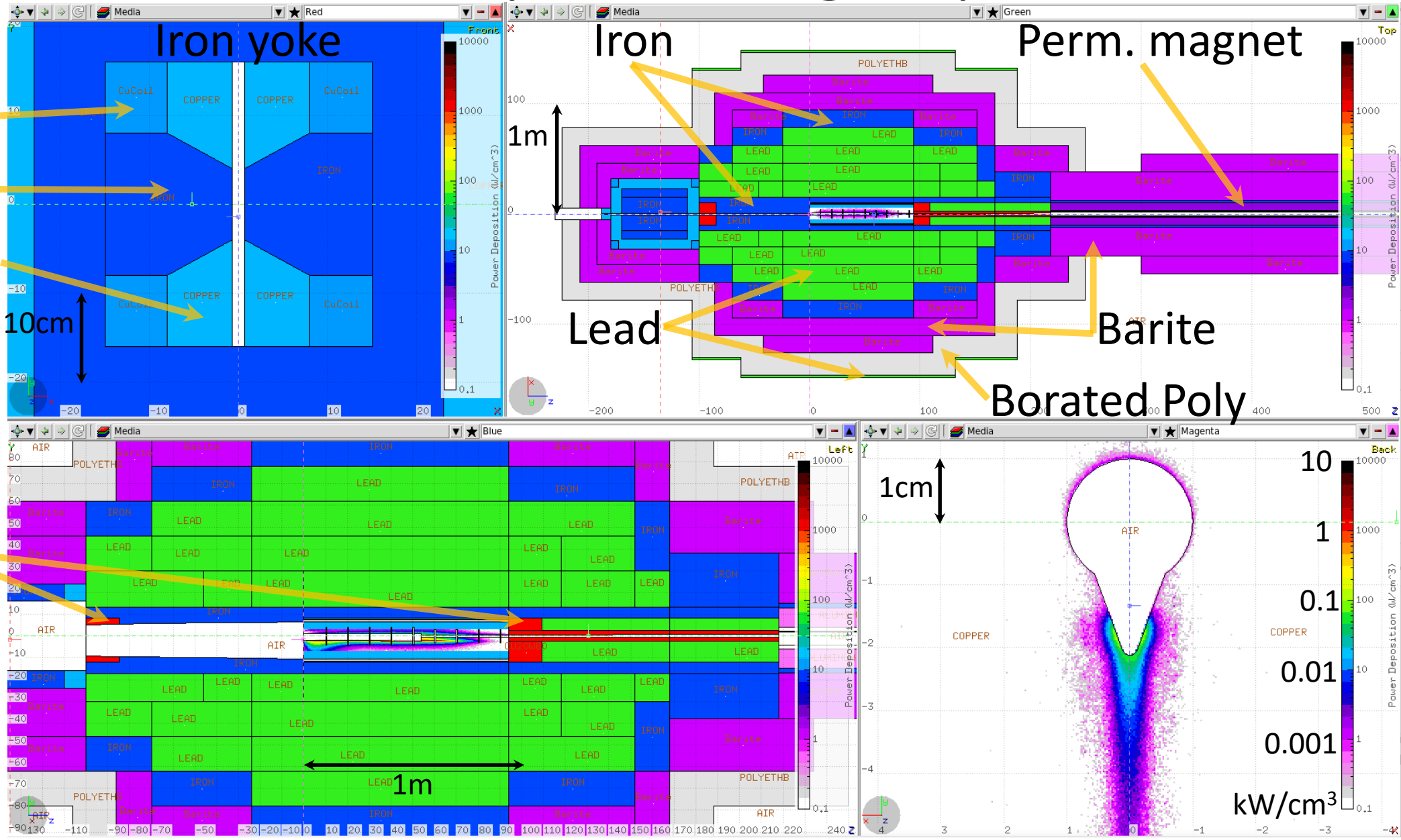
Density Color

Magnet Coils

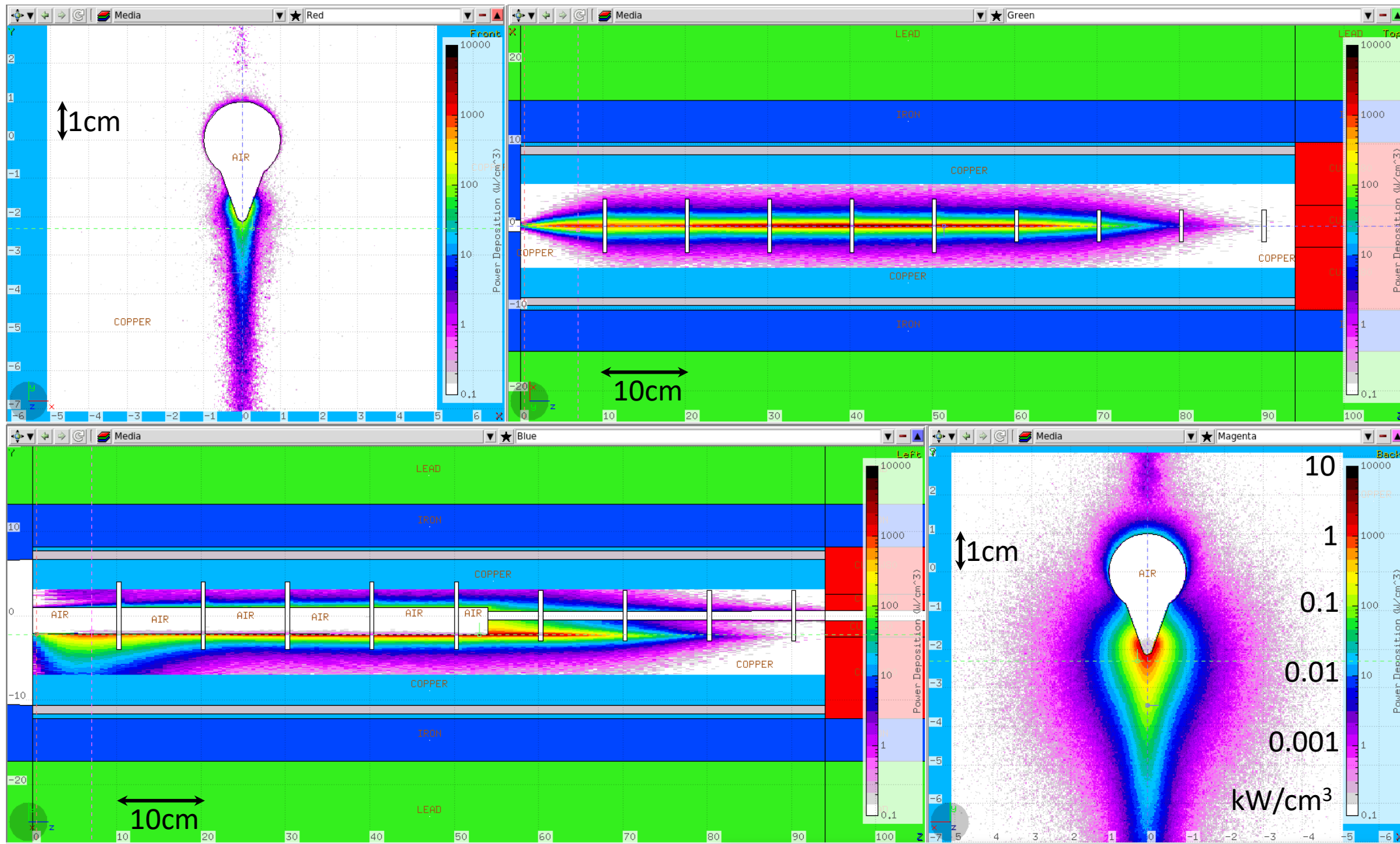
Magnet Poles

Copper shield

