Update on proto 2

SuperB La Biodola meeting

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The menu

- Cosmic data
- Resuming run after BTF exposure
- Cosmic pre-BTF after-BTF comparison
- Energy loss vs. absorber
- Conclusions and outlook

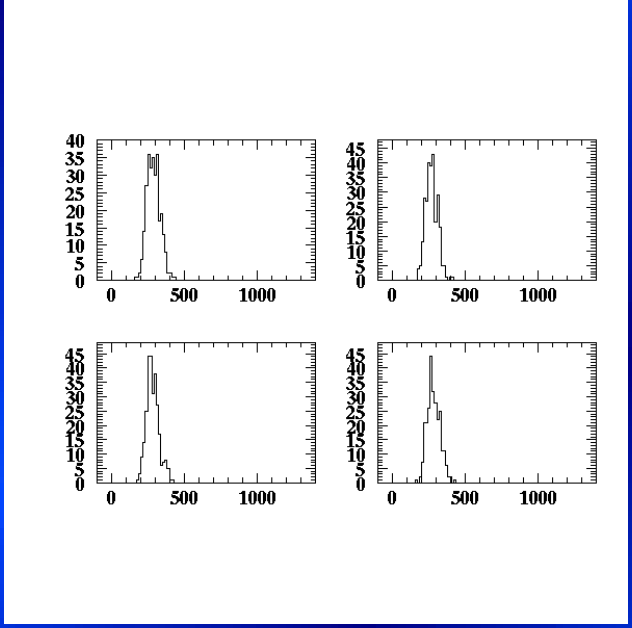
Cosmic data

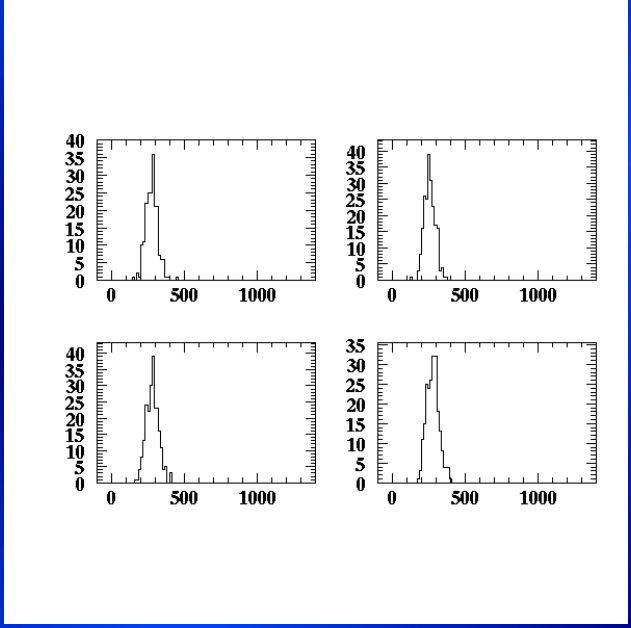
- Moving back from the BTF beam line, was quite rocky.
- The re-commissioning of the external tracker was painful and unsuccessful.
- We decided in the end to drop it.
- We had to reconfigure the analysis software.
- In the end, we, since a couple of weeks, have a relatively stable situation.

A comparison with earlier data

- Given the hardware/software reconfiguration our first worry was to check the before/after situation:

