



***Reconstruction & analysis
activities***

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CYGNO reconstruction & analysis meeting

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- We have discussed recently a (non-exhaustive) list of activities:

1. Analysis of data taken with LIME:

- AmBe , ^{137}Cs and ^{55}Fe sources, and data with no source
- Possible objectives:
 - optimize and improve the reconstruction algorithm in presence of high occupancy
 - better noise suppression
 - iterative reconstruction (cosmic first, long recoils second, then the rest)
 - unification of clustering + superclustering steps
 - change of clustering approach (e.g. directional iDBSCAN)
 - Study the efficiency, rejection, energy resolution of LIME (i.e. repeat the analysis done with LEMON of the AmBe paper)
 - Study the directionality power
- People interested / involved already:
 - Igor A. and P., Rafael
 - myself, Davide, Gianluca and Giovanni
 - Samuele, Atul: welcome ! => we can define an attack plan soon

2. Directionality on LEMON

- it can go in parallel with the same analysis on LEMON, but this can start now. Data are well known, the reconstruction is oiled and it is an easy start for newcomers
- it can be an offline analysis using the ntuples already made
- possible candidates are *Samuele and Atul*

3. Study of the saturation

- use the LEMON and LIME data, and recover the study of Francesco & Karolina
- test the correction on LEMON integrating it with the current code (50% done)
- **continue the study on the LIME data and possible detector corrections**
- natural candidates: *Francesco R., Davide, Karolina*
- I can help with the integration in the code

4. Migdal effect:

- start with the LEMON reconstructed data (low expected rate) and old FNG data (high rate)
- **eventually go to FNG again**
- natural candidates: *Andrea M. and Co.*

- Reconstrcution code is in <https://github.com/CYGNUS-RD/reconstruction>. Two branches:
 - **lime_2020**: the current one for developments
 - **dev20py3**: the one for LEMON reconstruction
- Running it: out-of-the-box locally, but more data need more resources.
- I have a setup to run in batch at LNGS batch system, but it's black-magic. **Working to centrally install all what is needed there (ETA: next week)**
- What is there already:
 - a cygno NFS directory with custom software (python3.8, ROOT6 recompiled, GEANT4, etc.): /nfs/cygno/software
 - /nfs/cygno can be used for temporary data storage (e.g. download the file to analyse, then remove it)
 - a cygno “reserved” batch queue (it uses PBS batch manager, i.e. qsub). Also the general queues can be used
- I have also a setup to run on Rome1 farm of “piccoli esperimenti”. If LNGS works cleanly, I would just move everything there and keep that for backup

The End