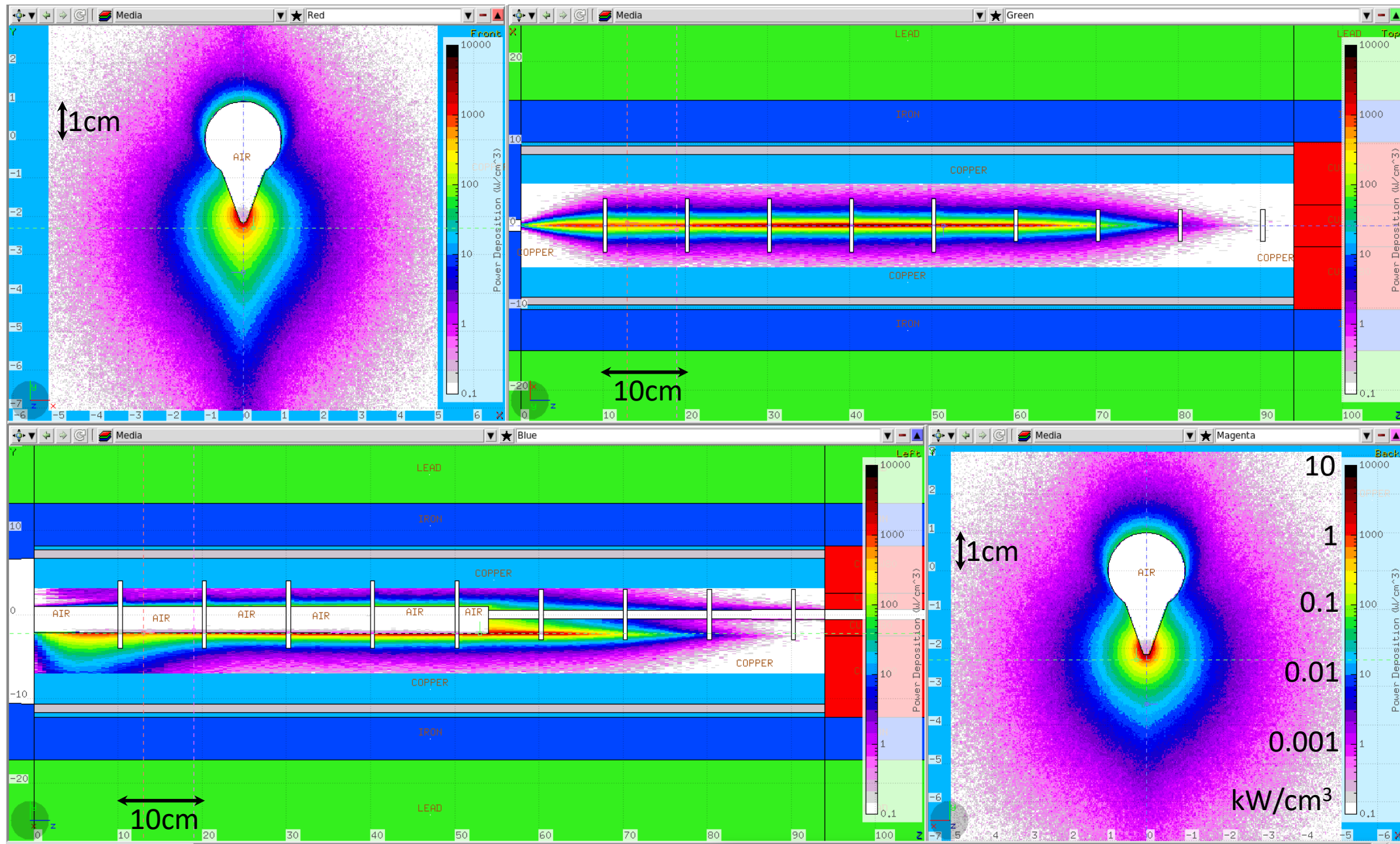
CuW alloy



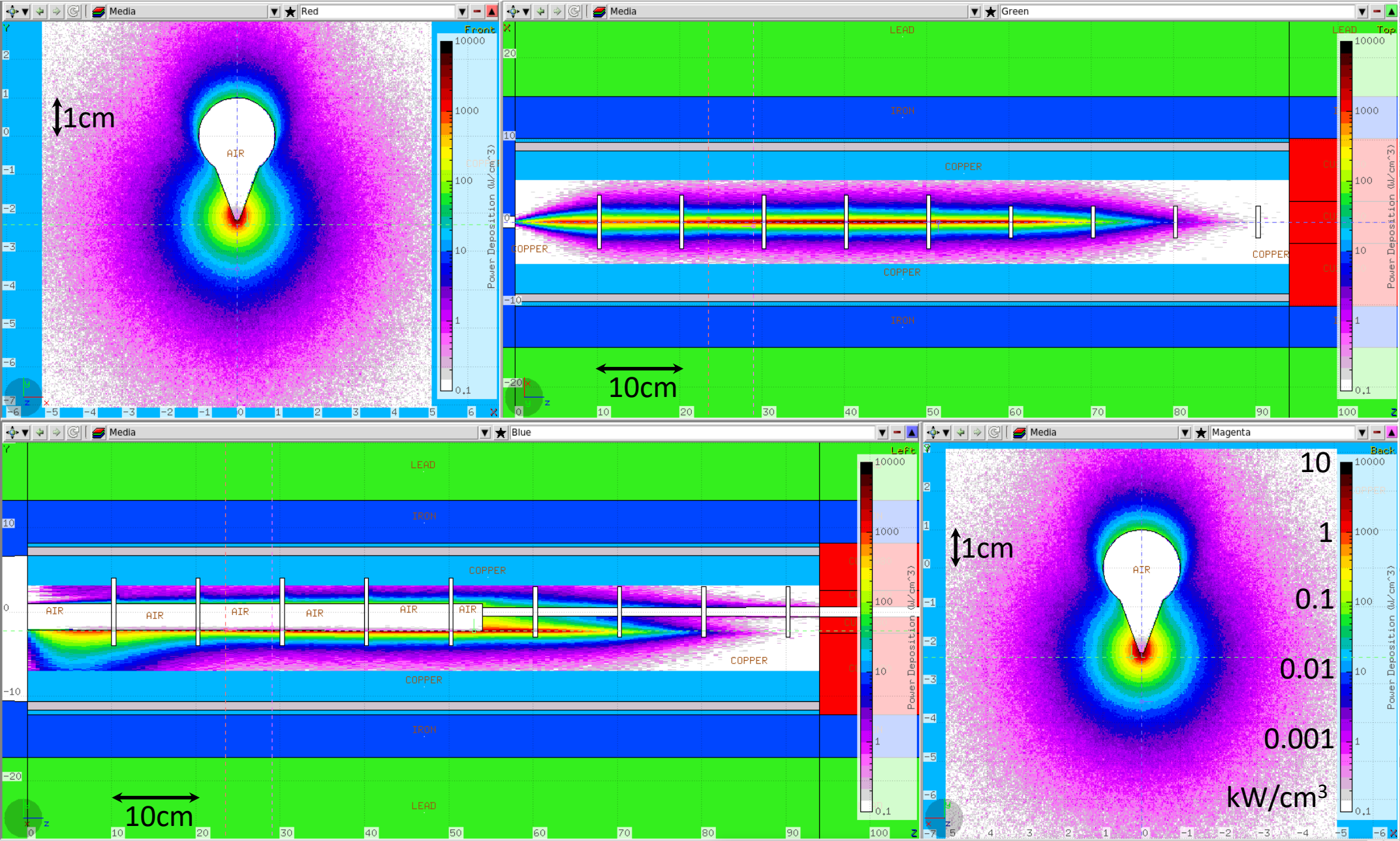
Absorber Power Distribution #1



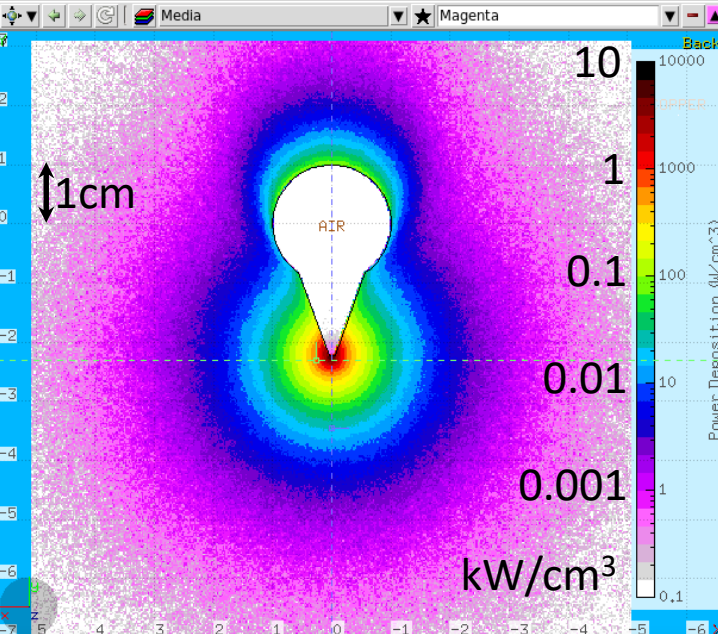
