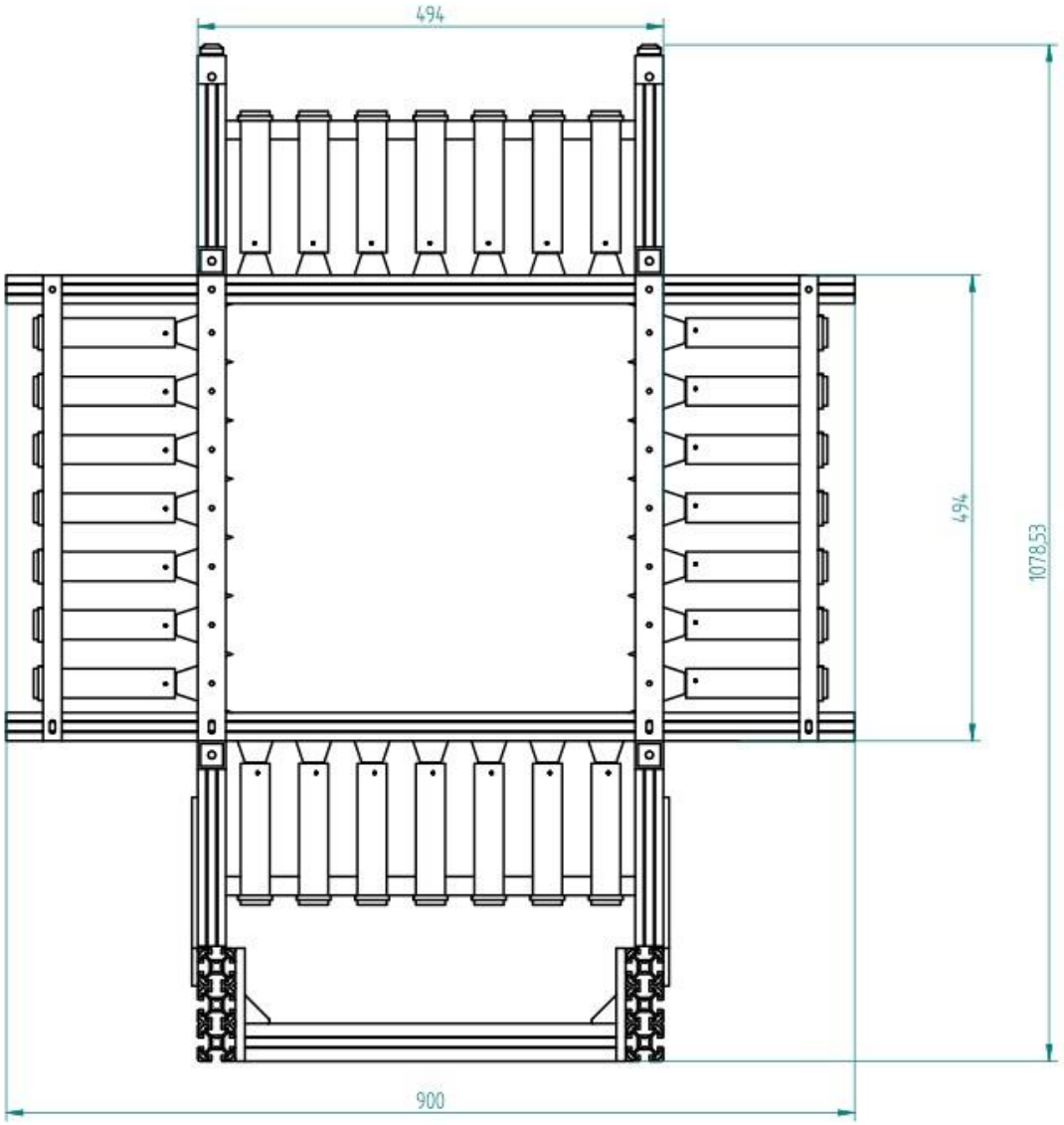
MICE PRY
Field TOF PMTs

Holger Witte
Brookhaven National Laboratory
Advanced Accelerator Group

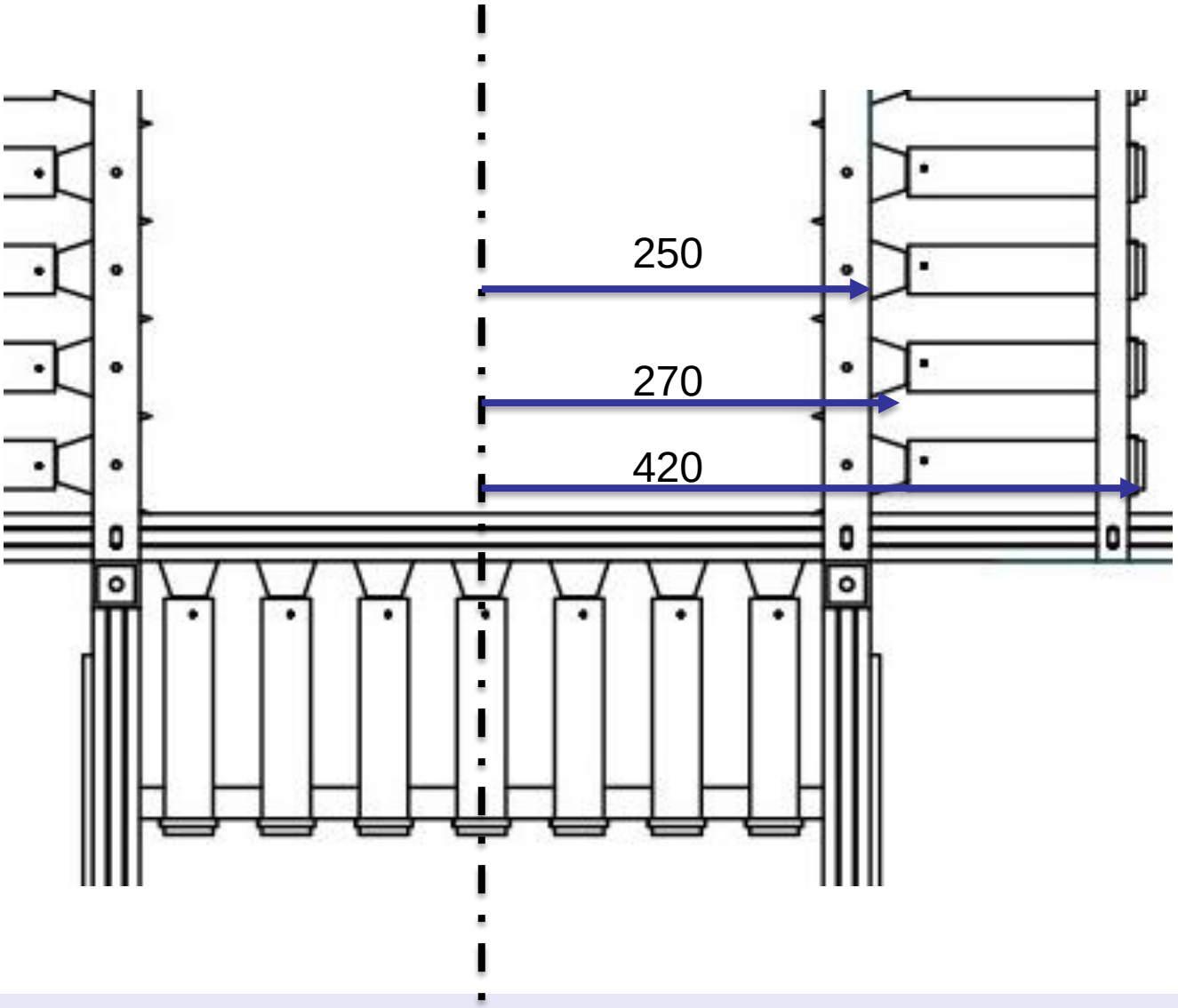
PMT Limit

- Hamamatsu R4998 PMT
- Shielding
  - ARMCO (6x6 cm^2) shield
  - 1 mm μ-metal
- Field limits
  - Axial (parallel to PMT axis): 600 Gauss (60 mT)
  - Orthogonal (perpendicular to PMT axis): 1000 Gauss (100 mT)
- M. Bonesini et al. / Nuclear Instruments and Methods in Physics Research A 693 (2012) 130–137. http://dx.doi.org/10.1016/j.nima.2012.07.039
- R. Bertoni et al. Tests in magnetic field of conventional Hamamatsu R4998 PMTs. MICE-NOTE-DET-201.

