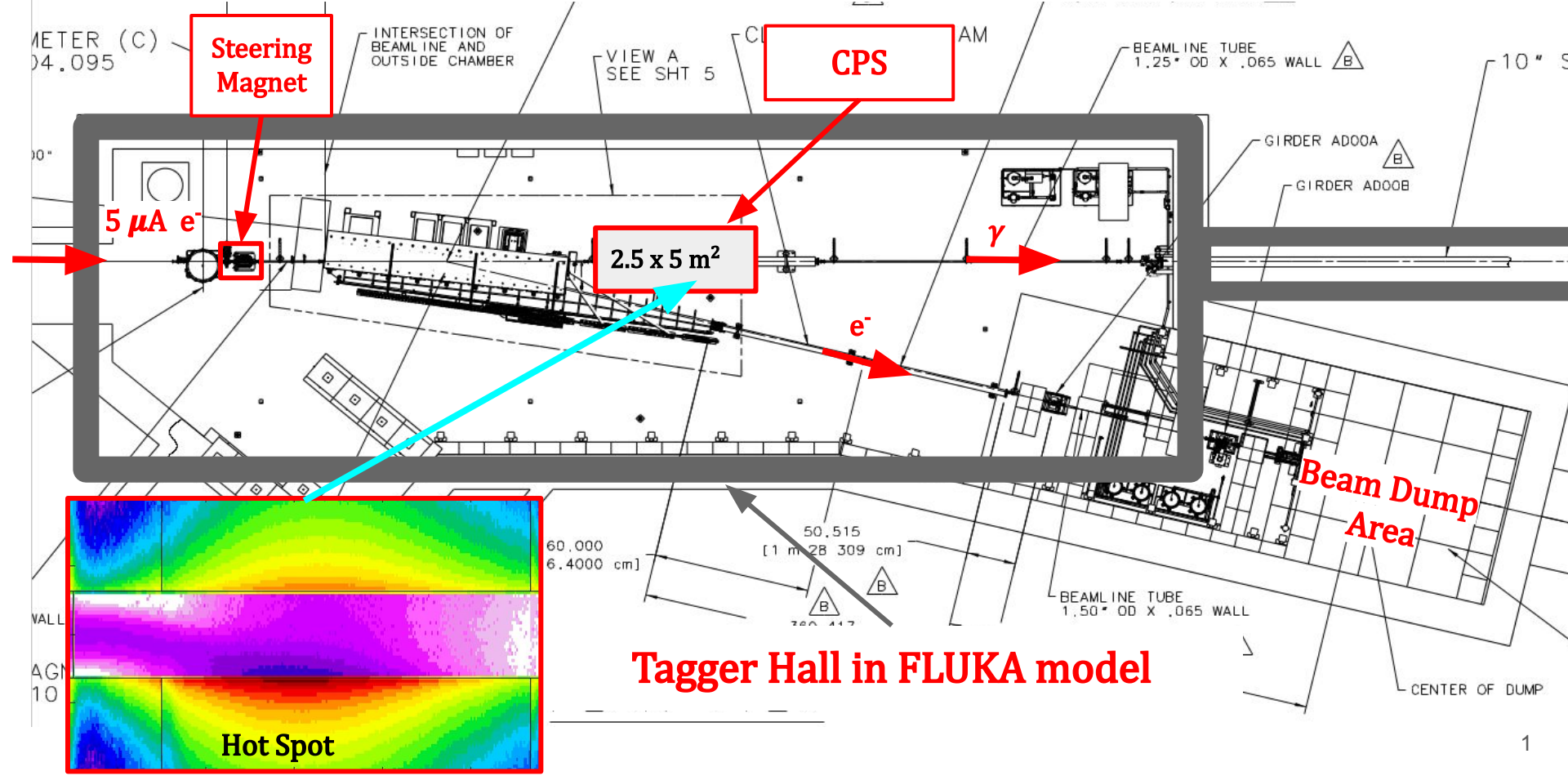
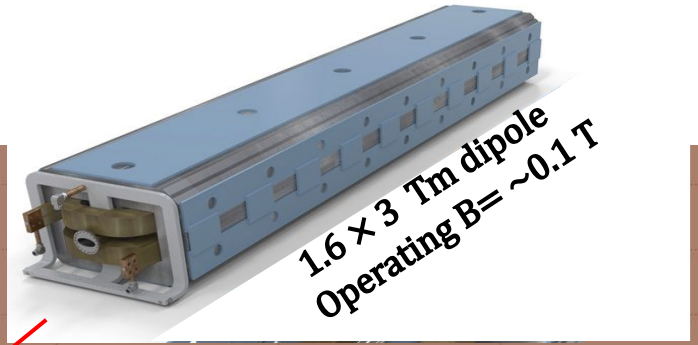
CPS location in Tagger Hall. Beam 5 μA , Gaussian, FWHM=2.5 mm.