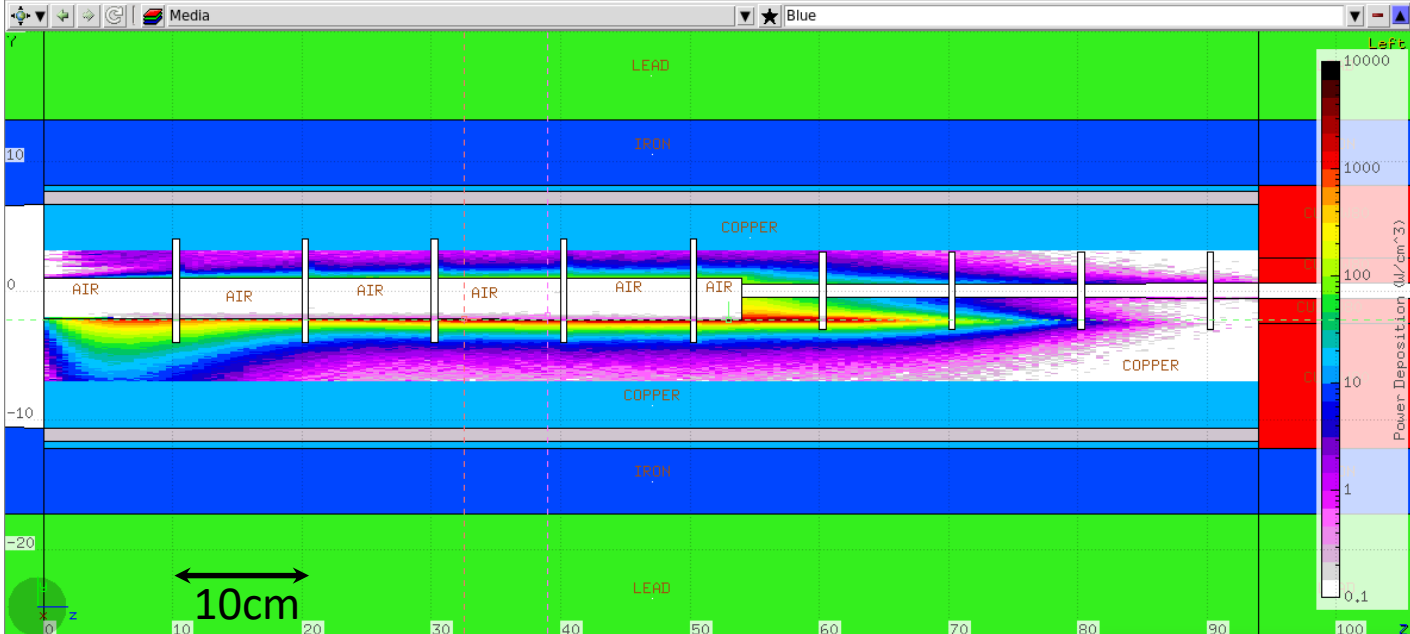
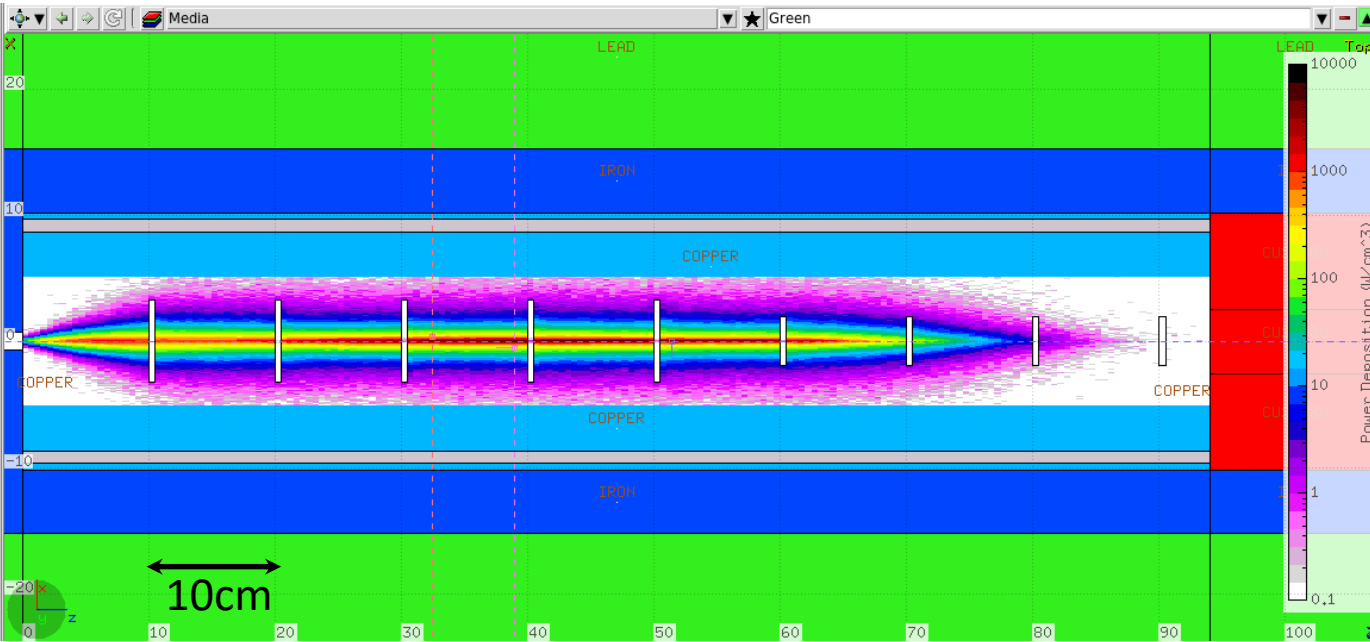
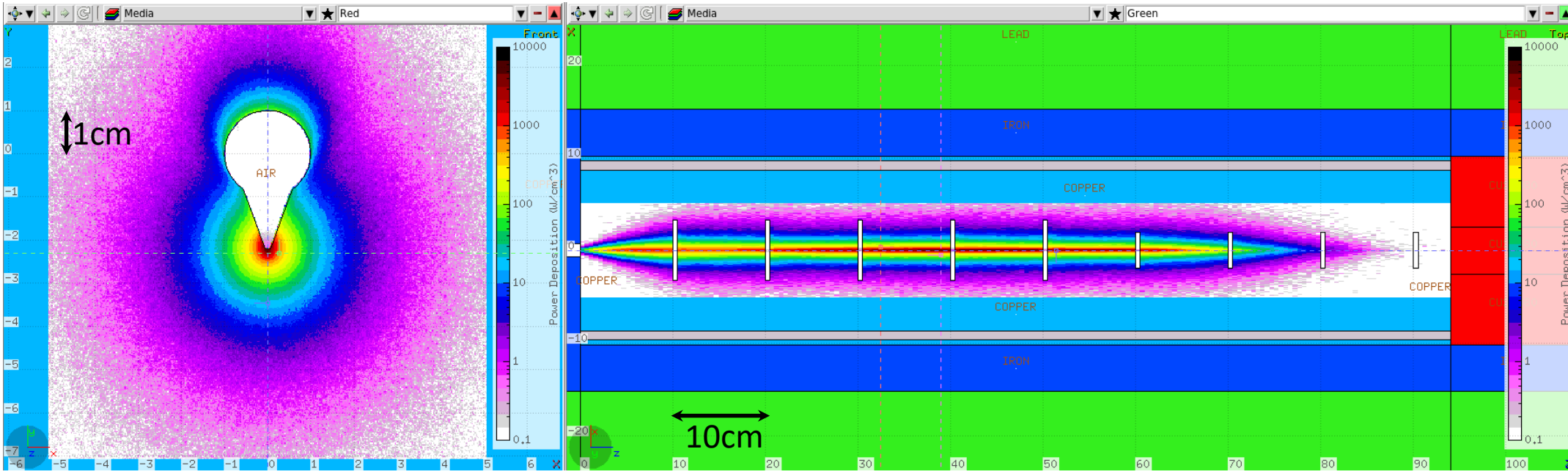
Absorber Power Distribution #2



