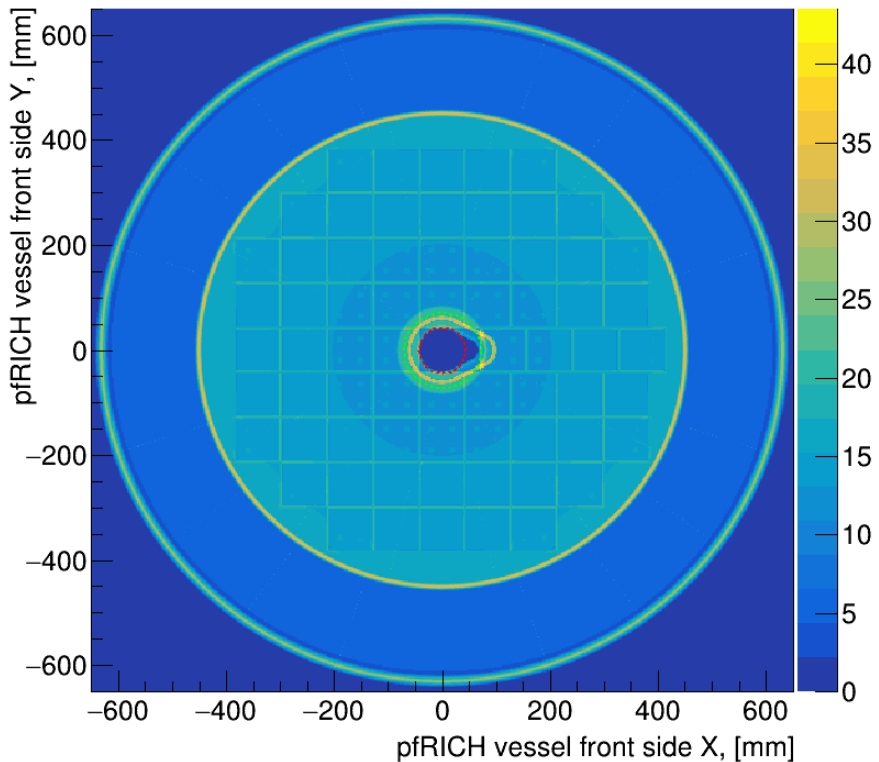


# pfRICH material budget evaluation

- Based on GDML output of our GEANT model
- Custom xray.C ROOT script (creates a raster picture with a source at the nominal IP)
- Material description:
  - Vessel (1/2" and 1/4" honeycomb, reinforced by aluminum rings)
  - Aerogel with its support structure
  - 3mm thick acrylic filter
  - Mirrors (also a honeycomb structure, without reinforcement)
  - 1/2" thick aluminum sensor plane support frame (cut away to almost zero average thickness)
  - HRPPDs (window, walls, MCPs, anode plate, silver plating)
  - Readout PCB (no copper yet) with ASIC placeholders
  - No cables
  - And no cooling system yet

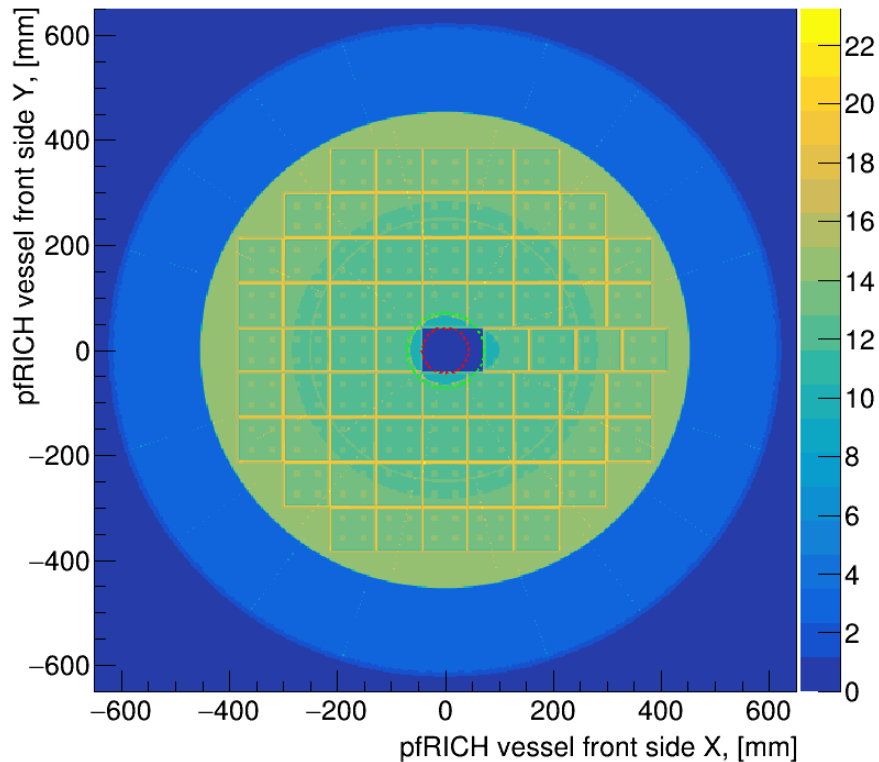
# pfRICH material budget, full radial size