CPS, Tagger Hall, KPT and Magnet prototype in FLUKA model.



Soil mound

Concrete ceiling

CPS

HALLAIR

DUMP1

KPT

Photon Beam Pipe

PLASH1

PLASH2

Concrete floor

Tritium detector

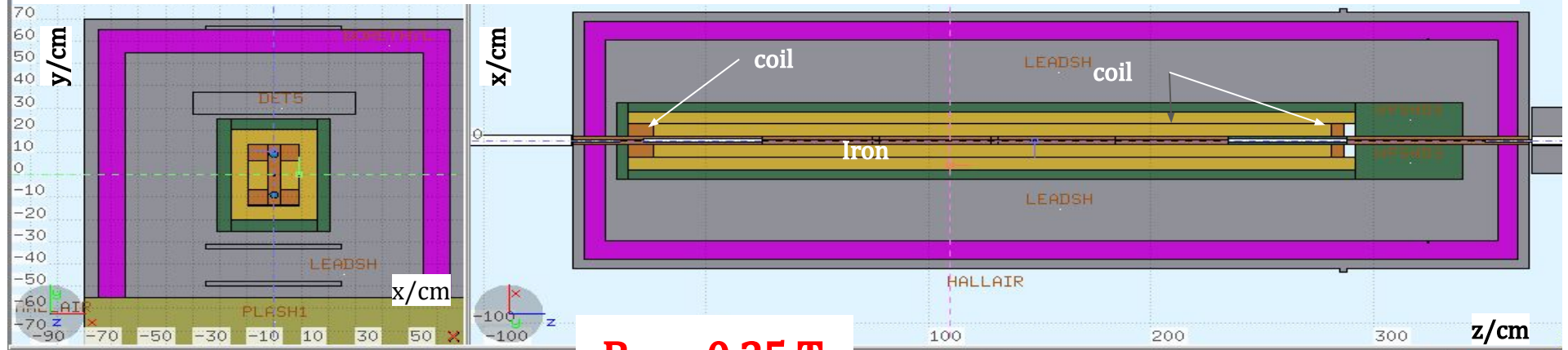
Wet sand

y/cm