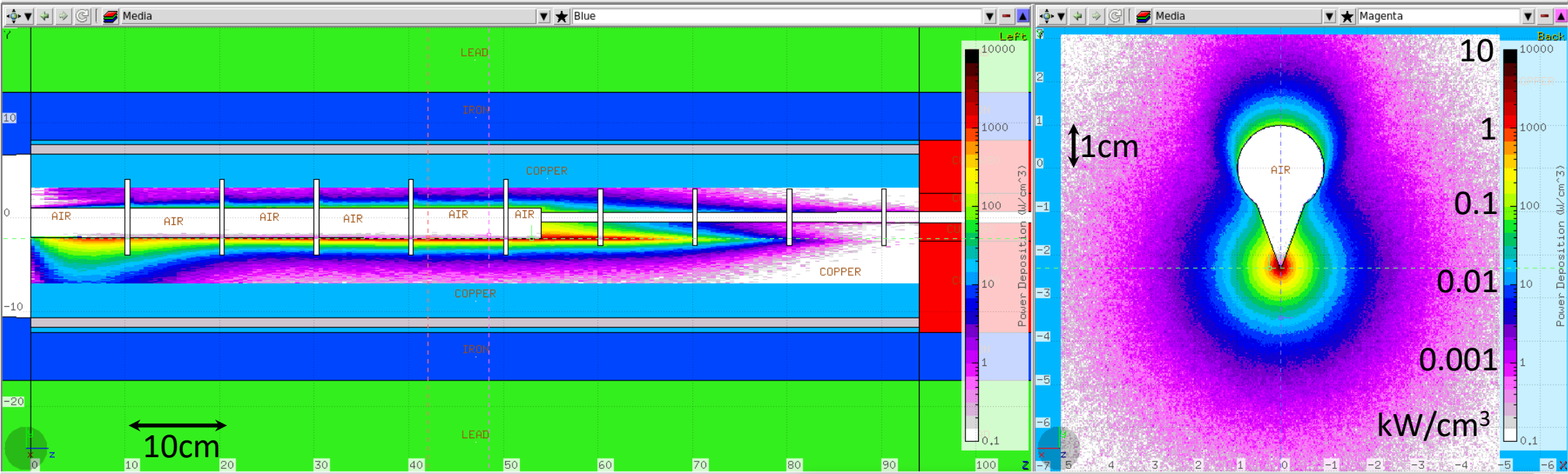
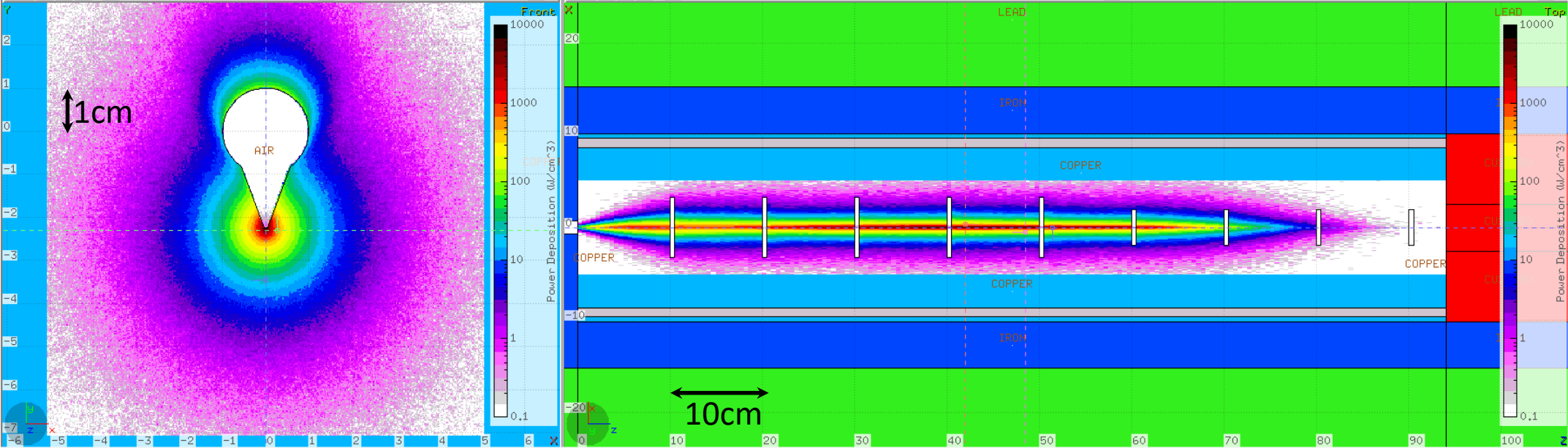
Absorber Power Distribution #3