Pre-BTF



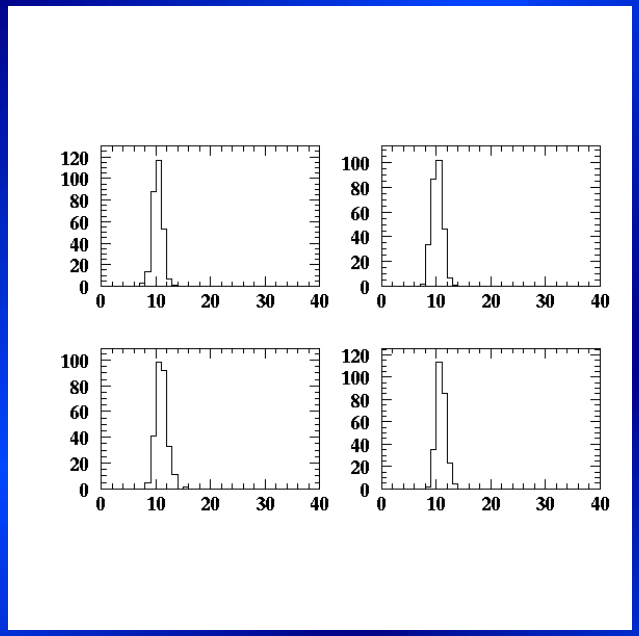


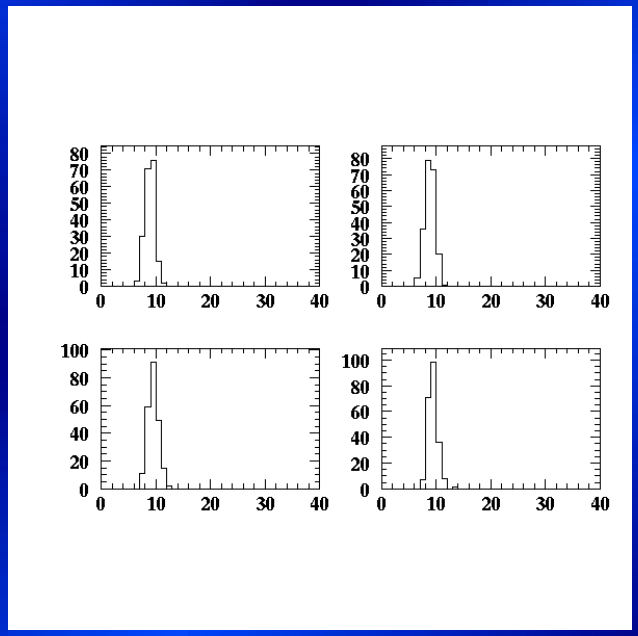
Post-BTF

A comparison with earlier data

- Here is the same comparison for number of clusters

Pre-BTF

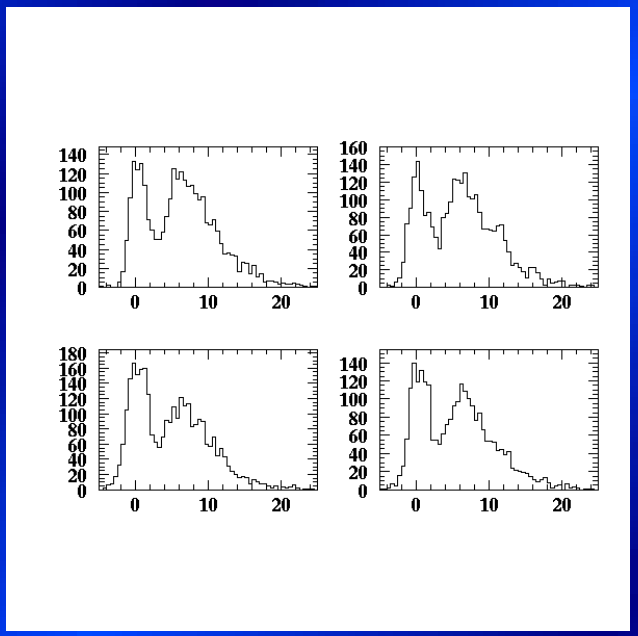


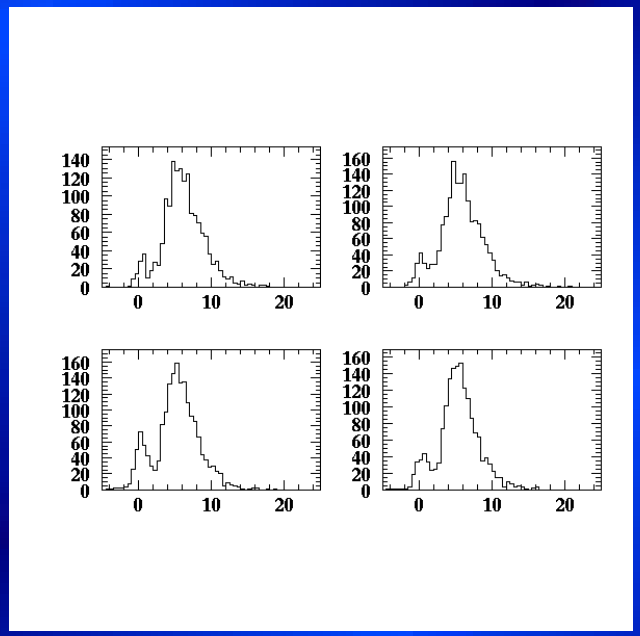


Post-BTF

Single cluster charge

Pre-BTF





Post-BTF

Reliability of the setup

- The amplitude and # of cluster before and after the BTF trip are consistent.
- Corrections due to temperature effect NOT applied yet.
- Quite convinced that gas mix during the BTF running, different from the one we used on cosmic running.
- New calibration on flow controllers show some malfunctioning on the ones used at BTF.

The new cosmic data

- As mentioned at the beginning the old external tracker decided to quit.
