

Meeting CYGNO News

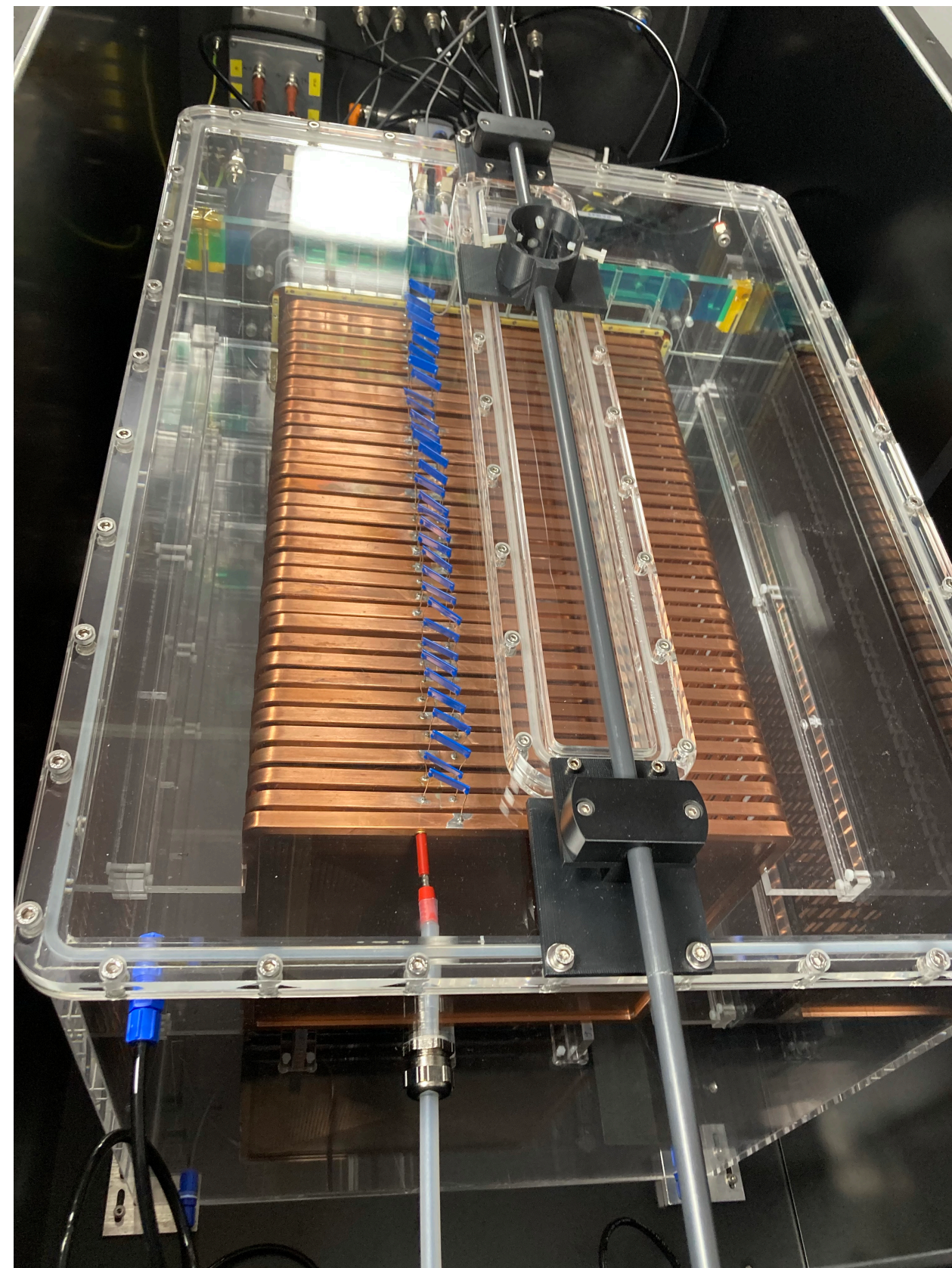
Underground data so far

RUN 1: No-shielding

From Oct 8, 2022 to Dec 6, 2022

- ➔ Integral number of **BKG pictures**:
 $\sim 4 \times 10^5$
- ➔ Background **observed event rate**:
 (33.88 ± 0.58) Hz
- ➔ Background **expected event rate** (from MC):
 ~ 37 Hz

$\sim 4 \times 10^6$ BKG events



RUN 2: 4 cm Cu shielding

From Feb 15, 2023 to Mar 9, 2023

- ➔ Integral number of **BKG pictures**:
 $\sim 4.5 \times 10^5$
- ➔ Background **observed event rate**: ~ 3.5 Hz
(data not fully analyzed)
- ➔ Background **expected event rate** (from MC):
 ~ 1.1 Hz



$\sim 0.5 \times 10^6$ BKG events

LIME: Run3

- Next Run will be devoted to study the neutron flux in the LNGS tunnel (in particular in LIME site);
- **10 cm copper shield installed;**
- We expect **100 external neutrons interactions per month;**
- Half of them with energy larger than **20 keV;**
- Crucial to perform a test with **AmBe** source to model the response to **neutron**
- It will be another and detailed point for **MC-data comparison;**



Plans

Gas **systems** showed several **some issues**;

Moreover, we were obliged to run with **20 l/h gas flow** that is **not affordable**

Filters against humidity and polluting contaminants are in place, next week we are going to start the recirculation and filtering stages

The LIME camera shown an hot spot never seen in other. We're going to test another and in case we replace it;

We'll probably make some preliminary DAQ test with LIME to check the trigger rate, shielding effects in the next week, but Run3 will start last week of April.

Papers

In 2022 we started several papers:

1. “Noise assessment in dark conditions of scientific CMOS sensors for the CYGNO Experiment”, c.a. R. Nobrega – second review
2. “LIME: overground characterisation” - C.a.: G. Cavoto - second review
3. “Electroluminescence from GEM avalanches in He-CF4 and He-CF4-isobutane for CYGNO – Directional Dark Matter search with an optical TPC”, c.a. C. Monteiro – second review
4. “Directional DBSCAN to detect cosmic-ray tracks for the CYGNO experiment”, c.a. I. Pains – first round done
5. “Modelling the detector response of the CYGNO optical readout TPC” (proposed title) – c.a. F. Petrucci - first draft in preparation
6. “Negative Ion Drift” – c.a. E. Baracchini – first draft in preparation
7. “Electro-luminescence: latest results with ITO” – c.a. G. Dho - first draft in preparation
8. “Underground background simulation for CYGNO-04” – c.a. G. D’Imperio - first draft to start