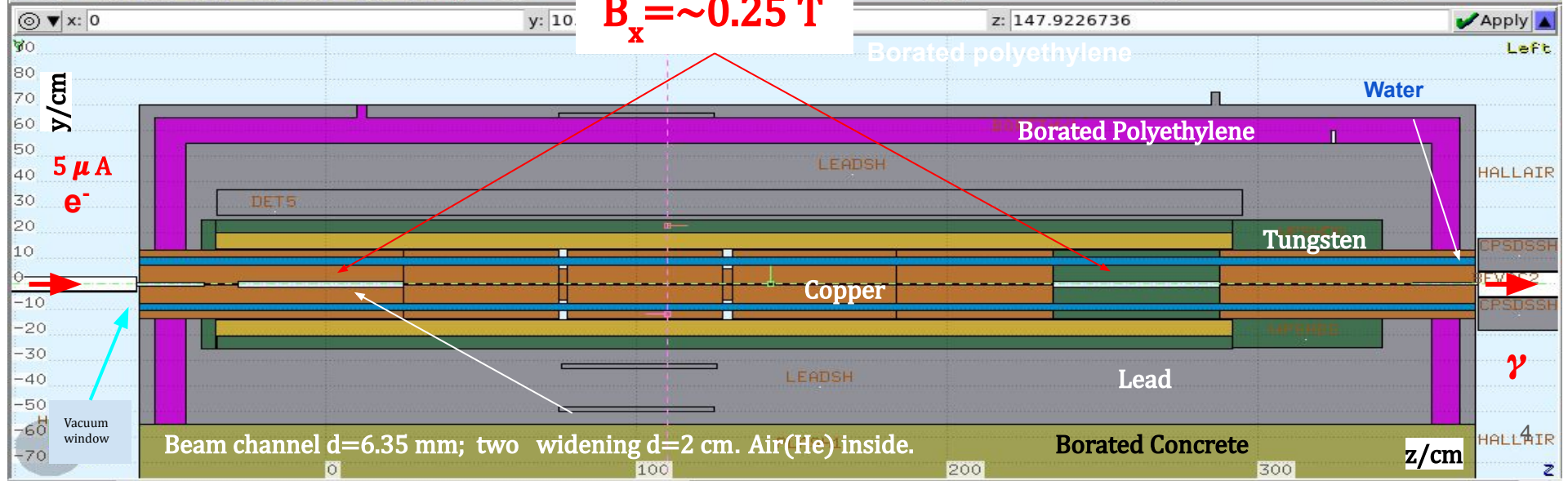
z/cm


NOTICE
NOTICE
EMERGENCY
EYE WASH
EMERGENCY
EYEWASH STATION
CAUTI
OK

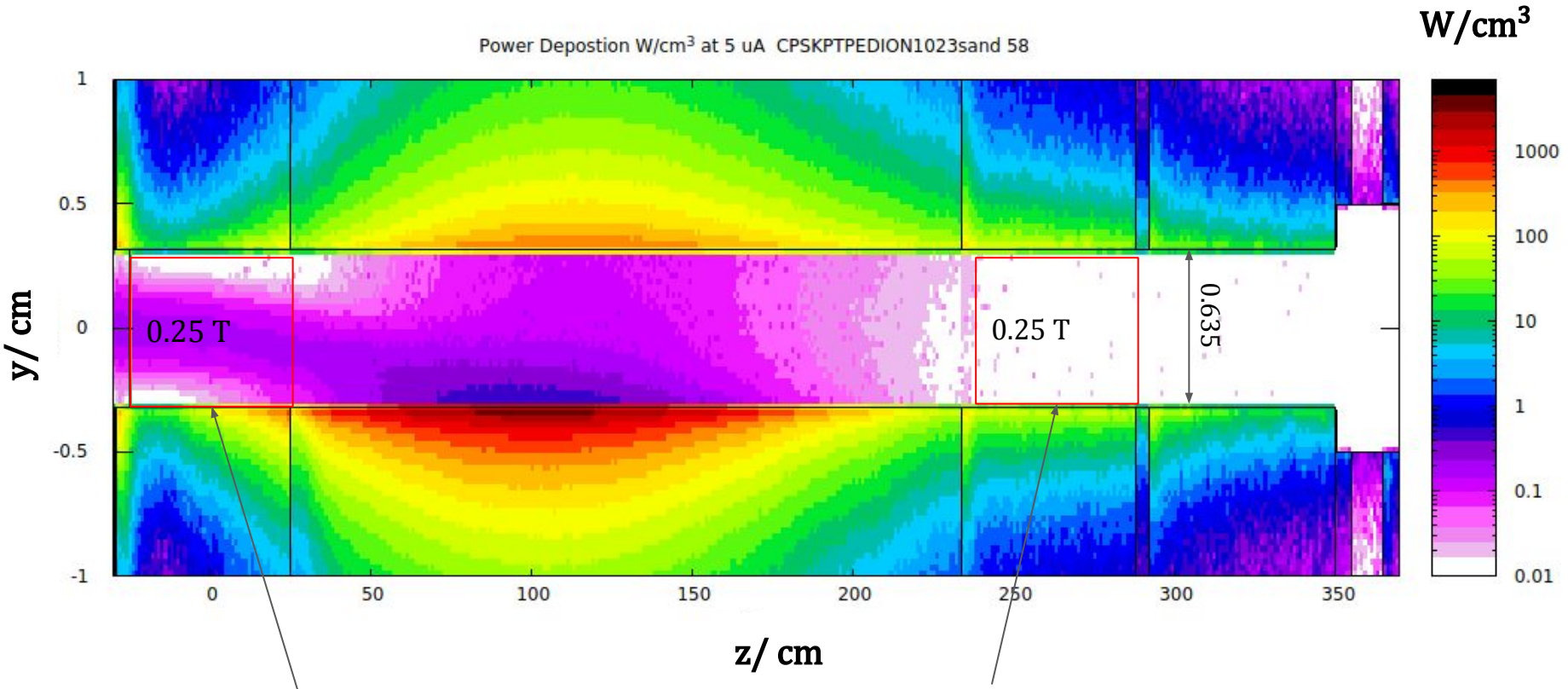
CPS in FLUKA: Magnet Yoke/platform, Two Coils, Cu Absorber, and 4 shield layers.