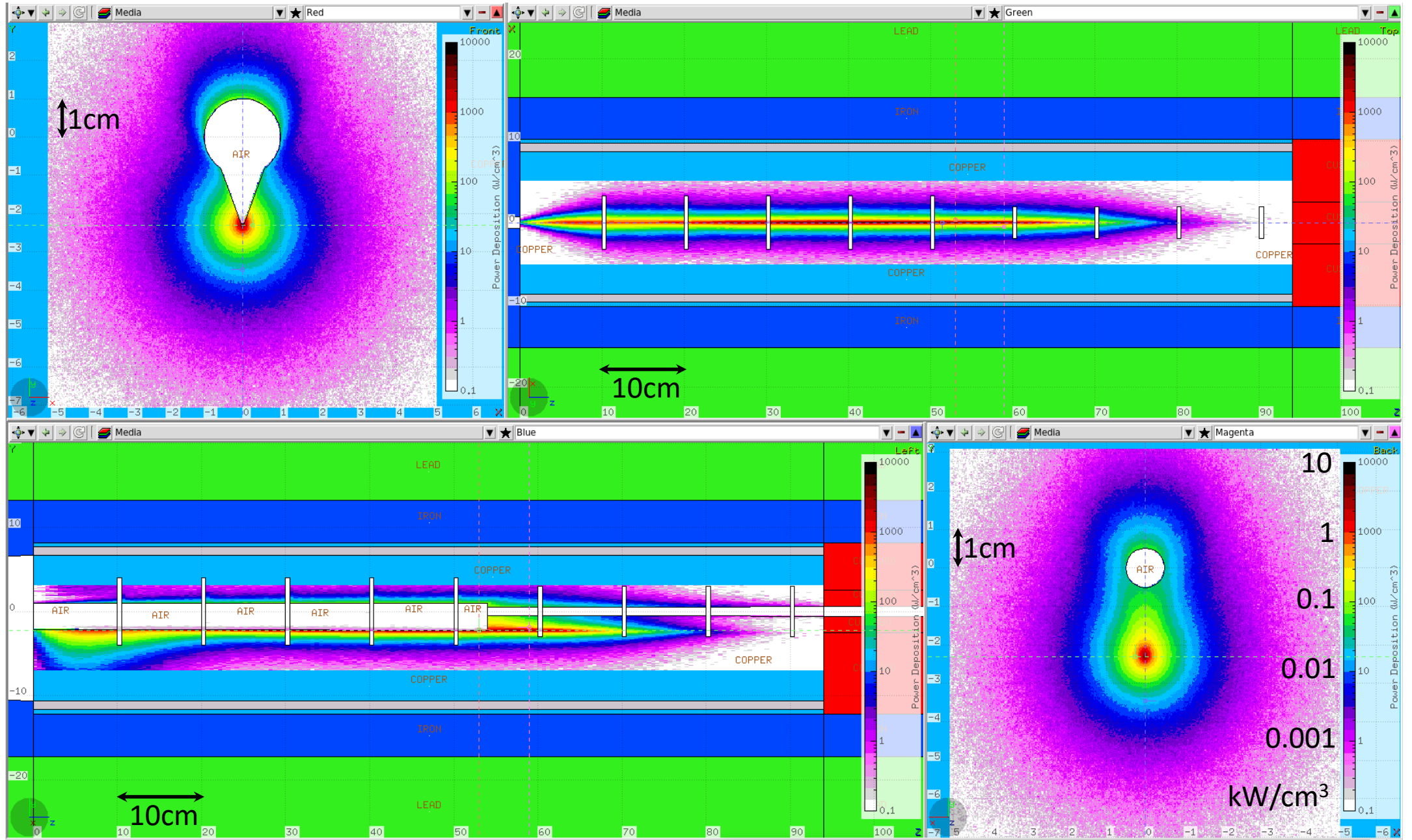
Absorber Power Distribution #4



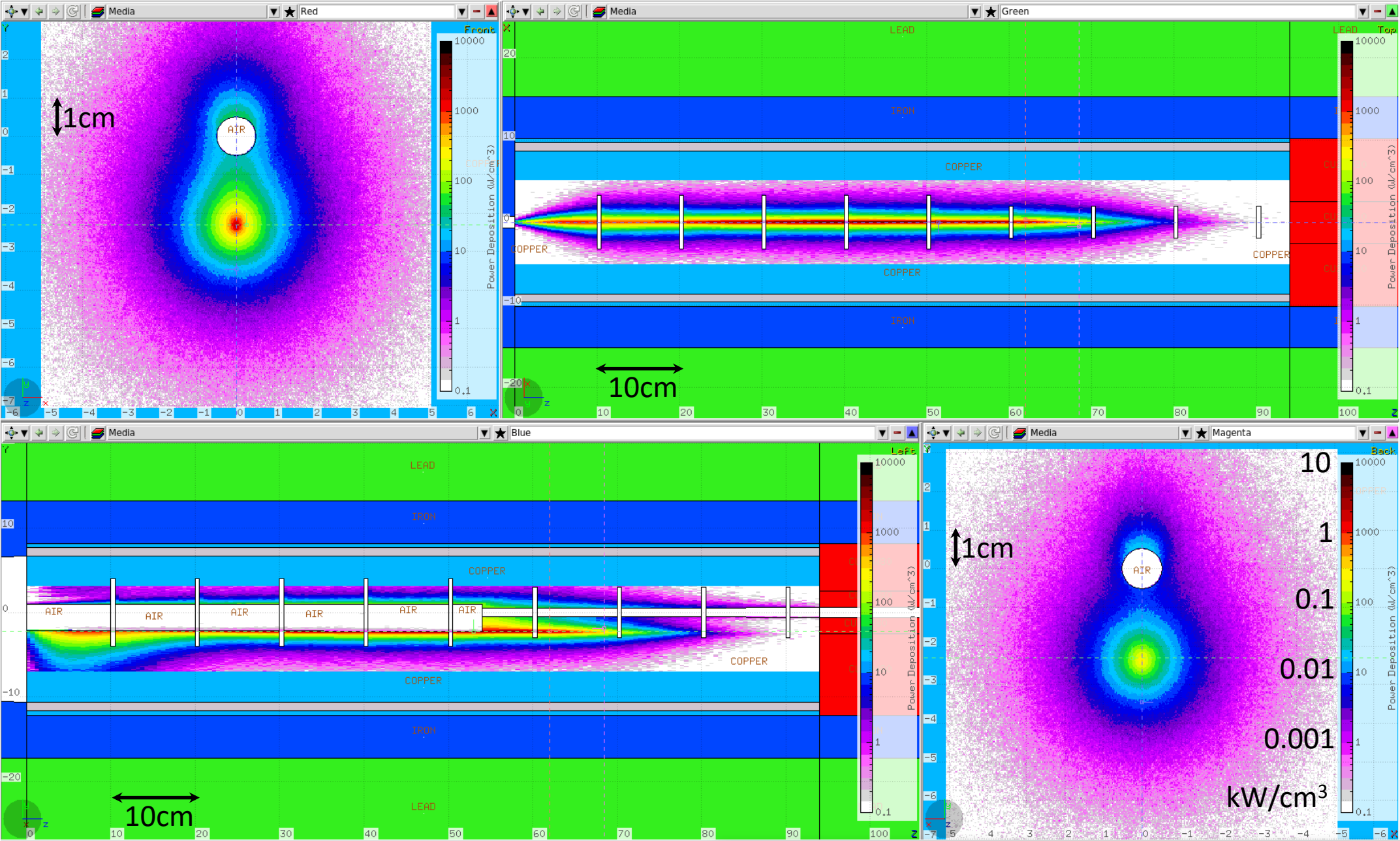
Absorber Power Distribution #5



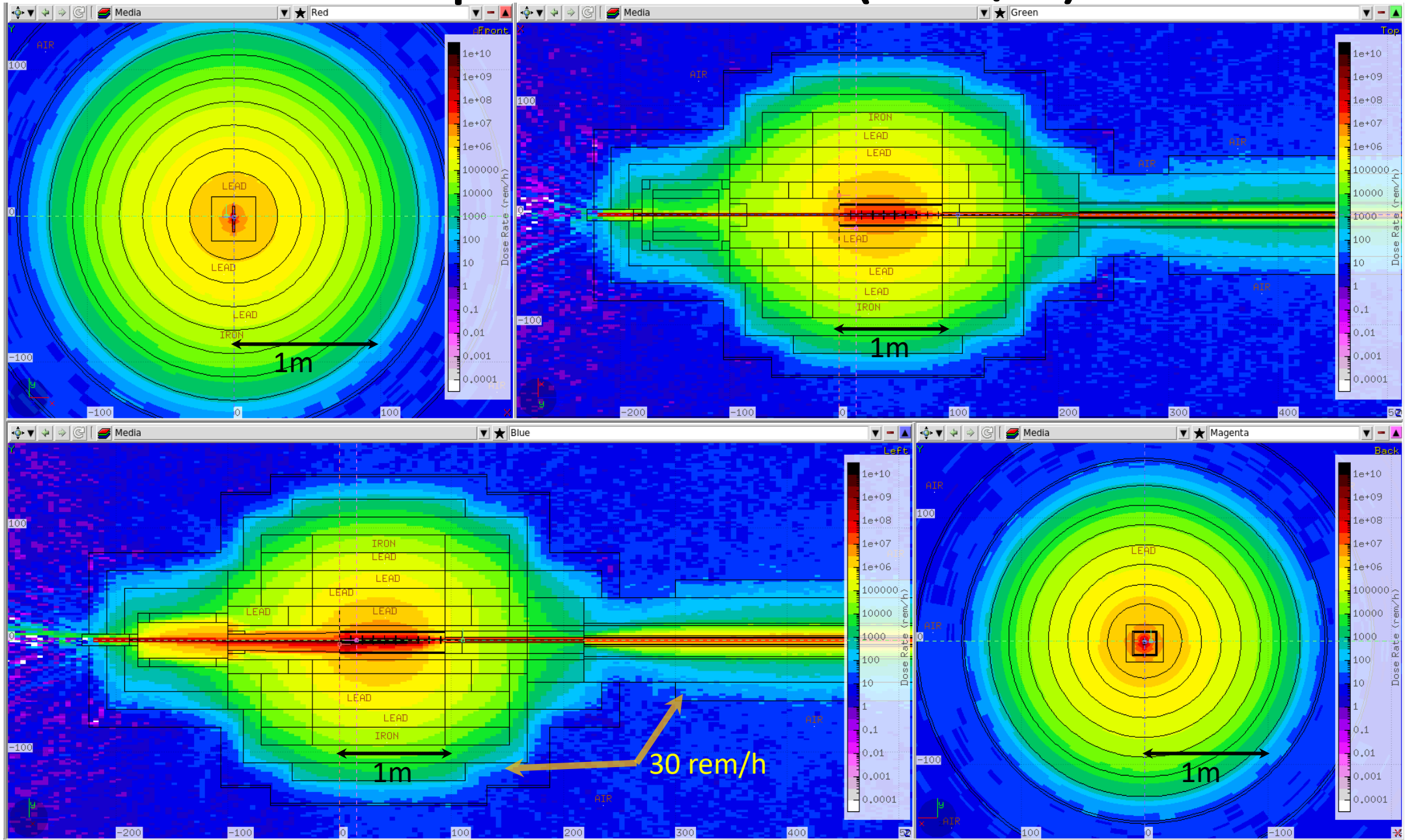
Absorber Power Distribution #6



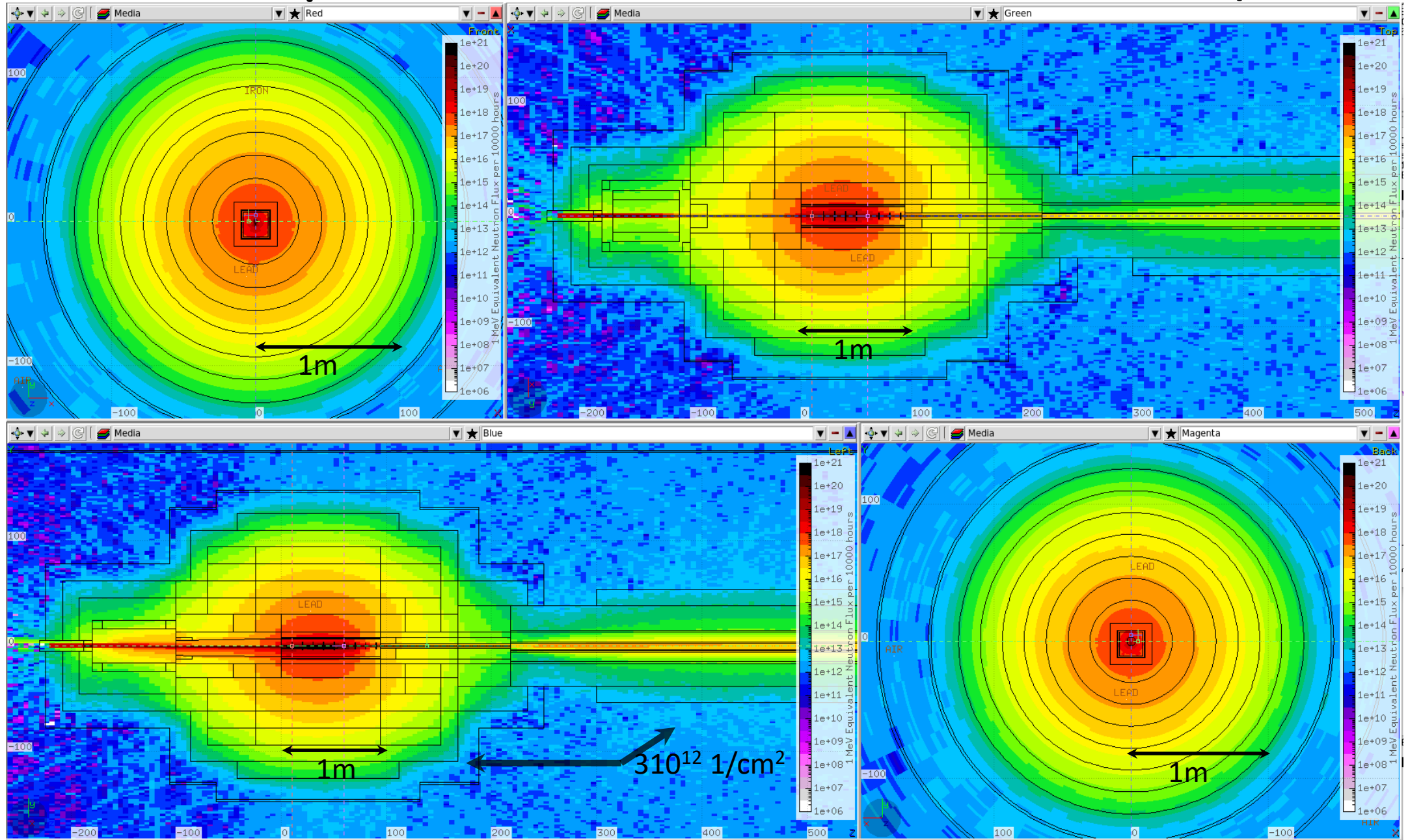
Absorber Power Distribution #7



Prompt Dose Rate (rem/h)