- Need to track with the proto itself.
- Some new software has to be written mainly to have some pattern recognition on the proto.
- On the bright side, the (chamber) trigger implementation is working , so at least one order of magnitude on data collection rate is practically available.
- Some extra hardware MUST be added to measure at the level of 10 cm. the longitudinal coord.

First attempt to see p dep. on dE/dx

- Once the detector had settled down, we tried, as first measurement, to check if we could detect a momentum dependence on energy loss and/or # of detected clusters.
- We refurbished our system with some absorber (both Fe and Pb) filling the space originally used by the external tracker.
- The following slide shows the actual situation.

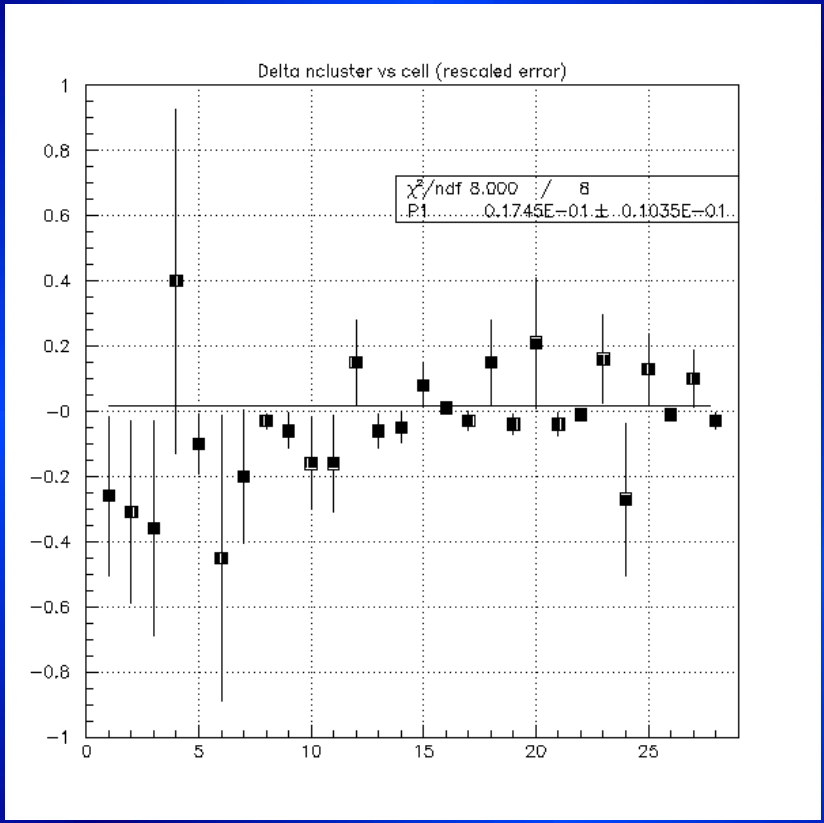
As of now.