pfRICH radiation length scan [%]



All material

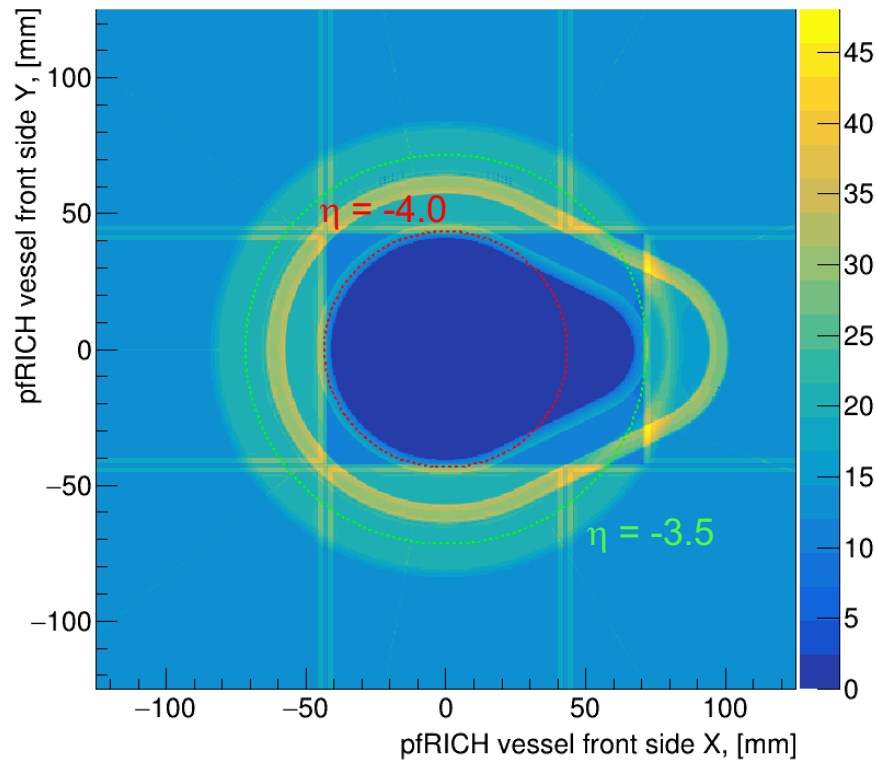
pfRICH radiation length scan [%]



