

Summer summary and plans

GAS System

We discovered and fixed an important leakage on the detector gas piping;

- now it's possible to flush the gas with a rate of few litres/hour (reduction in consumption and recovery volume);
- PMT should be in more safe conditions;

Still present a malfunction on the booster compressor: i.e. not efficient behavior of the recovery circuit;

Moreover, in last weeks, we had several (fake?) alarms (6/06, 19/06, 19/07);

On the 4th of August, the system was sent back to Air Liquide for repair;

Almost nothing happened so far;

A couple of days ago Air liquide evaluated at least 30 working days.

LIME

LIME has taken data for almost 1 month in different conditions;

So far it was not possible to calibrate CMOS and PMT with the ^{55}Fe source;

We are working to solve last technical and bureaucratic missing parts;

We are also starting the procedure to have the AmBe source for underground tests in LNGS;

In the meanwhile, we'll calibrate new 4 PMTs at LNF to substitute the "helium-damaged" set after the summer;

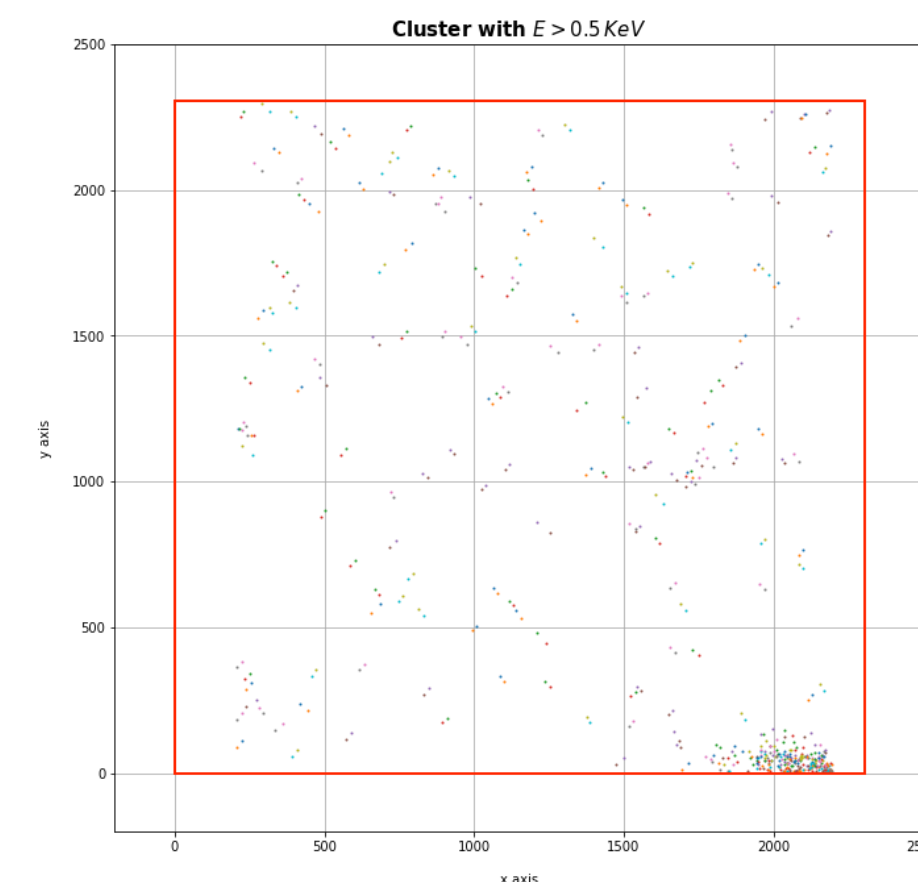
LIME is now OFF and it will stay like this in the next 4 weeks at least;

LIME plans

LIME is now OFF and it will stay like this in the next 4 weeks at least. In the meanwhile...

- **conclude** the **site setup** (install CMOS water cooling system, remove LIME trolley and install the final system “shield compliant”);
- **upgrade DAQ** and **slow-control** systems to reduce dead time;
- **finalise** the optical system **focus** and **alignment methods**;
- take sensor-blind pedestal runs to compare with those taken in July to check the source of some hot corner (light?)

- fake clusters with more than 0.5 keV



Data Analysis

A complete list of acquired runs is available here:

http://Inf.infn.it/~mazzitel/php/cygno_sql_query.php?table=on

The most “significant” ones are the one with the tag:

S000:DATA:BKG,trigger with at least 2 pmt

With PMT gain equalised. HV: 730, 895, 785, 895

All runs in the interval 1700 - 2280 (22/06 - 6/07) were reconstructed.