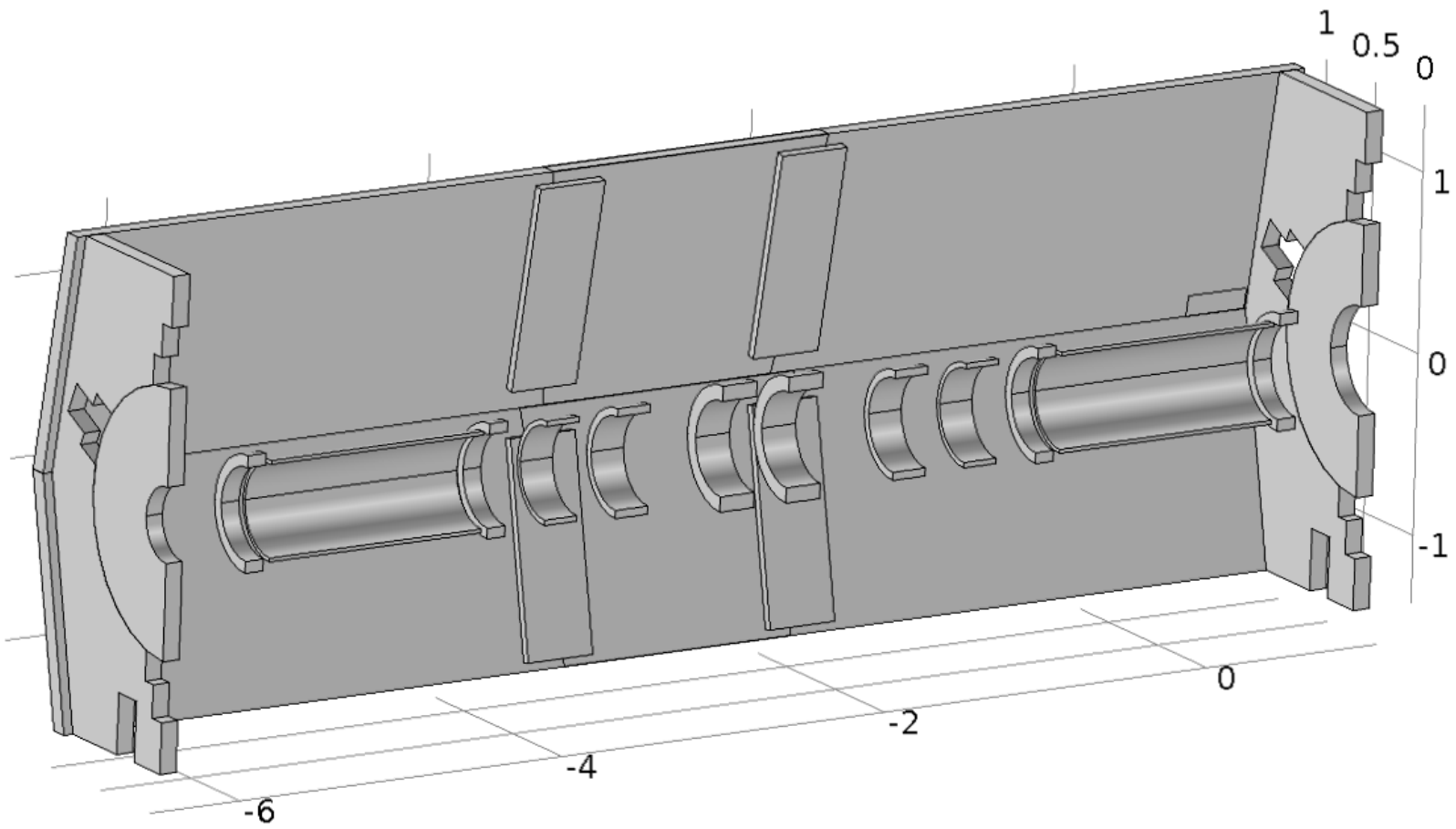
TOF Geometry



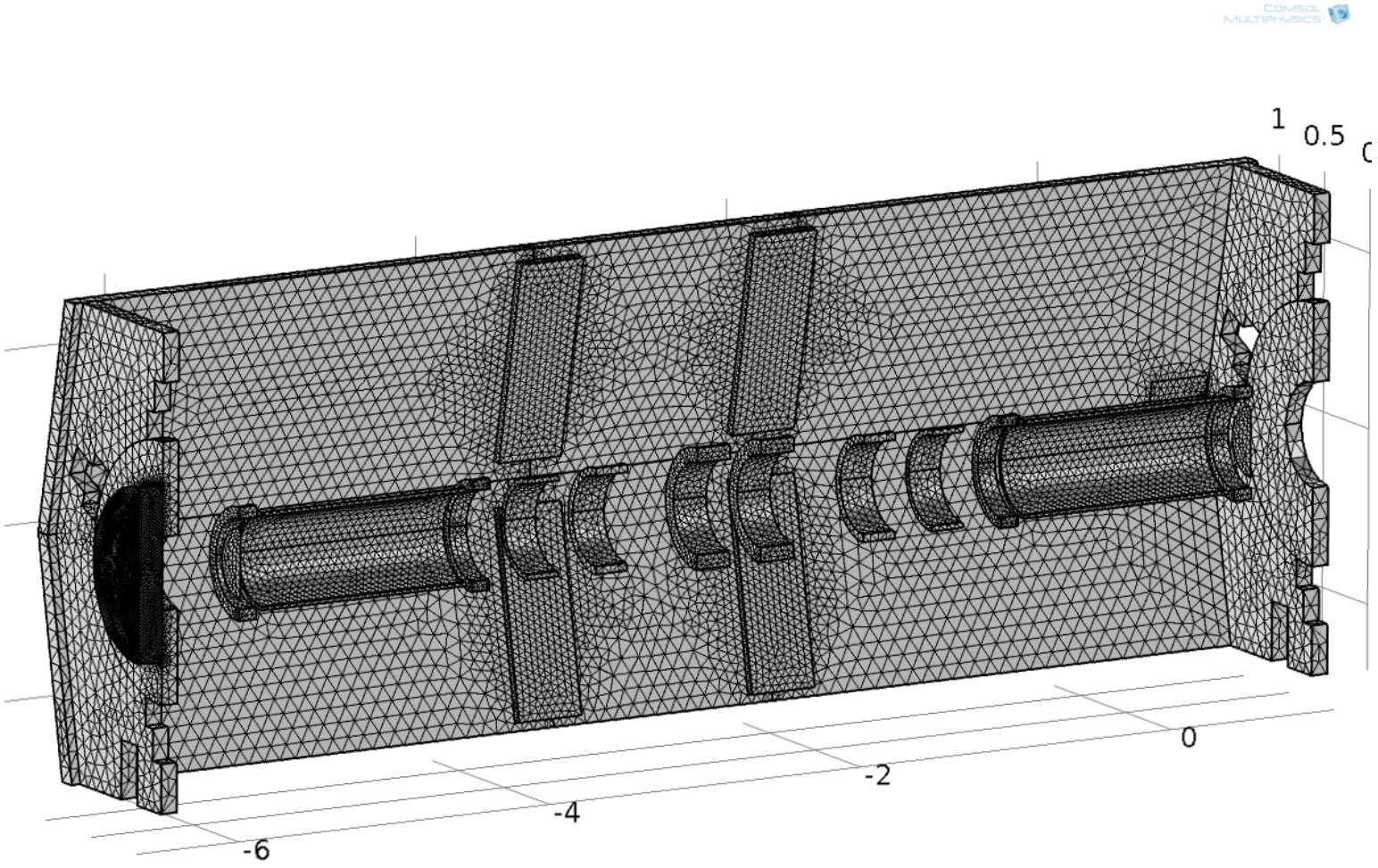
Geometry



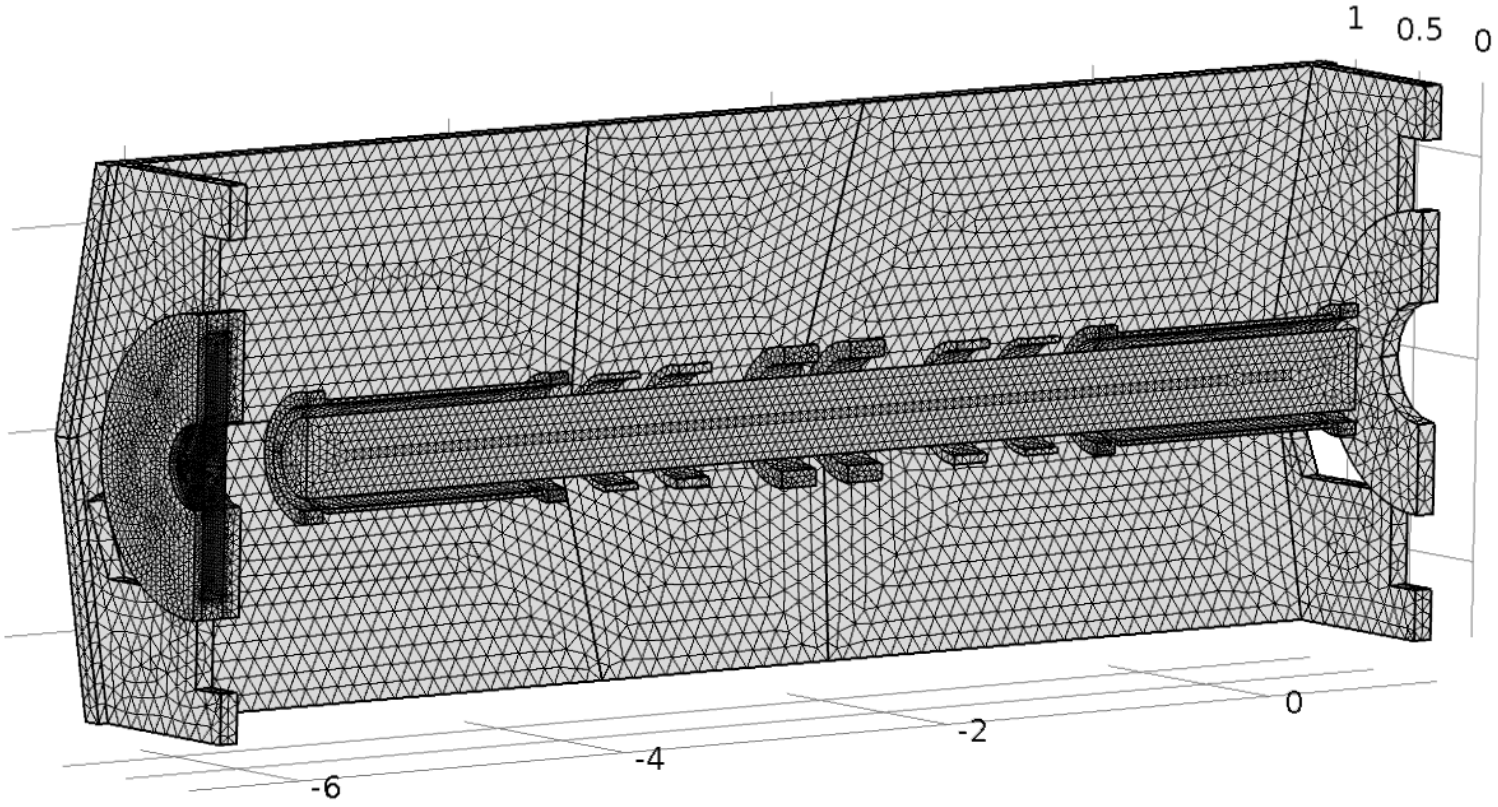
PRY Model



Mesh – No TOF Cage



