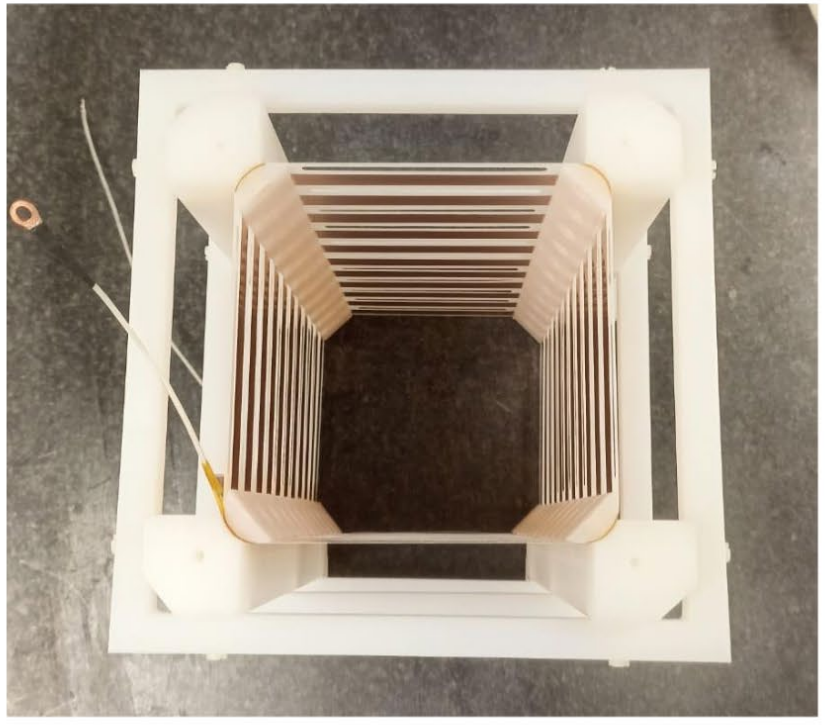
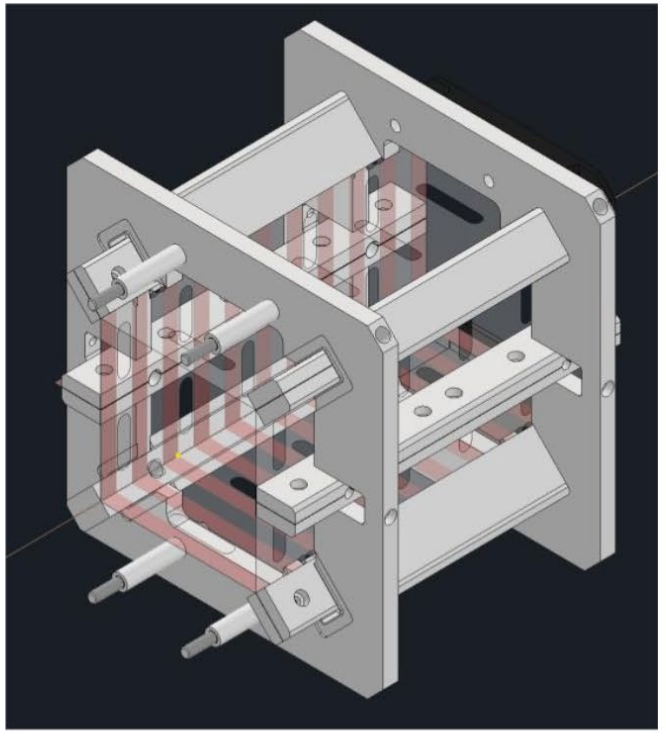
Field Cage V3

- Next step is to try a hybrid between the two FC
- Using the material and resistor position of of the FC_V2_1, but the clipping angles of FC_V2_0 to try to guarantee better corners and solidify the hypothesis of the deformation



Va sviluppato un modello ibrido di FC e risolto il problema di interferenza con il telaio delle GEM.