No vessel and no mirrors

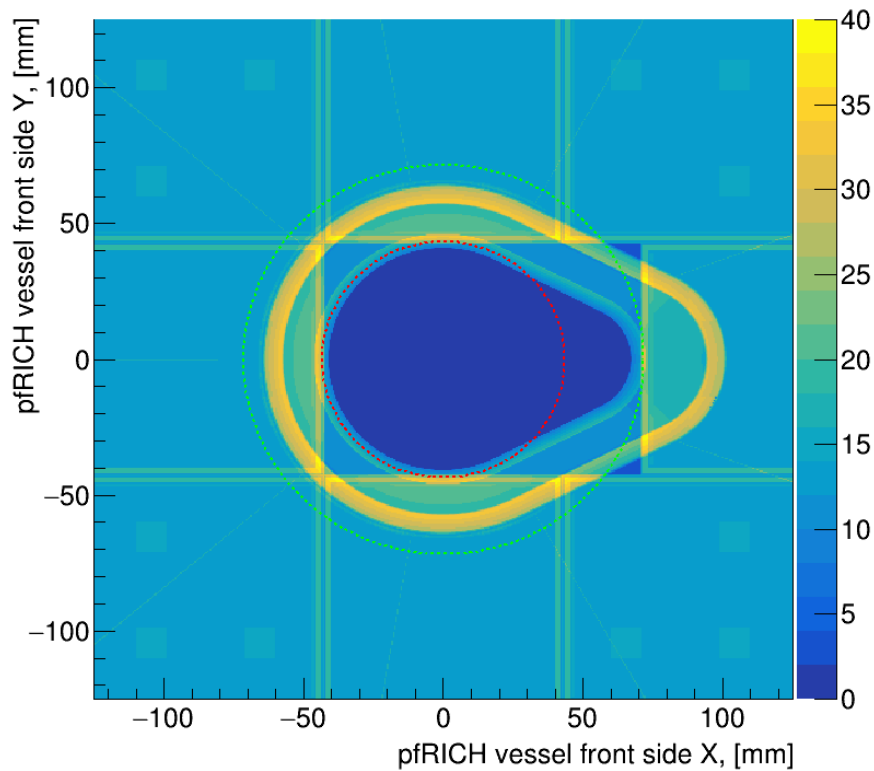
# pfRICH material budget, beam line area

pfRICH radiation length scan [%]



All material

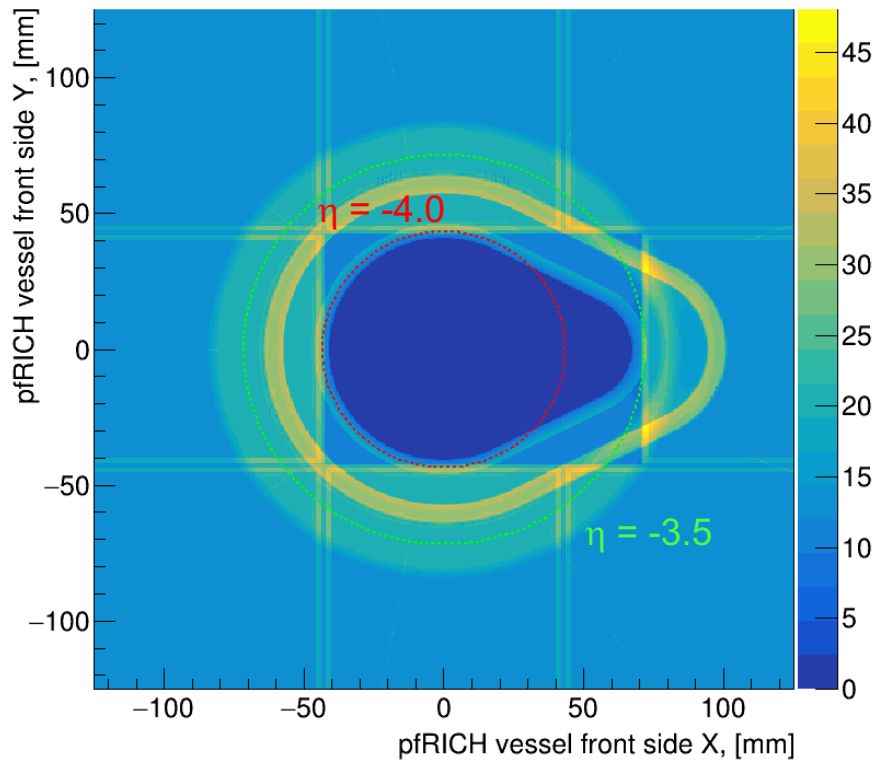
pfRICH radiation length scan [%]