Are there volunteers for the analysis?

DAQ

We are currently running a simple TDAQ version;

We should upgrade it to:

- mitigate the effect of “images” cut by the CMOS working mode;
- integrate the Herman trigger module (HTM);
- operate the HTM via Midas;

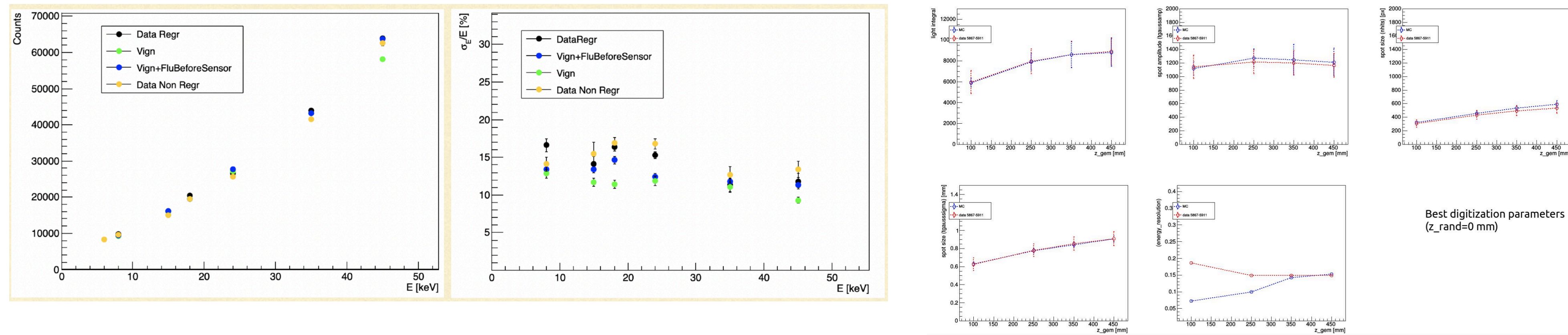
Development and tests to be performed in LNF and then moved to LNGS;

We have to start developing the CYGNO-04 TDAQ system;

Herman and Rafael will be in Italy at the beginning of October;

LIME response simulation

There was a lot of work by the Simulation team in last months;



Linearity very well reproduced. Energy resolution, better than exp data, probably some issue on data analysis, we are accepting it;

Flaminia simulated the background spectrum in LIME;

Mariana is simulating the PMT response;

ToDo: integrate all of them to simulate LIME response (CMOS+PMT) underground, taking into account the particle rate and pile-up;

CYGNO 04

TDR was submitted to INFN and LNGS Scientific Committee:

<https://drive.google.com/file/d/1kdzVPeHHHJ3N3jK3xcFd6v-NwKJniqs6/view?usp=sharing>

Many thanks to all people who contributed and in particular to Giovanni who took care of all the coordination;

Yesterday we had a 3.5 hours meeting with referee about the CYGNO plans:

<https://cernbox.cern.ch/index.php/s/djOUy288qGjK3pv/download>

There were some remarks about some details still missing in the TDR, mainly related with radioactive budget expectations and the all procedures needed to systematically moderate it;

Anyway we all agreed that in order to be able to properly use ERC funds, we hadn't had time so far and something will be studied and learned during the detector production;

On Tuesday their report will be presented at the CSN2 meeting;

Pending papers

<https://airtable.com/shrzOTHNqWQ6tARSi/tbl3ESqx7hsxsv9EQ/viwxnTfCi1tZR5xRa?blocks=hide>

Usual table seems quite out of date;

- LIME: overground performance, c.a. Luca, expected by September;
- Electro-luminescence: latest results with ITO, c.a. Giorgio, expected by December;
- CMOS-Noise: study of pedestal stability of different CMOS, c.a. Rafael, expected by September (?);
- Hydrocarbons: study of GEM light yield with Isobutane (and Methane?), c.a. Cristina, expected by September (?);
- CMOS-Performance: study of light yield of different CMOS, c.a. Rafael, expected by December (?);
- Optical signal simulation: method developed to simulate signals and comparison with ^{55}Fe , c.a. Fabrizio, expected by December (?);
- Underground background simulation: background expected in CYGNO-04, with different shields, c.a. Giulia, expected by beg. 2023 (?);