B_x=~0.25 T

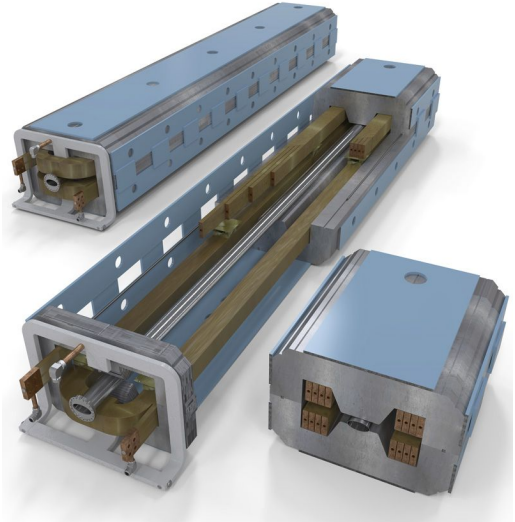


Source of radiation. Hot spot in the absorber. Power deposition

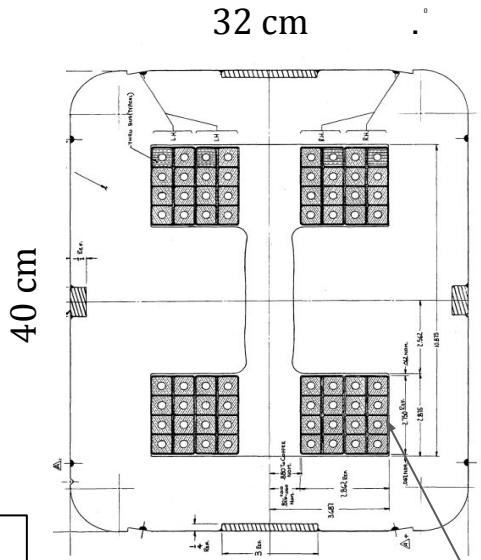


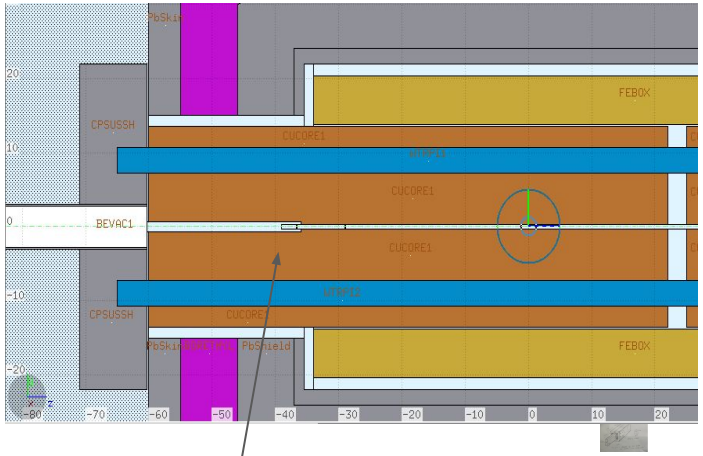
- Upstream magnet forms the Hot Spot; Downstream - cleans the photon beam.

Magnet as precise platform for Absorber



Fermilab Beamline Dipole 1.6×3 Tm,
I_{max} =1.8 kA, Cooling ~20 kW.

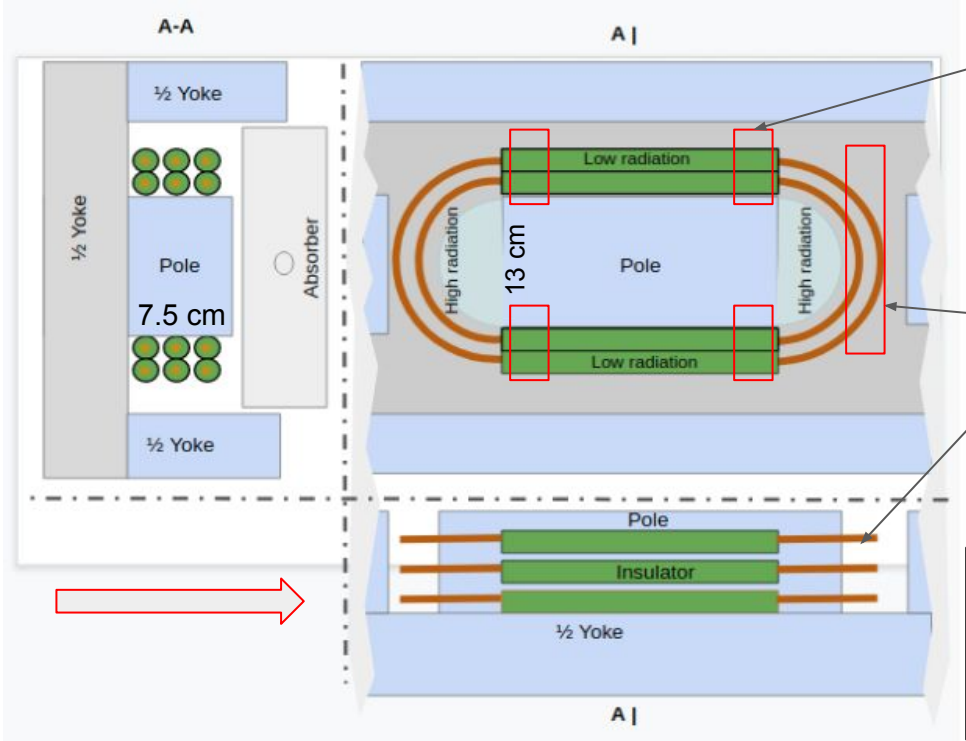




B=1.6 T - 16 wires 1.7×1.7 cm^2
B≤0.6 T - 6 wires.

1. **Iron shield** and **precision platform** for Absorber. Specified flatness within 500 μm
2. **Housing for all parts** with narrow beam channels, **including protruded segments.**
3. **Precision Assembling at a bench** and **in-hall Alignment with 5 DOF** only.

Coil Design and Insulation Exposure to Radiation.



Hot area for insulation.

Very hot area,

Air insulation,

Gap between wires

~8 mm.