Remove mirrors

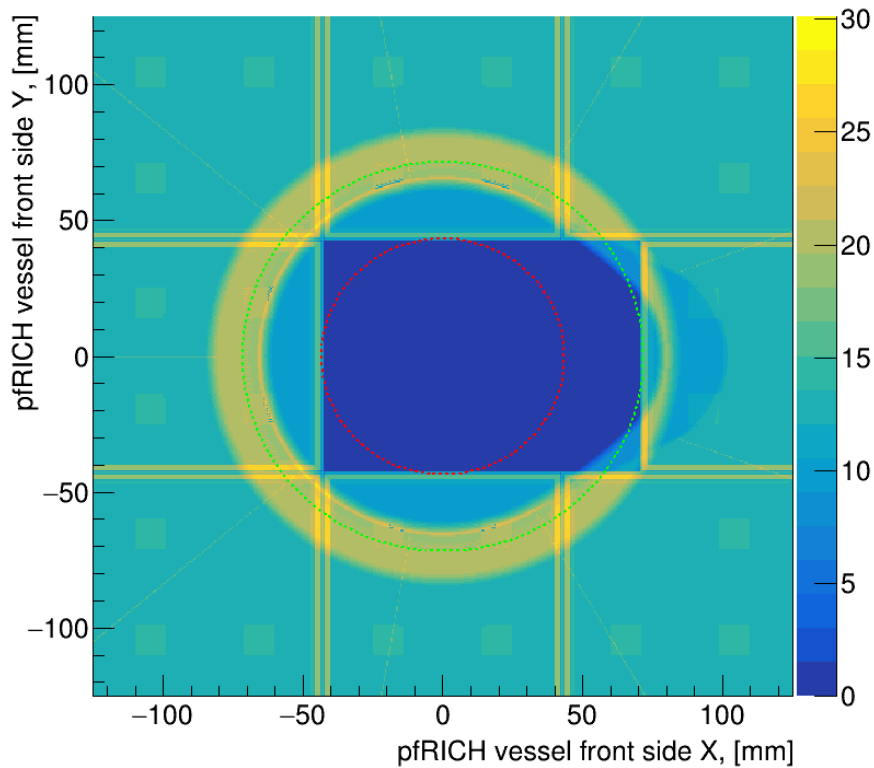
# pfRICH material budget, beam line area

pfRICH radiation length scan [%]



All material

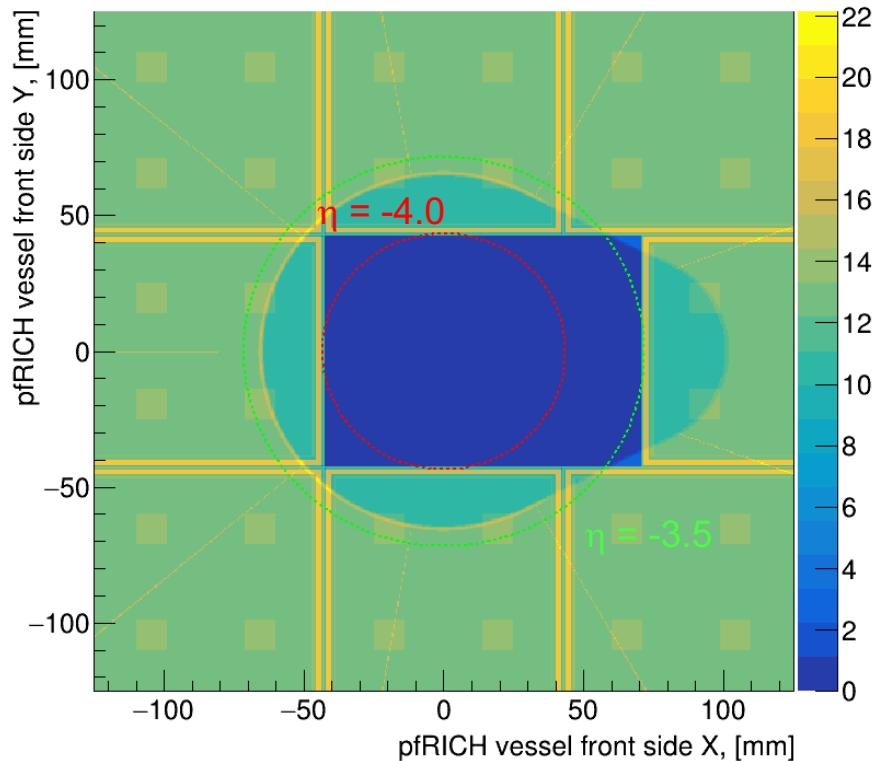
pfRICH radiation length scan [%]