Conclusion

About source ports on the copper shielding and PMMA

For the Ru source, we should foresee a inlet to inject the Kr in the gas;

For the ^{55}Fe, our proposal is to have:

On the COPPER

- 14 slits 62.5 mm apart each other;
- 4.5 x 14.5 mm^2 and 40 mm deep (the whole clean copper layer)

On the `PMMA

- 2 windows (1 per half volume)
- 80 x 402 mm^2 windows

This setup should allow 10 kHz of events (about 2 Hz/cm^2)

Presentazione di Pinci
THE ETFE cannot be used because of ligh tightness
TEDLAR?!

DONE… AND FOR THIS I WAS ACCUSED AS INCORRECT USER… THAT IS A SHAME!

GAS distribution

See Renga presentation

IT IS IMPORTANT TO DESIGN AND TEST THE FEEDTHROUGH FOR PIPES AND CABLES

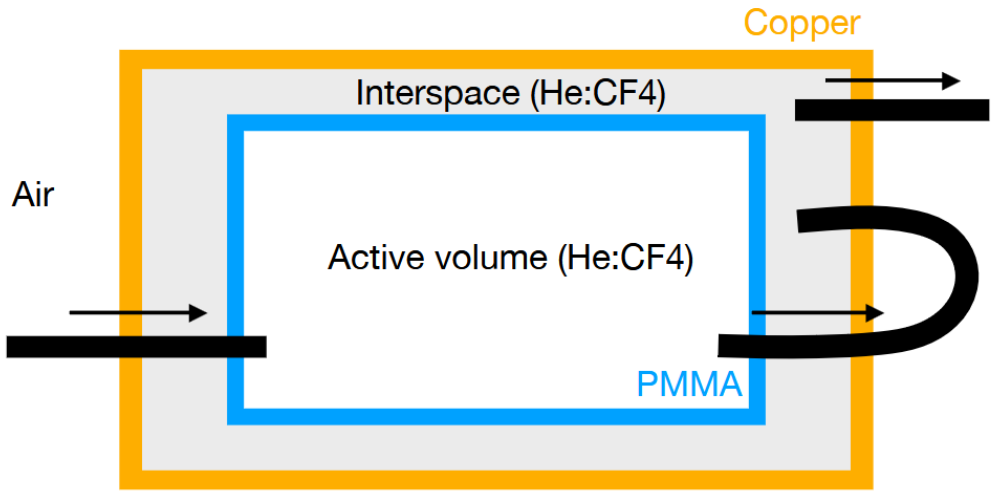
FEA ANALYSIS FOR THE COPPER VESSEL

Connection requirements

- To keep the differential pressure through the PMMA low, we need the connections to be low in impedance
- Still, we could desire a small pressure difference (a fraction of mbar)
  - "regulated" by number and length of pipes in between the two volumes

➡ tests of pressure drop through pipes and connections can be easily performed in labs and are desirable

➡ one could even consider a pressure drop "tunable" on site



Overpressure

The present gas system can perform an overpressure of about 2-8 mbar wrt the air pressure

IT IS IMPORTANT TO DESIGN THE COPPER SHIELDING TO WITHSTAND WITH THIS KIND OF OVERPRESSURE AND CONSIDERING A SAFETY MARGIN