Mesh TOF Cage

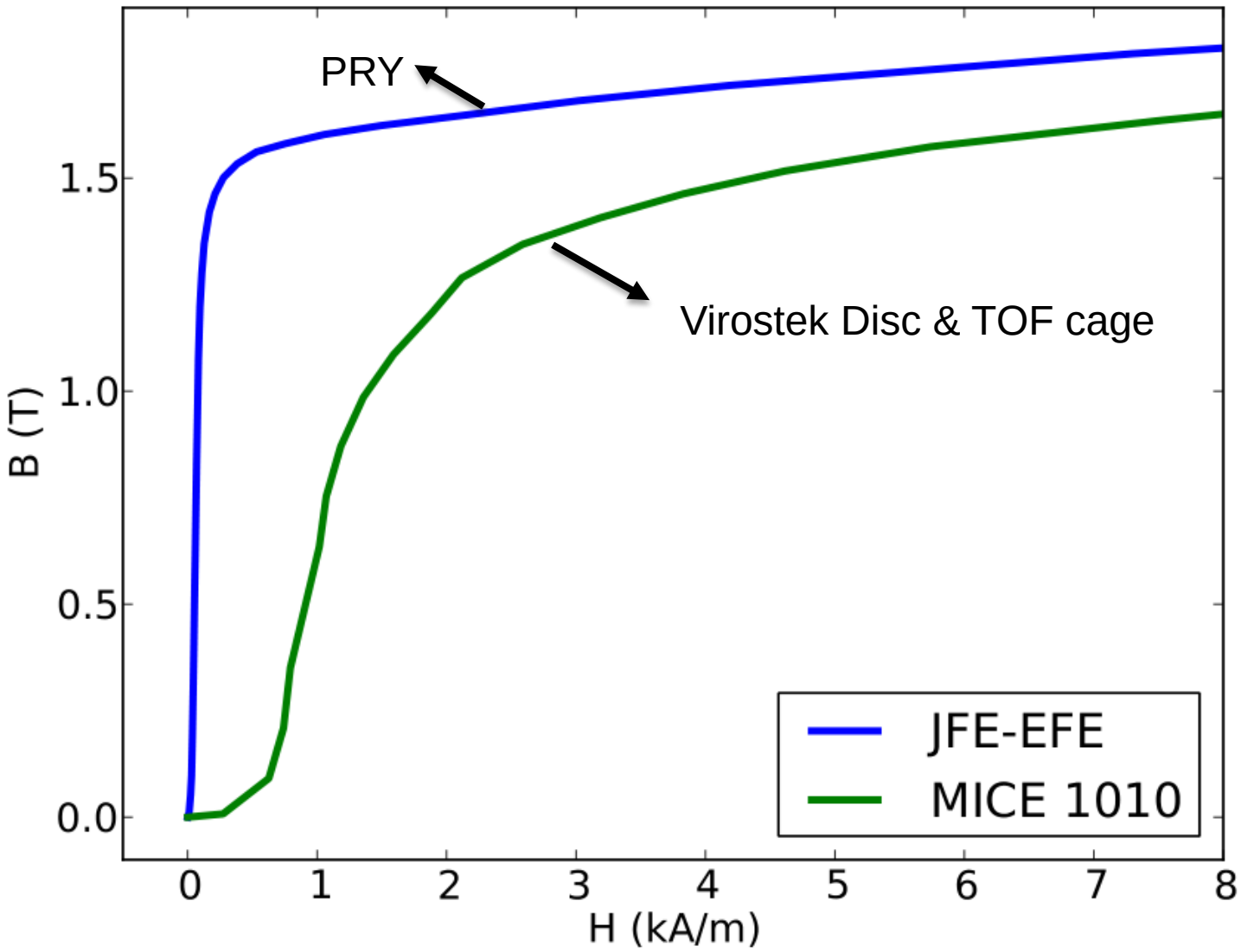


Note: No backing plates, no gaps centre plates
Larger openings for Virostek Disc brackets

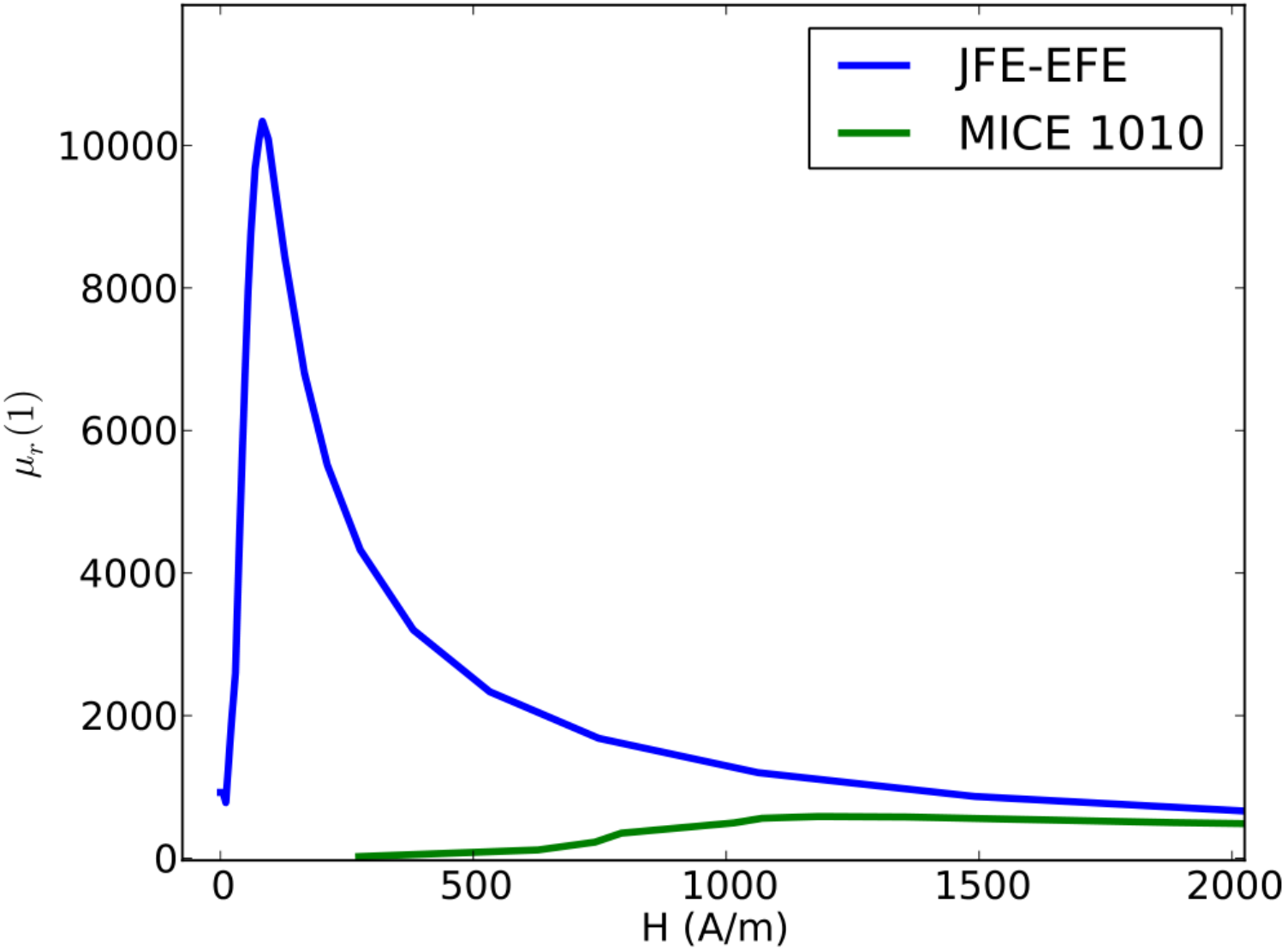
Notes

- Magnetization curves
  - JFE-EFE 62 mm
  - MICE 1010 steel as measured
- Virostek disc ID: 420mm
- TOF Ring fully closed (360 deg)
  - In reality the ring only covers 240 degrees