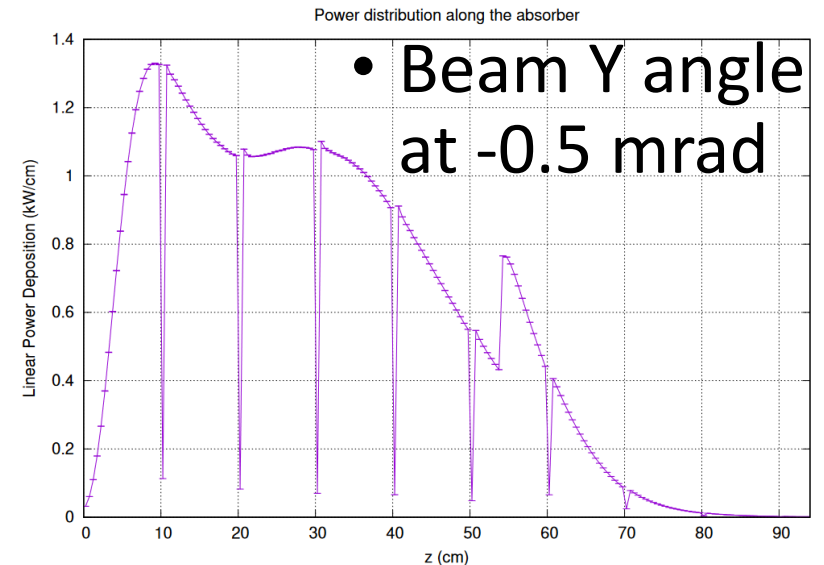
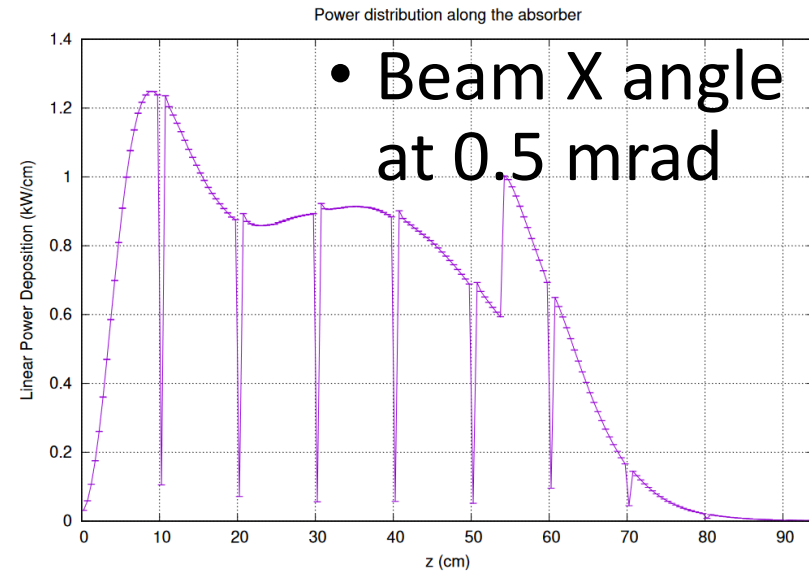
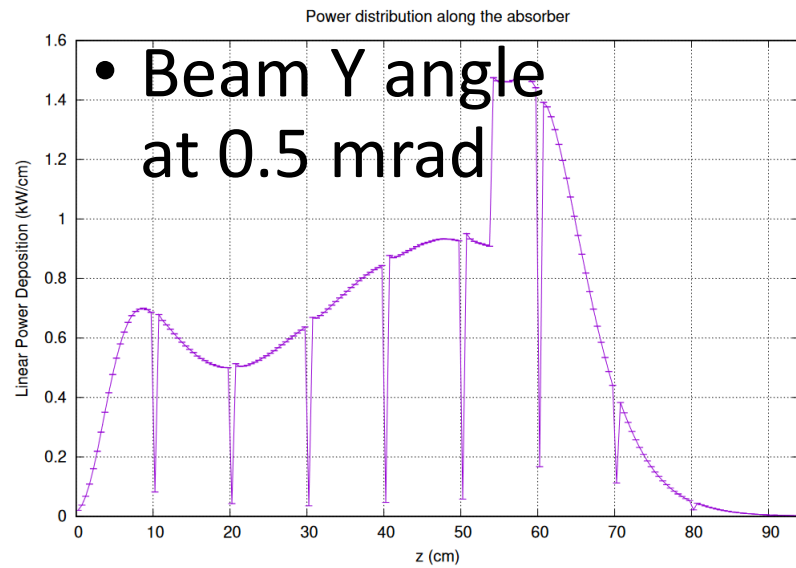
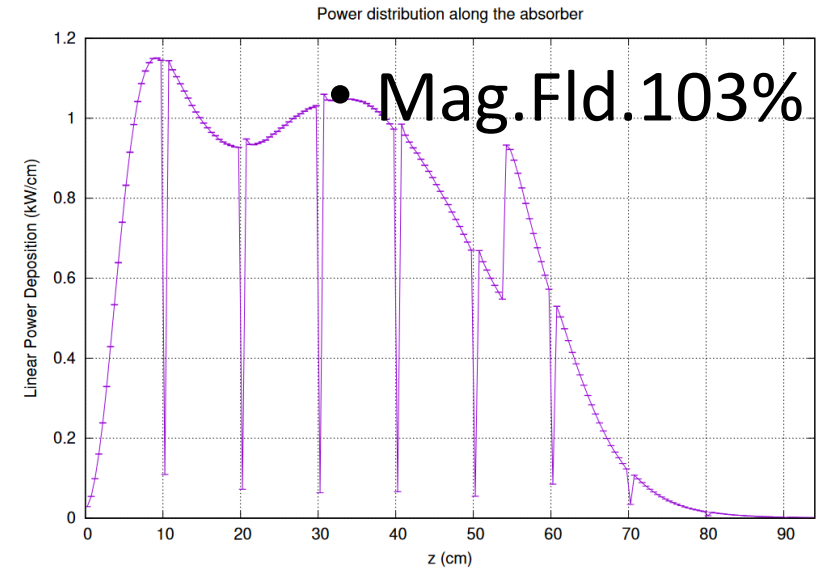
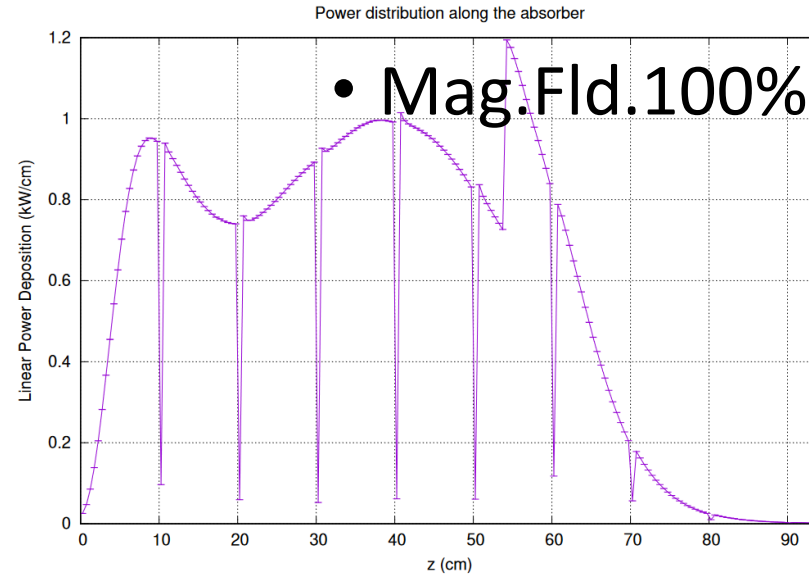
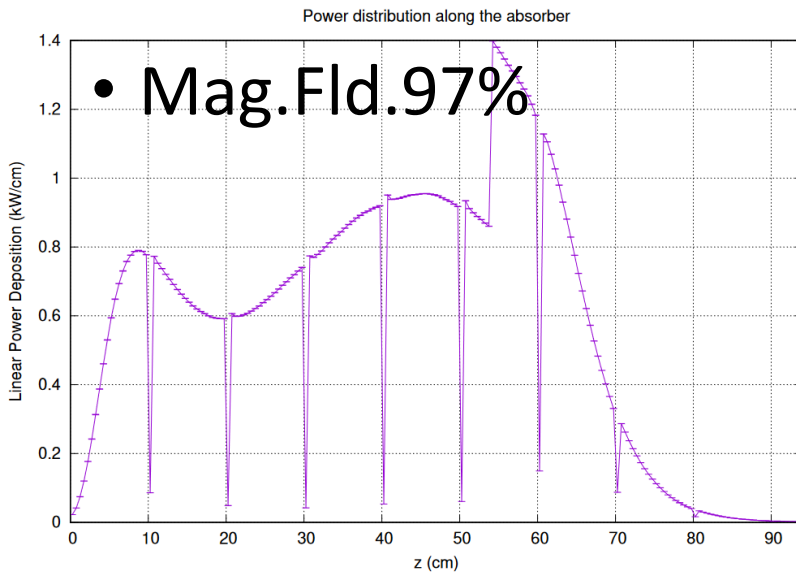
Si 1 MeV-Eq n flux accum. at 10^4 beam hours ($1/\text{cm}^2$)