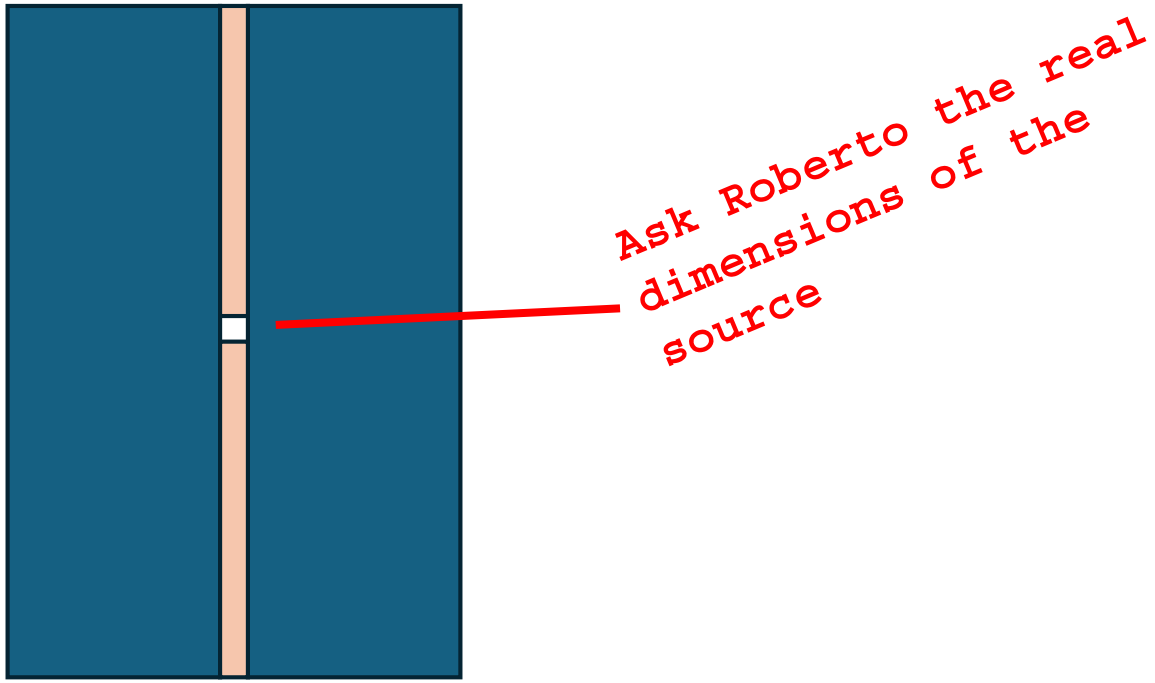
Pressure control

- At present, we control the **absolute pressure** inside LIME, but we regulate the set point so that the differential pressure against the atmosphere is always between +2 and +8 mbar.
  - To do that, a cross-calibration between sensors was performed, whose stability was never tested
  - Typical short-time fluctuations of the atmospheric pressure are ~ 3 mbar
- Without an upgrade of the system, pressure control within less than a few mbar has to be tested
  - To go below 1 mbar, we could need to switch to **differential pressure control** (change of sensors and firmware)

Port for source on neutron shielding

It is needed a port, see real dimensions on source (Roberto), on the neutron shielding (tanks). This port should be located in the middle of the cathode.

We can use a PE plate with a hole…



CONCLUSIONS FROM CAGLI

- The service project at LNGS was prepared by an external professional and approved by the LAB. Installation work will start on January 10th 2025.
- The procurement of radiopure raw copper plate was not awarded yet. The lead time for the copper plate delivery is 18 weeks.
- The recovery of copper slabs from OPERA is well understood. Even though a lot of work must be done yet
- The mechanical design of copper shielding (radiopure and OPERA) must be finalized to precede soon with the order for production
- ~~The cleaning method (IF REALLY NEEDED) for copper and PMMA must be decided and the order must be awarded soon because it will be time consuming and expensive~~…
  (Plasma cleaning only for the cathode)
- The design of the field cage is progressing. Small FC prototypes have been built for the GIN detector. Results are expected soon. More optimizations must be considered for the FC after the first tests.
- The acrylic vessel design is ongoing provided the limit of 135 kg mass. Windows for the test source have been designed. Samples of material from two different vendors have been requested, a first bunch is available and in preparation for measurements…
- The design and procurement of Polyethylene base must be done.
- The Neutron shielding design is ongoing. A smaller shielding has been built and installed for the LIME detector. Some other work must be done in the coming months…