

2020 cosmics

Guang Yang

Cosmics with superFGD prototype

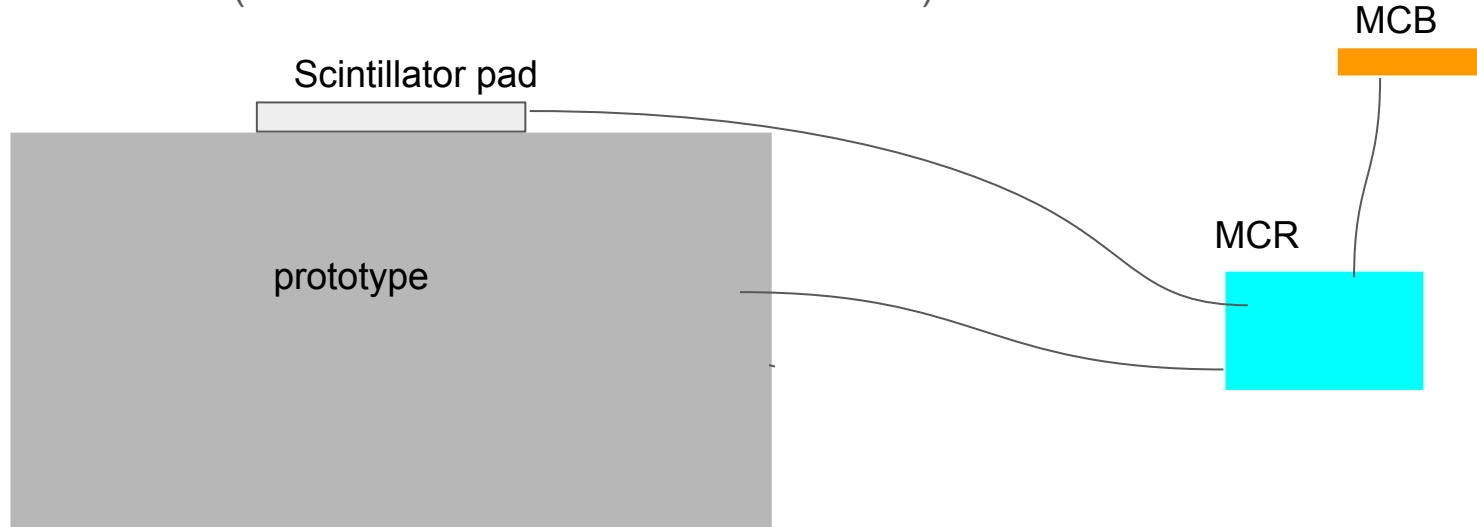
- This is the data set since a week ago
- Trigger: set to almost very high duty cycle
- Data taken for a couple of days (8-10 hours per day) in air conditioned environment
- Temperature sensors applied recently (two days ago), not used in this quick check
- I looked at a run with less than 10 mins so stat. Is not good enough. A later analysis with all runs will be needed.

Detector setup

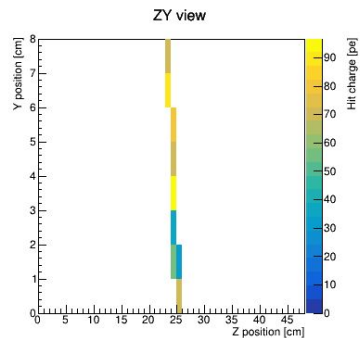
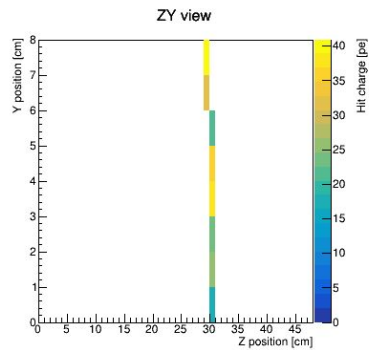
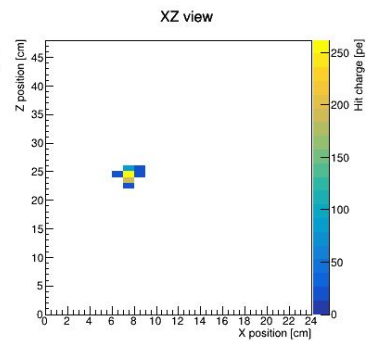
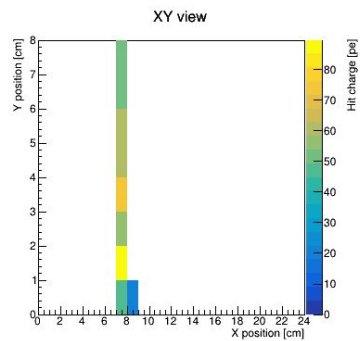
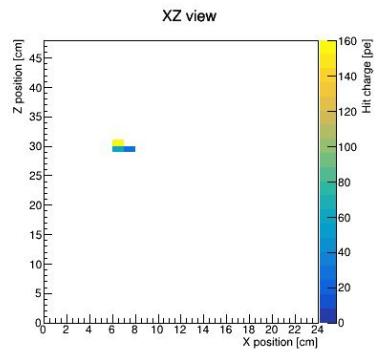
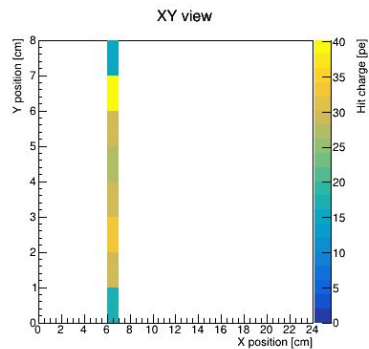
MCB trigger is almost covering all the time