Magnetization Curves

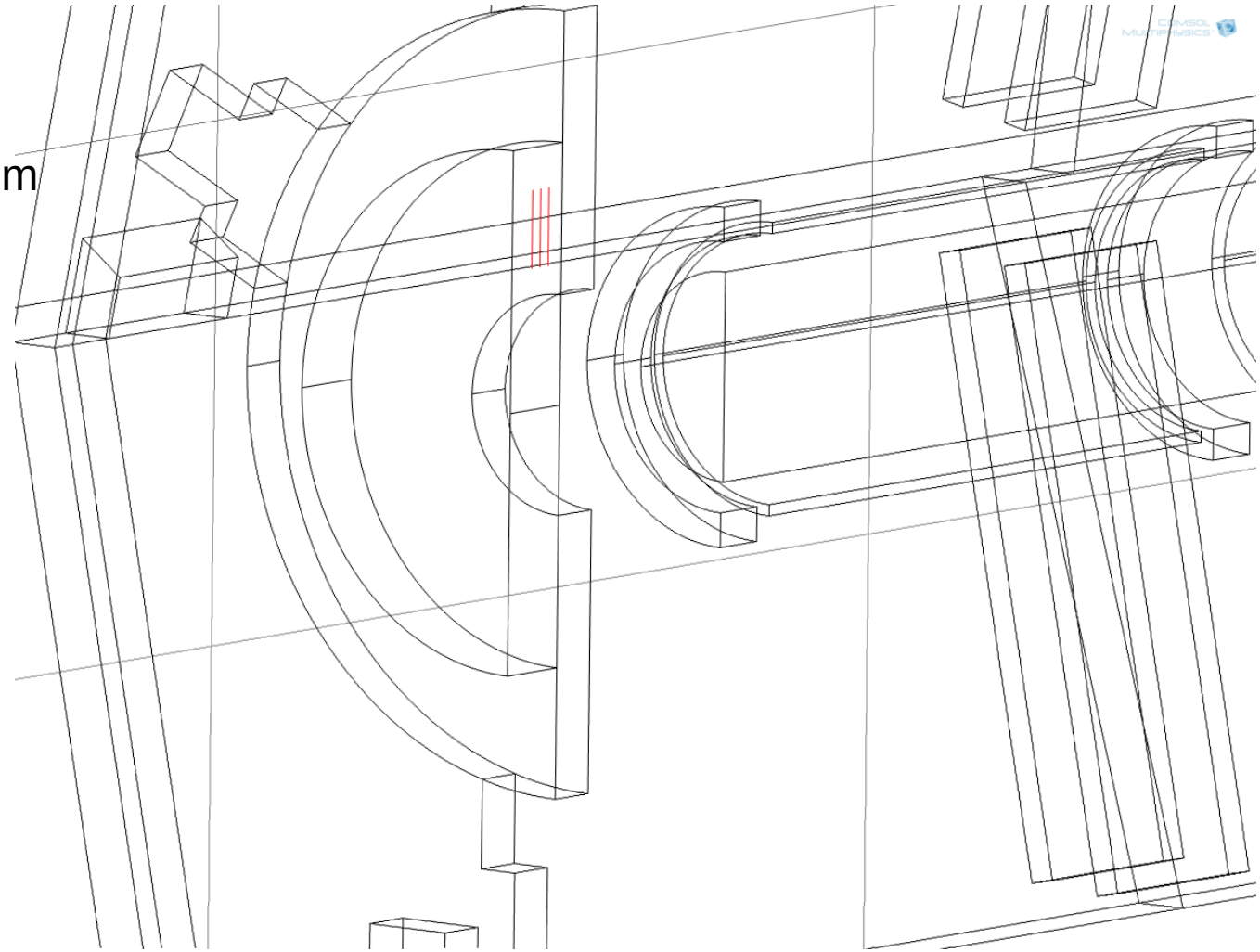


Permeability

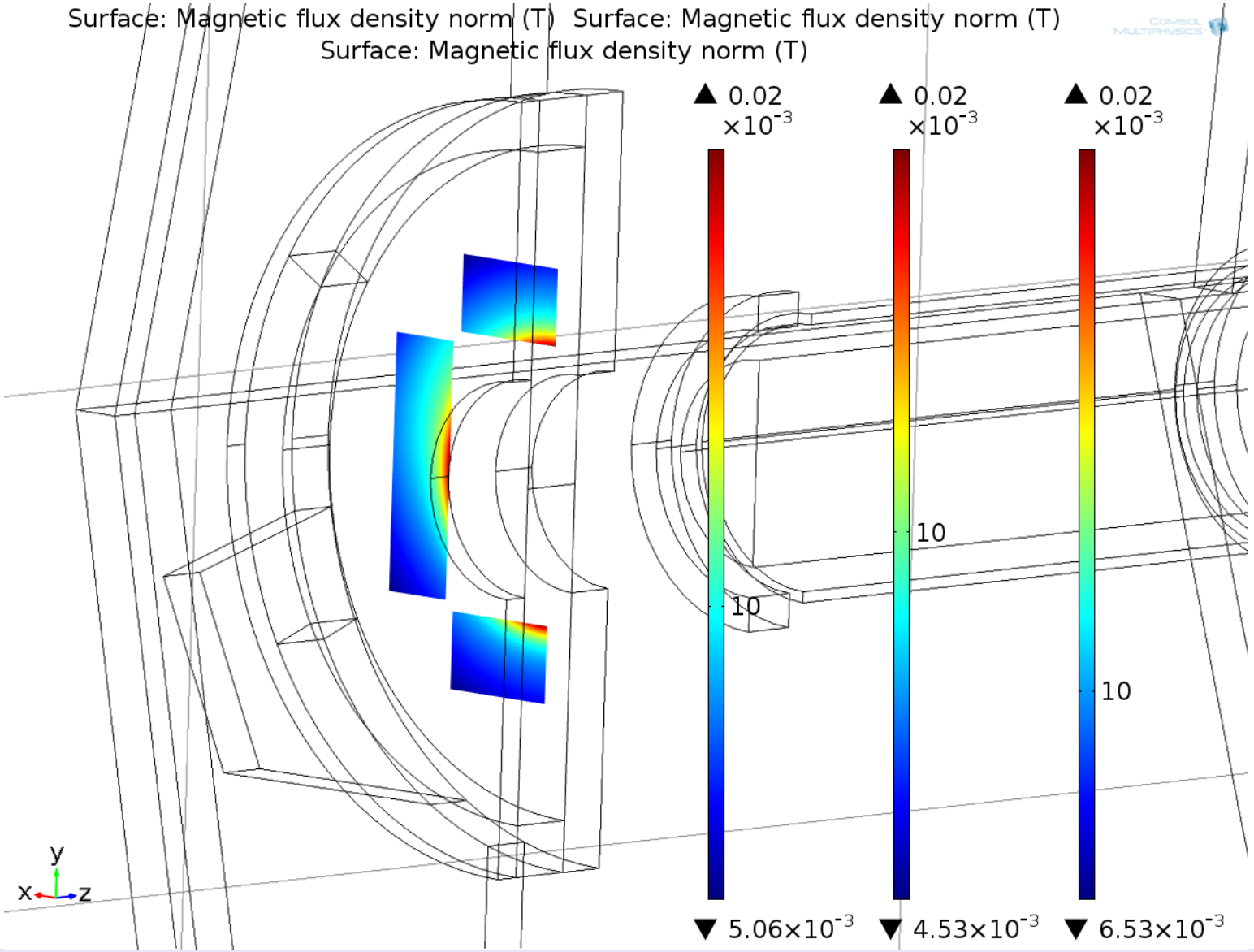


Position PMTs

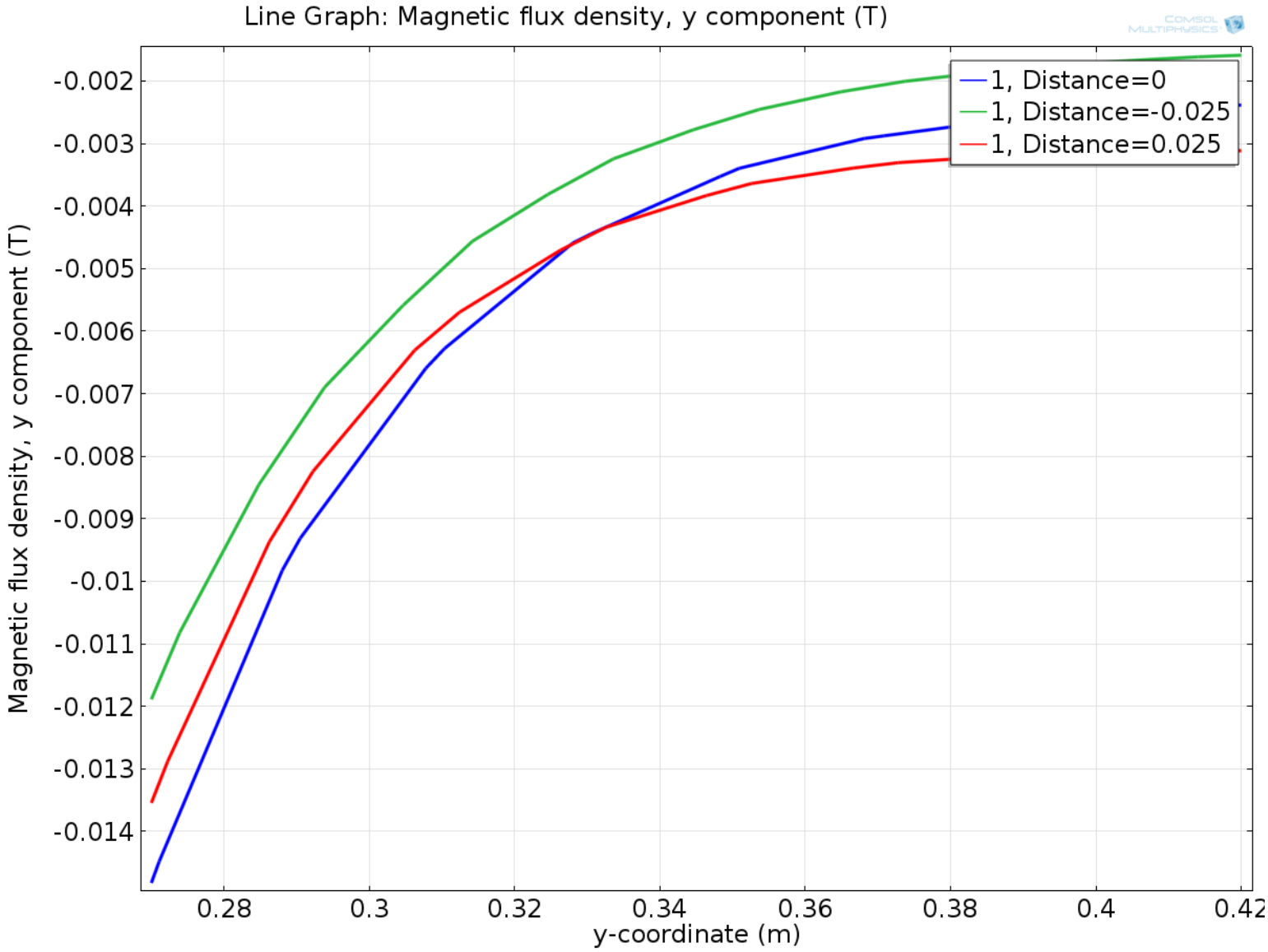
Center, +/- 2.5 cm