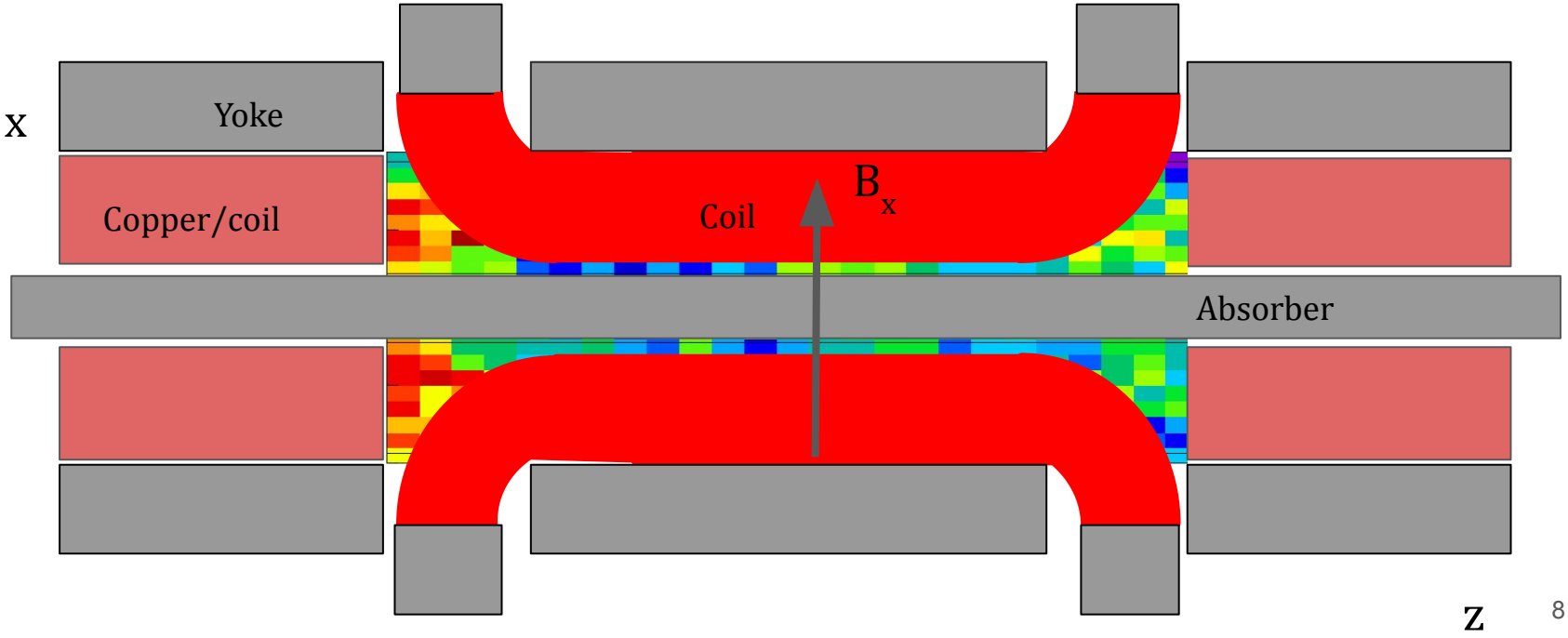
Ampere's force law:

$dF/dl = (\mu_0 / 2\pi)\ (I^2/d) = \sim 25$ N/m

at I=1800 A ; d=2.5 cm; $\mu_0 = 4\pi$E-7 N/A^2

- Attractive force of bent parts F = 25 N/m* 0.3 m = 7.5 N.
- Copper 1.7 cm -wires (tubes) will not touch .

Tim Whitlatch's solution.



Required modifications.

1. Remove 3m long coils.
2. Re-machine magnet poles and yoke for 2 shorter coils.
3. Design, make and install 4 short coils with 4-6 windings for 0.4-0.5 T.
4. Install Absorber segments.
5. Assemble the magnet.