The cosmics used the scintillator pad (22 cm x 18 cm area) to trigger a time window of 200 ns.

Results look reasonable (at least 80% of them look like cosmics)

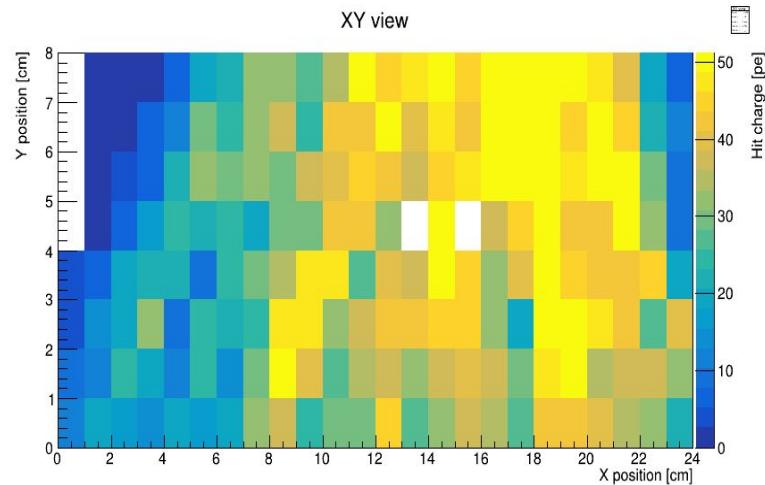
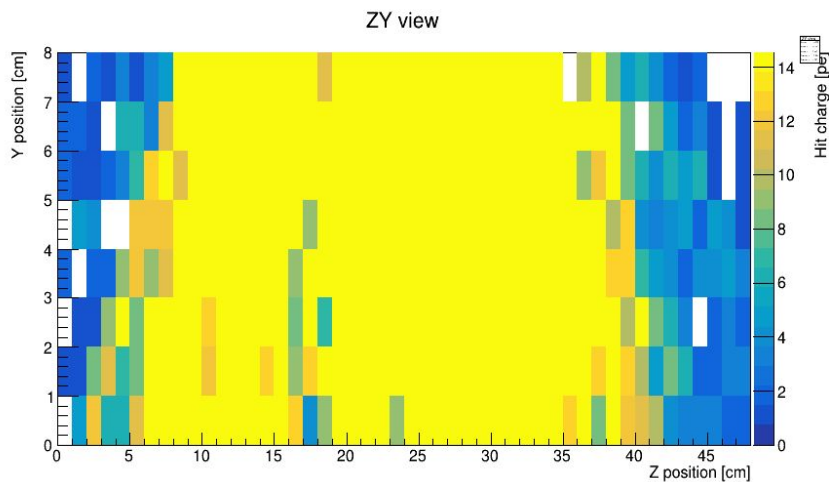


