

LXe R&D

Members (PhDs):

Vitaly Chepel (full time)

Vladimir Solovov (0.2 FTE)

Francisco Neves (0.15 FTE)

Info update

Funding

2022 – 2024: CERN/FIS-INS/0026/2021 -- FCT funding for participation in RD51 - LIP/UC/UA – 70 k€ / 2 years

2022 – 2024: RD51 Common Fund – LIP/UC/WIS – 36kCHF / 2 years

2024 – 2025: 2024.00269.CERN -- FCT funding for participation in DRD1 - LIP/UC/UA – 100 k€ /year for LIP; 25k€ for LXe group

Future oportunities/plans:

We are participating in the **DRD1** (Gas Detectors) and **DRD2** (Liquid Detectors) Collaborations with:

- Development of novel readout techniques (**Floating Hole Multiplier, novel Micropattern structures for electroluminescence in liquid xenon and argon**)
- LXe physics (**surface studies, electroluminescence in the liquid phase**)

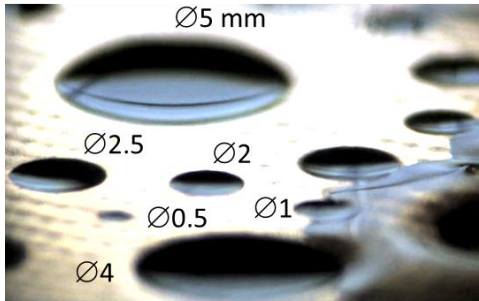
Will apply for support of our participation in DRD1&DRD2 (FCT/CERN; together with the collaborations if there will be a common proposal)

Current activities:

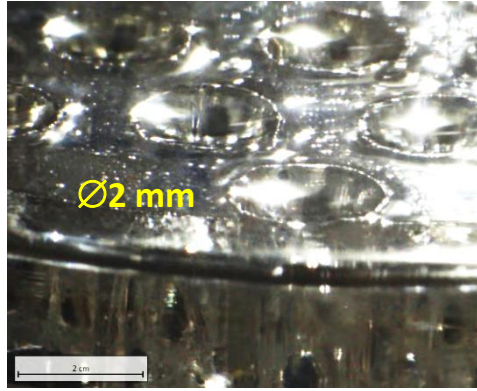
1. Floating Hole Multiplier – studies extended to LAr (LIP/AstroCENT)

FR4 1.6mm thick

PMMA 6mm thick (FAT GEM)



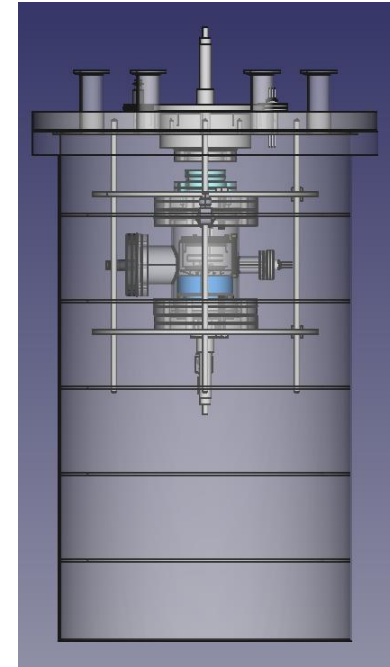
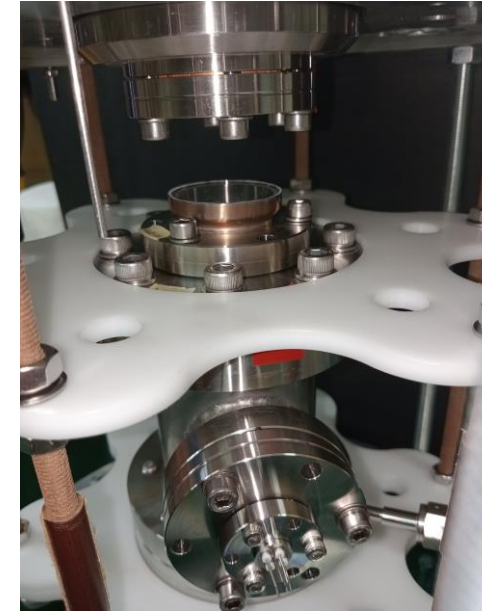
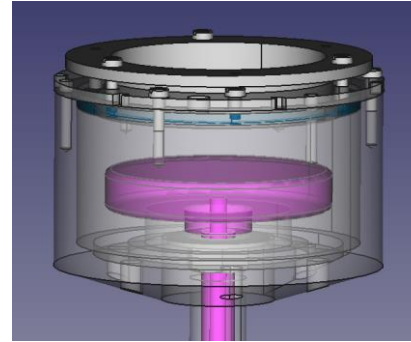
LXe