KLCPS69: Runs with Varying Beam Parameters

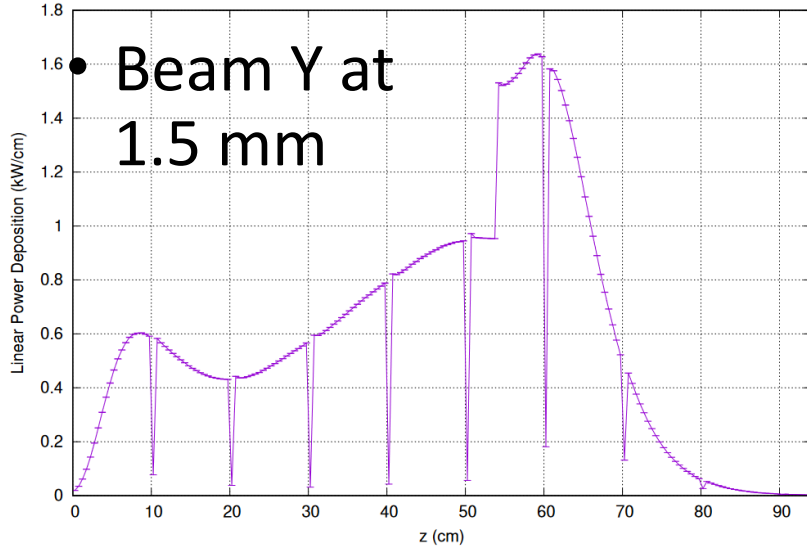
- [klcps69/mf97/](#) → Magnet field at 97% nominal value
 - [mf103/](#) → Magnet field at 110% nominal value
 - [nominal/](#) → Gaussian beam with FWHM at 2.5 mm (nominal mf & pos)
 - [fwhm250um/](#) → Gaussian beam with FWHM at 0.25 mm
 - [fwhm3500um/](#) → Gaussian beam with FWHM at 3.5 mm
 - [xr1500um/](#) → Standard beam, shifted by +1.5 mm in X
 - [yu1500um/](#) → Standard beam, shifted by +1.5 mm in Y
 - [yd1500um/](#) → Standard beam, shifted by -1.5 mm in Y
 - [xar500urad/](#) → Standard beam, angle in X shifted by 0.5 mrad
 - [yau500urad/](#) → Standard beam, angle in Y shifted by 0.5 mrad
 - [yad500urad/](#) → Standard beam, angle in Y shifted by -0.5 mrad
- ... Plus few more settings