Absorbers runs

- We tried a variety of thicknesses on different spatial configurations:
  - 10 cm Pb
  - 20 cm Pb
  - 16.5 cm Fe
  - 16.5 cm Fe + 10 cm Pb
  - 22.5 cm Fe + 20 cm Pb

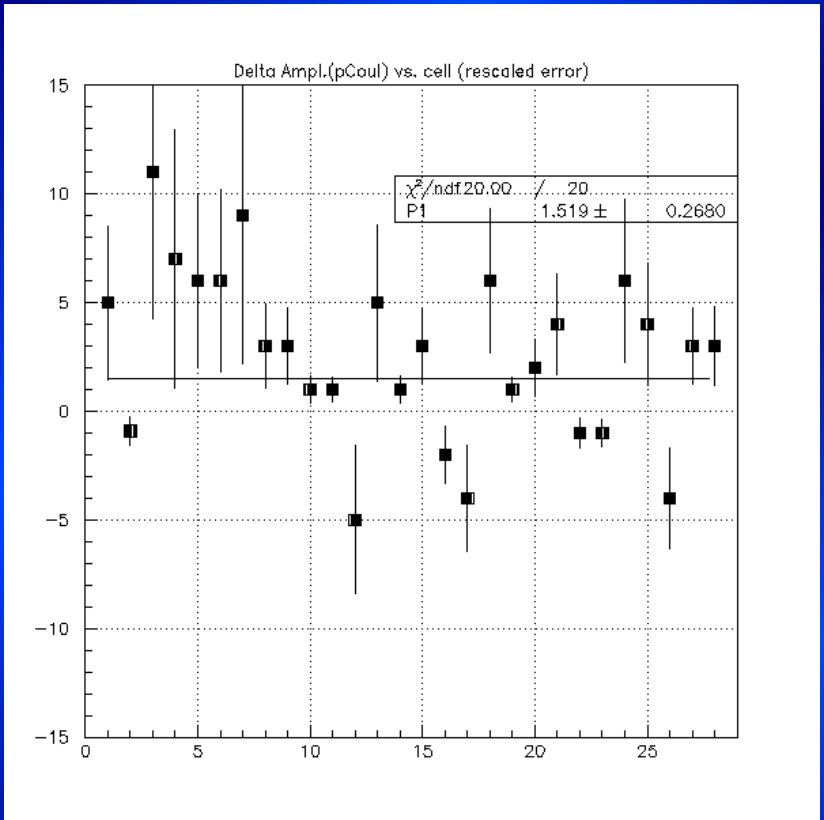
If we change p_cut

Δ ncluster : N- p>600 MeV/c – N-p>220 MeV/c



If we change p_cut

Δ dE/dx : dE/dx-p>600MeV/c-dE/dx-p>200MeV/c



Is that realistic ?

- Do we have any supporting evidence that the difference between a momentum cut of 220 MeV/c and 600 MeV/c should produce a nil effect ?
- If we look at the trigger rate in these two cases, we'll get an indication on how much of the momentum spectrum we cut away .
- The two rate figures are 0.1965 and 0.173.
- If on uses the ***analysis retained*** triggers one finds 0.126 and 0.104.

How do we proceed

- Need to select a momentum band : just changing the lower cut on momentum won't work.
- Can be done adding an extra absorber and an anti counter.
- Need a substantial improvement on counting rate. (using long scintillation counter with Δt measurement capability to get z).
- If a precise t0 (4-5 nsec.) can be obtained from the proto itself, 2 long counters may suffice.

Conclusions/outlook

- Proto-2 is alive and kicking.
- Data collecting rate on cosmic will be upgraded substantially in the coming weeks.
- I believe that, as soon as the trigger upgrade will be operational, some correlation between p and dE/dx and a first measurement of the analyzing power will be on hand.
- We will also try for an other BTF run in the summer.