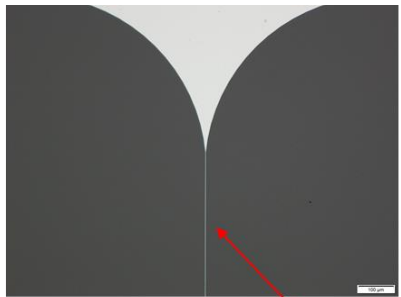
LAr

2. Liquid xenon surface studies:

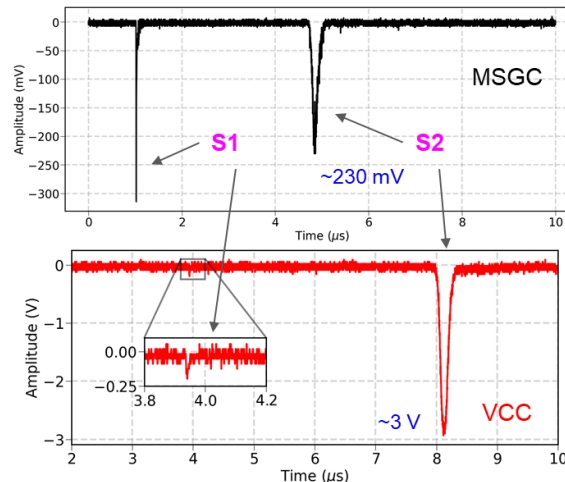
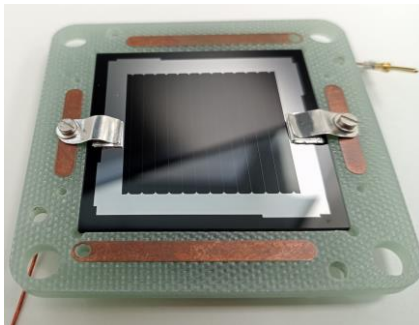
A new setup was designed and manufactured at the LIP workshop. The setup is being assembled at present; partially tested.



3. Electroluminescence of LXe with a Virtual Cathode Chamber observed for the first time (WIS/LIP)

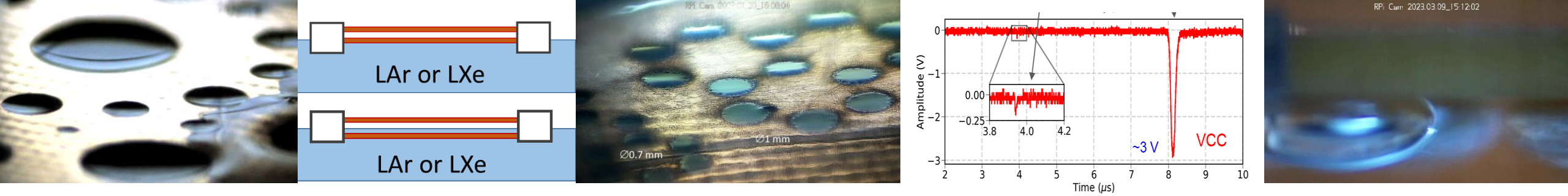


anode strip (Cr) 2 μ m wide



~ 500 VUV phot/e possible

although for a short period of time -- investigating



SWOT Analysis

Strength

Highly qualified members with many years of experience of R&D in the field of detector development.

Reasonable funding, at the moment.

Membership of DRD1 and DRD2 Collaborations; functional collaboration with other institutions.

Weaknesses

Limited availability of human resources. Heavy involvement of the group members in other activities and projects.

Opportunities

The weaknesses overcome, there will be an opportunity for sound contributions to the development of liquid xenon detectors and better understanding of the underlying physics, as well as to the development of novel technologies for the next generation of large scale liquid noble gas detectors for rare events, in particular.

Threats

Permanent funding uncertainty. Investment badly needed to renew the experimental base (vacuum pumps, gas purifiers, slow control, xenon dumping system, analogue electronics).