Remove vessel

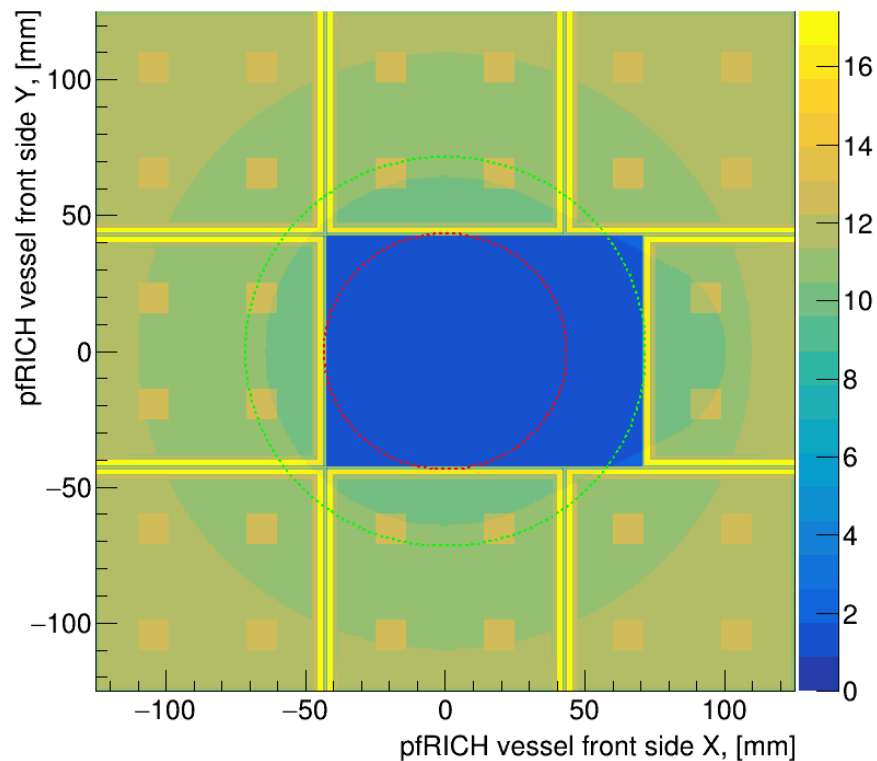
# pfRICH material budget, beam line area

pfRICH radiation length scan [%]



Also remove vessel

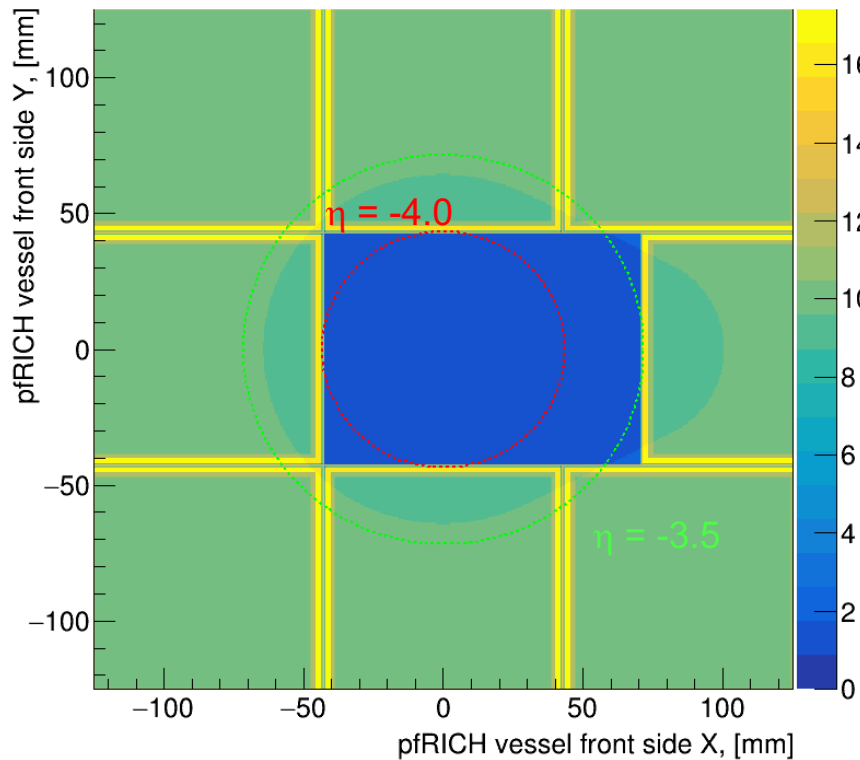
pfRICH radiation length scan [%]