Linear Power Distribution in Absorber in kW/cm

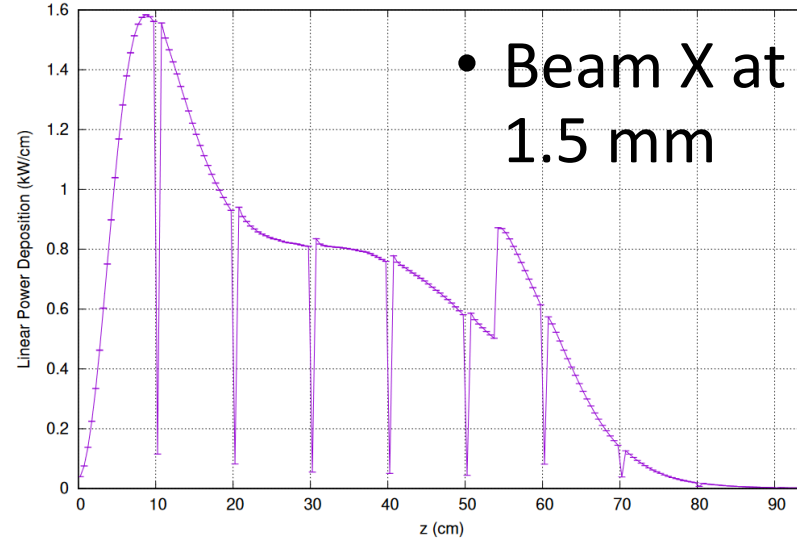


Linear Power Distribution in Absorber in kW/cm

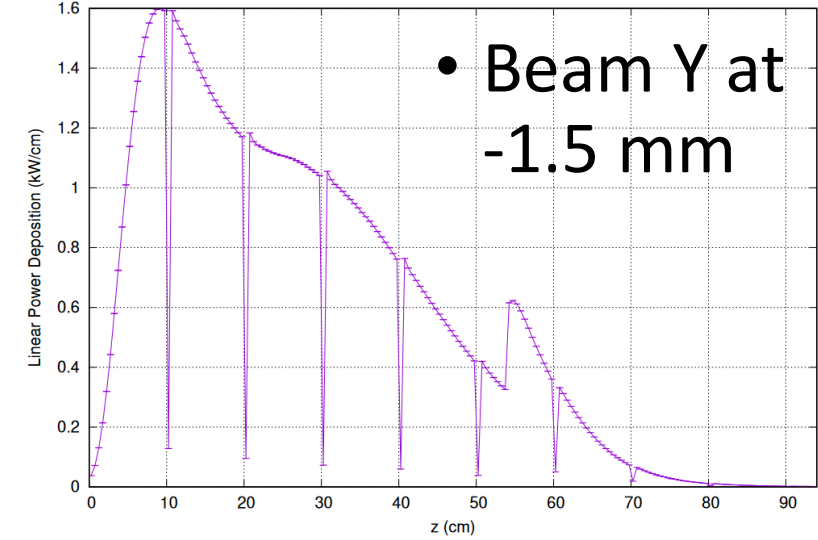
Power distribution along the absorber



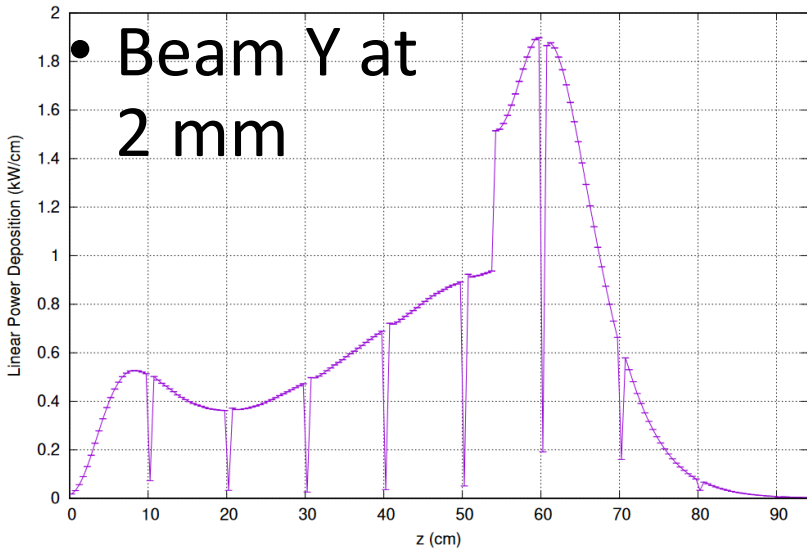
Power distribution along the absorber



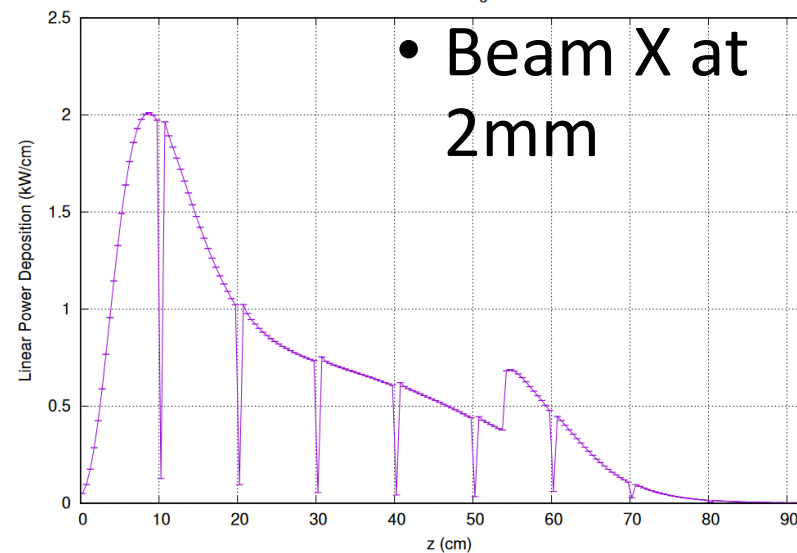
Power distribution along the absorber



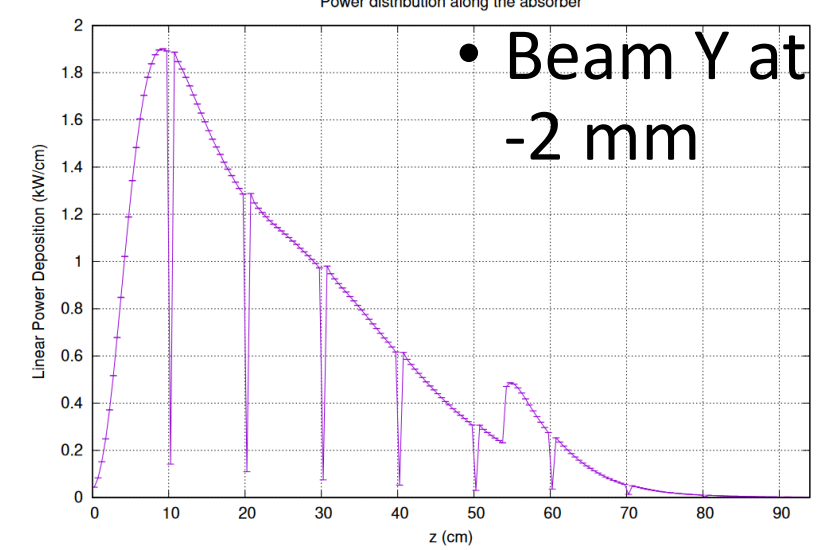
Power distribution along the absorber



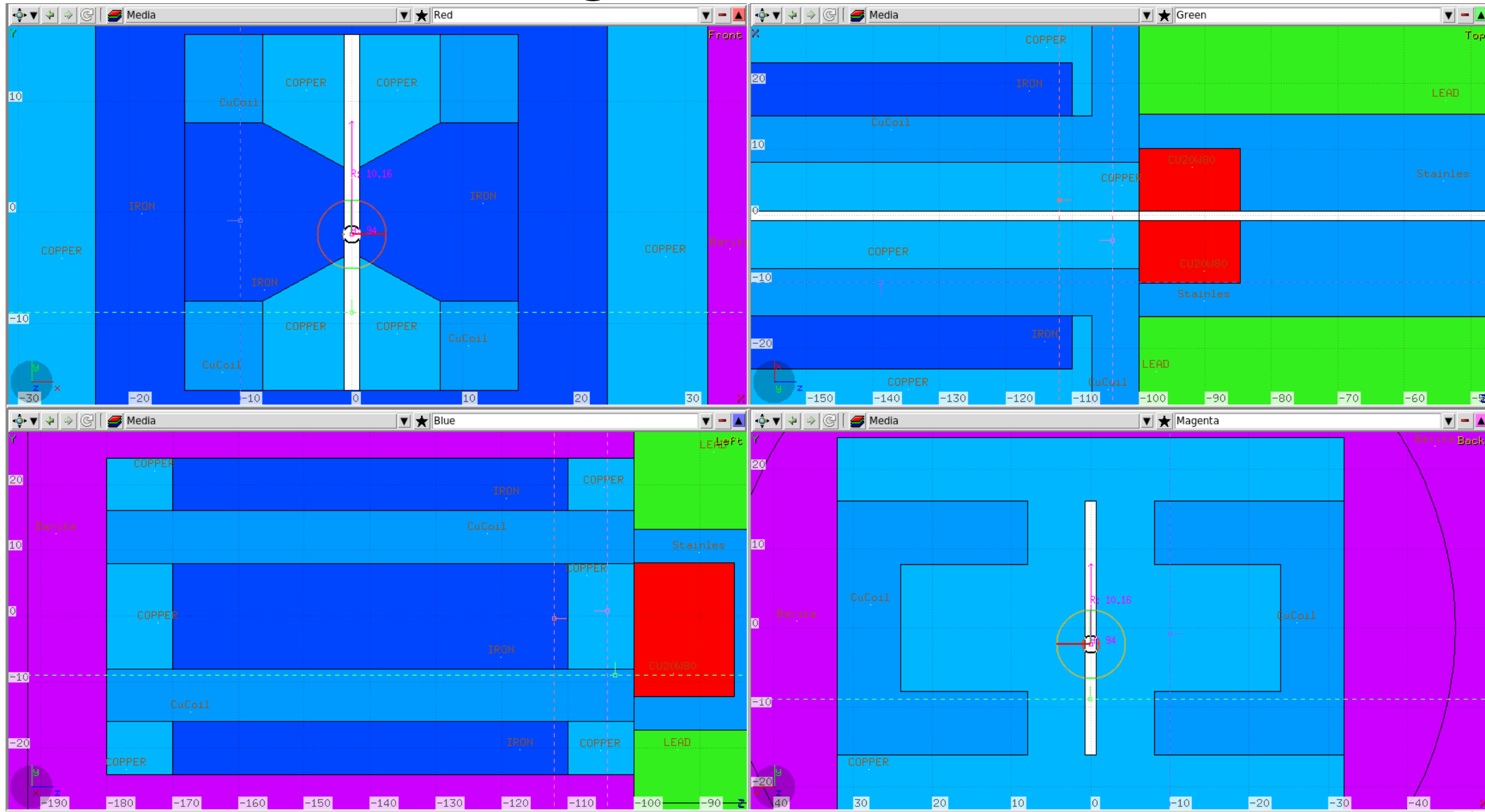
Power distribution along the absorber



Power distribution along the absorber



Magnet: Details



Coil Dose Accum, 10000 beam hours, under 10^5 Gy

