Pre-flight Limadou HEPD performance tests

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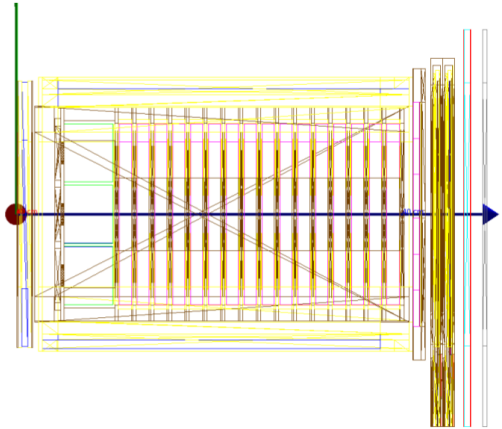
Performed beam tests



The LIMADOU-HEPD has been tested to fully characterize its performances:

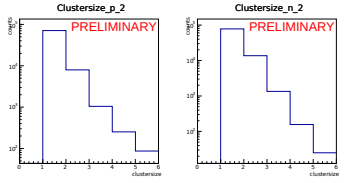
- Tests with cosmic muons (multiple runs. Different locations);
- Tests with electrons (October, 2016. BTF Frascati IT);
- Tests with protons (November 2016, APSS Trento IT).

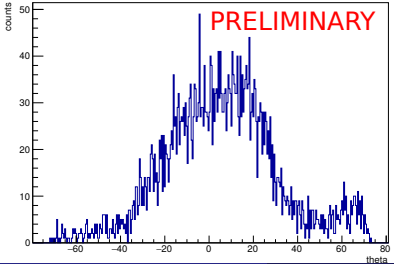
The results of the tests allow the collaboration to fully characterize the detector performances, with a particular attention to the tracker and the upper calorimeter. In this presentation I will show the main results about the detector performance.

Muon acquisitions results

Multiple runs of data taking have been acquired with cosmic muons. The cluster size and a preliminary angle reconstruction are reported.

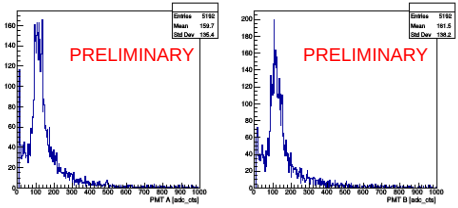
TRACKER

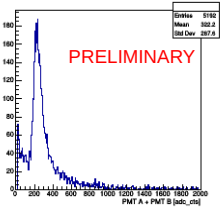




UPPER CALO

Credits: V. Vitale



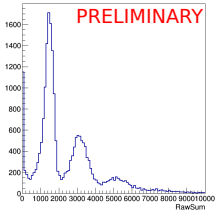


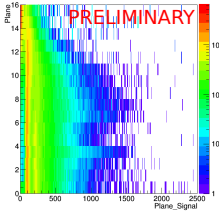
BTF Frascati Tests

The explored energy range at BTF goes from 30 MeV to 120 MeV.

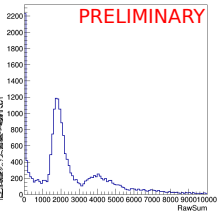
Credits: V. Vitale

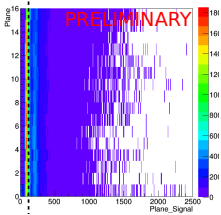
30 MeV





90 MeV



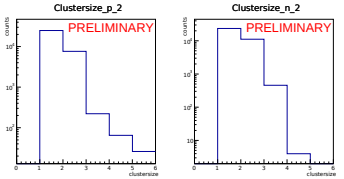


- Electrons above 30 MeV escape the upper calo and are stopped by the lyso crystals;
- The obtained data are used to calibrate in energy the calo response;
- Equalization for trigger bars and calo plane have been calculated and implemented in recontruction software;
- The number of peaks in energy distribution are due to events with high multiplicity.

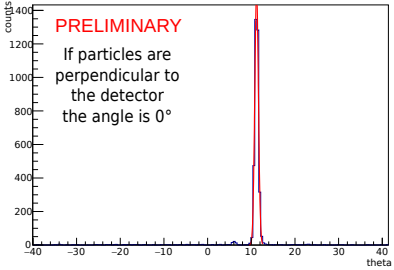
APSS Trento Tests

The energy range for protons goes from 30 MeV up to 230 MeV.

TRACKER



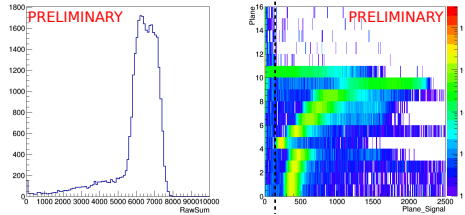
theta_central_ladder_n



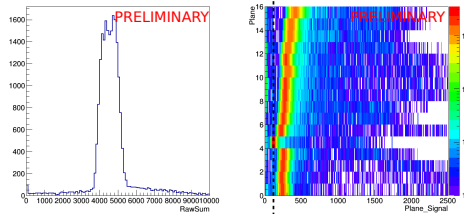
UPPER CALO

Credits: V. Vitale

125 MeV



202 MeV



Conclusions

- The pre-launch tests allow a full characterization of the detectors;
- For the tracker:
  - The track reconstruction capabilities have been tested and validated;
  - The energy release has been characterized to perform particle identification.
- For the calo:
  - We used the data from the test beam for energy calibration;
  - All the sub-section of the calo have been fully characterized.
- We are now ready for the launch and waiting for the real work to begin!