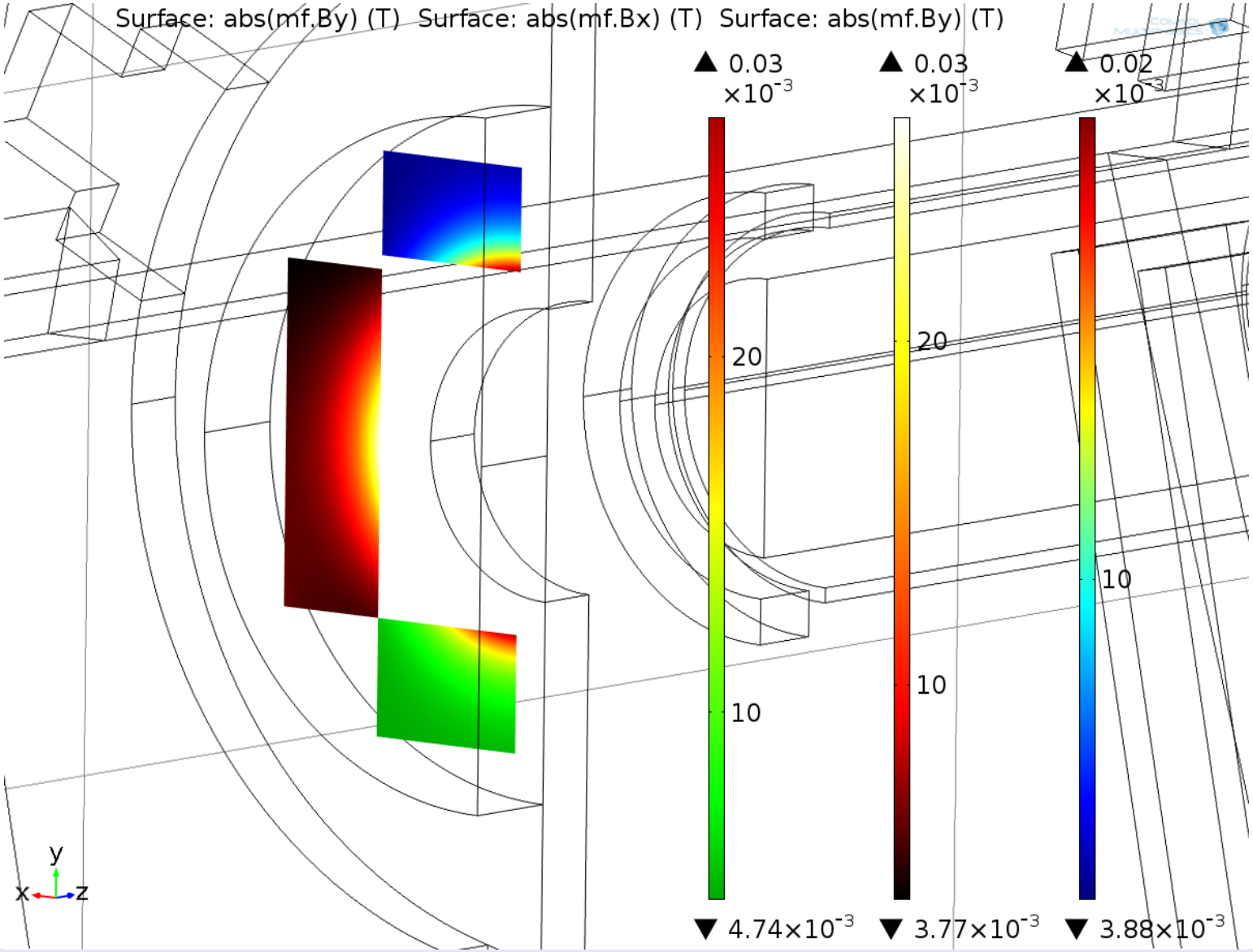
240 MeV Flip, TOF Cage



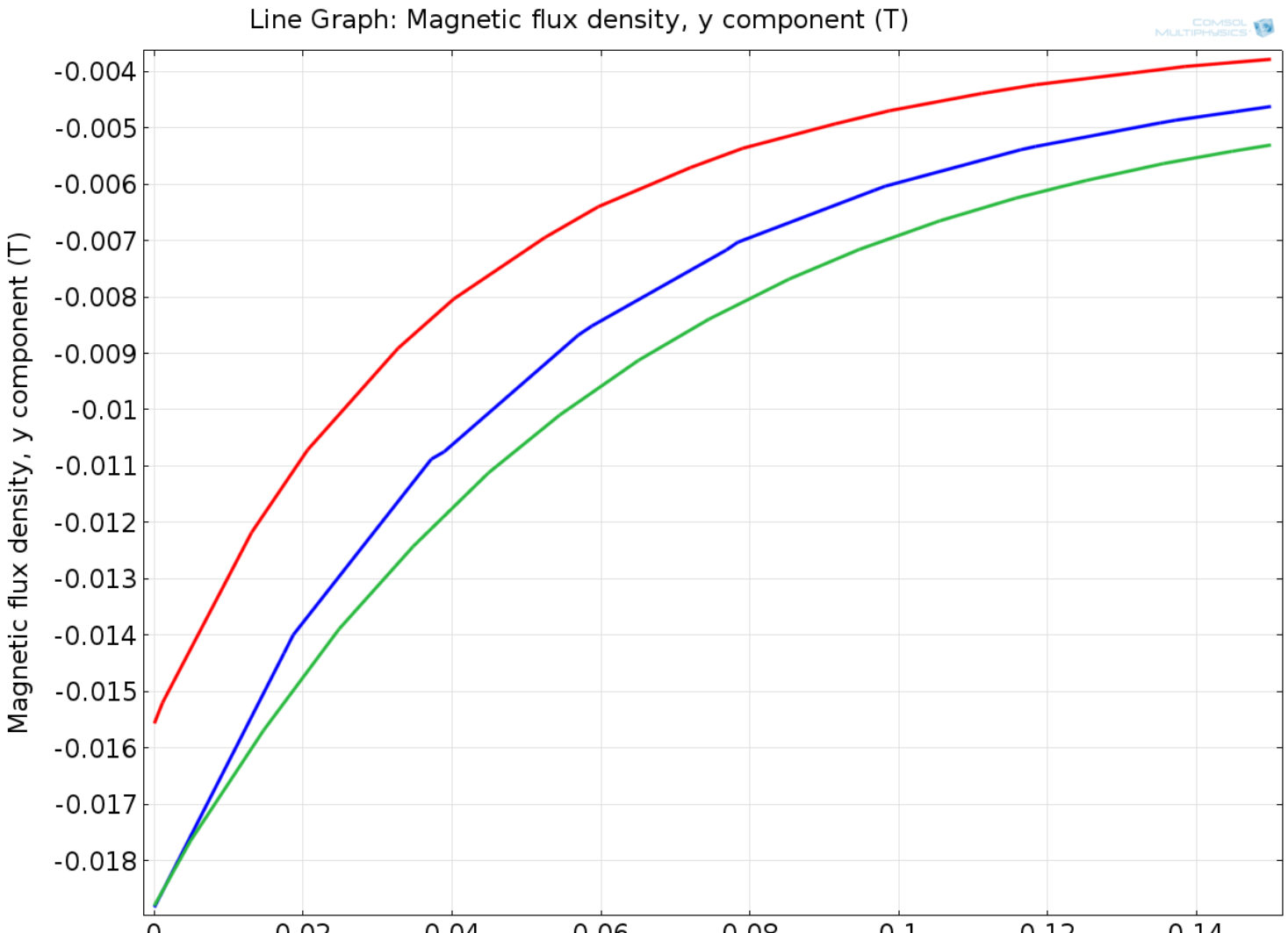
240 MeV Flip, TOF Cage



240 MeV Flip, No TOF Cage

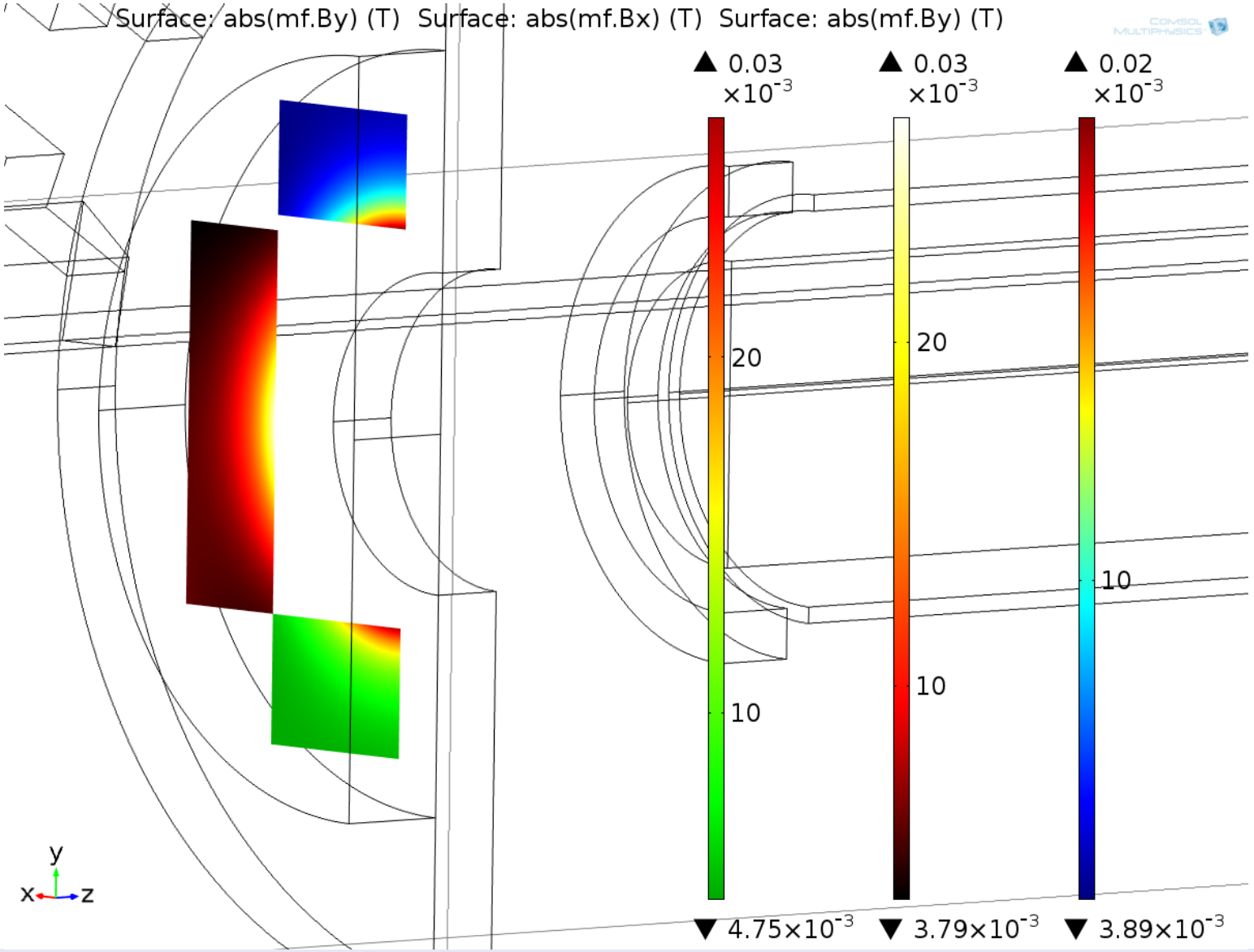