Also remove aerogel container

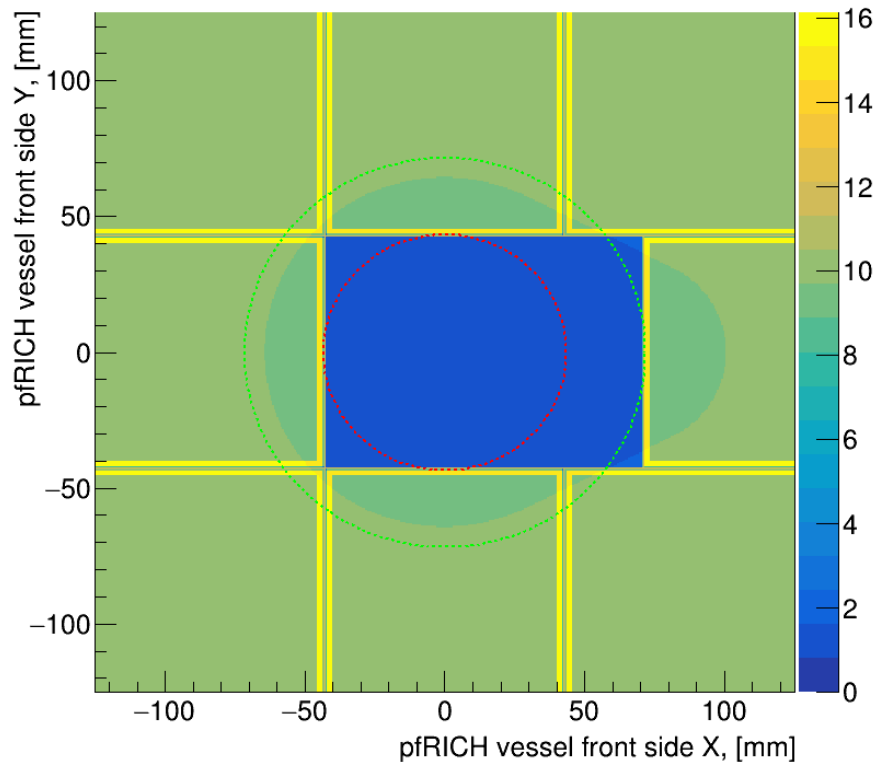
# pfRICH material budget, beam line area

pfRICH radiation length scan [%]



Also remove readout PCB

pfRICH radiation length scan [%]



Also remove HRPPD support plate

# Where do we go from here?

- Just sent this v01 file to Chris
- Will be waiting for Sasha's investigation
  
- Can we afford water cooling?
  - will produce spikes in the material distribution
  
- Should we be looking for flat (or multiwire) LV cables?
- Can we further optimize the inner vessel wall?
- What is the actual effective acceptance of the e-endcap EmCal?
  - and how does it affect the required radial position of the pfRICH inner mirror?
- Should we be shooting for smaller HRPPD material budget (4mm window, 2mm anode)?
- **Not to mention a conflict with the official ePIC beam pipe geometry**

**Good news is that the bare minimum of what we need is ~15% as expected**