240 MeV Flip, No TOF Cage

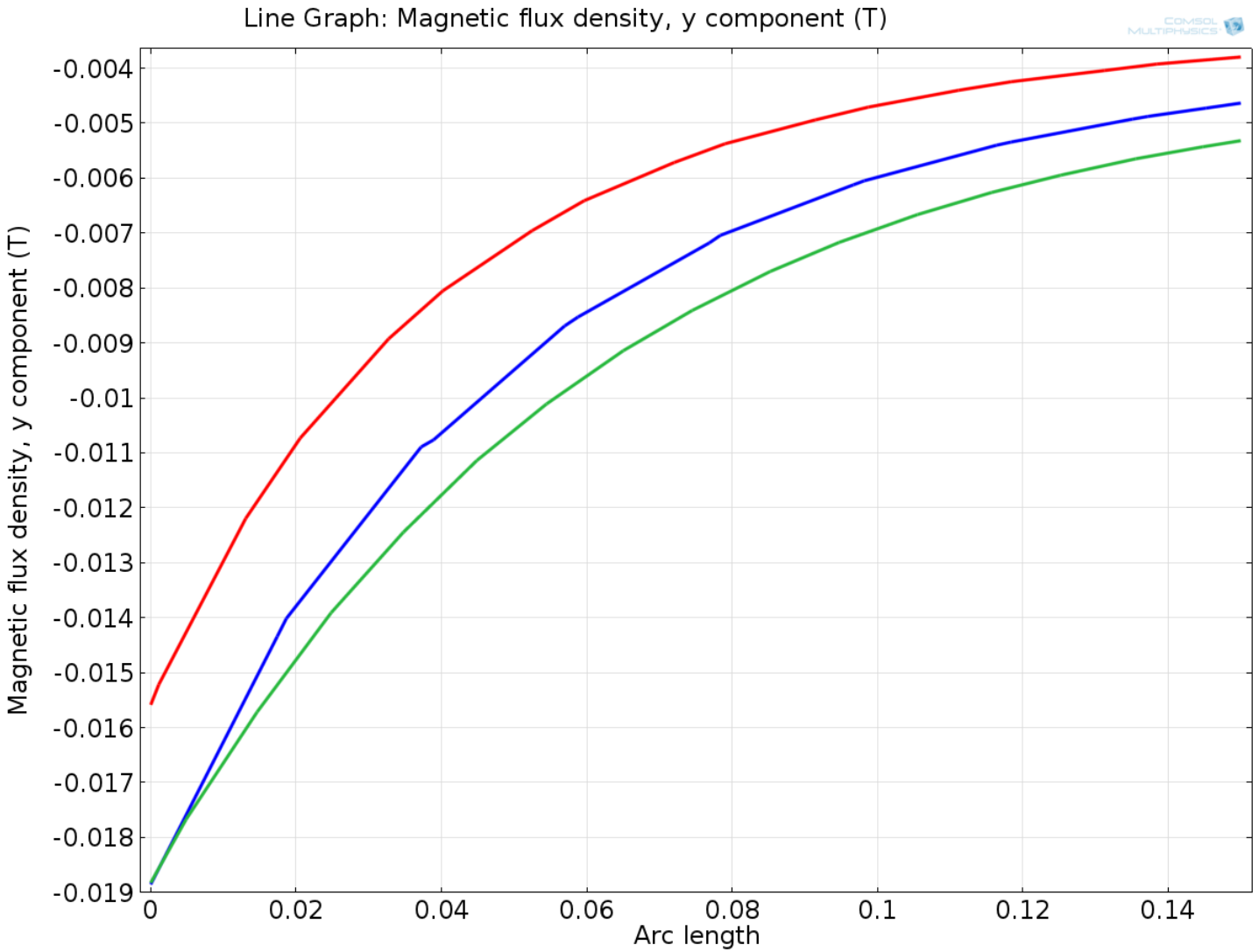


(27 cm) (42 cm)

240 MeV Solenoid, No TOF Cage



240 MeV Solenoid, No TOF Cage



(27 cm) (42 cm)

Summary

- No TOF cage:
  - Peak field parallel to PMT axis 20 mT (<30 mT)
- With TOF cage:
  - Peak field parallel to PMT axis 15 mT (<20 mT)
- In both cases the predicted field is less than the allowed field (60 mT parallel to the PMT axis)