Displays



Entire < 10 min run

You can basically see the pad location



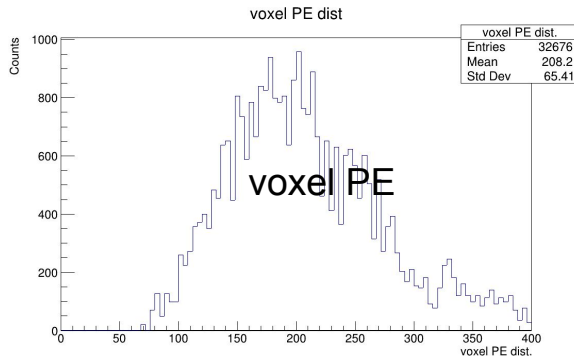
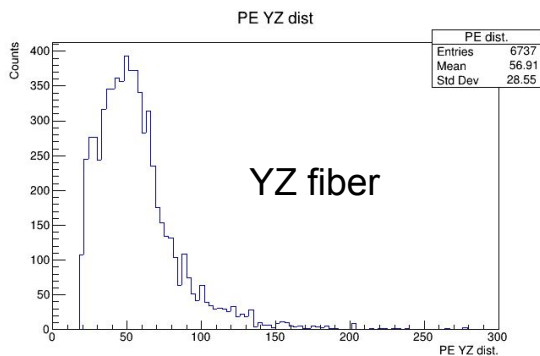
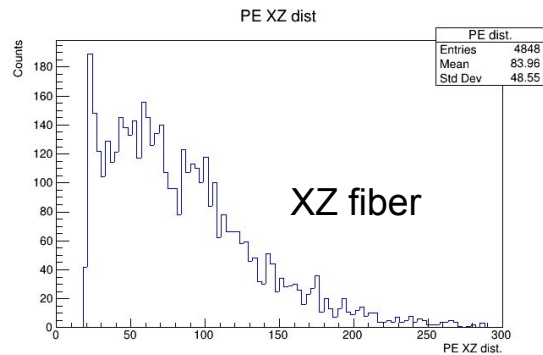
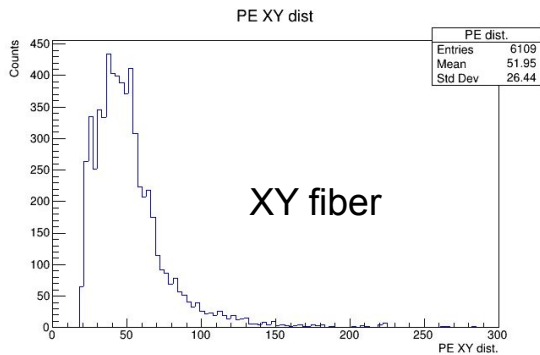
Event selection

Going through the reconstruction package :

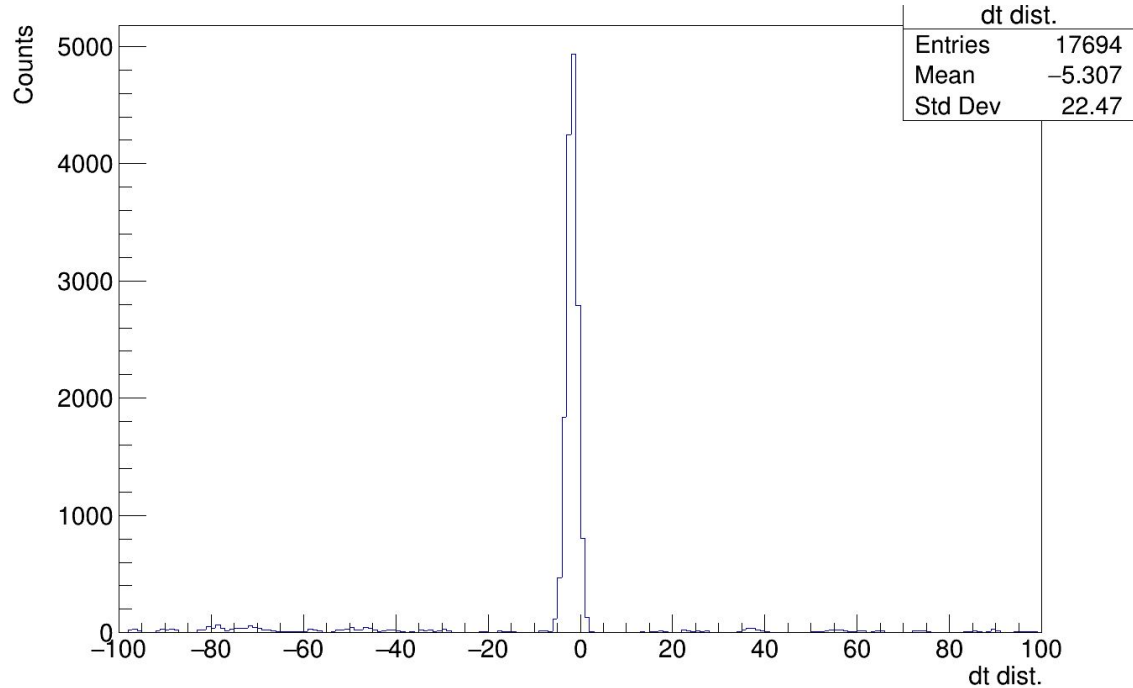
- Single time cluster within 20 ns
- 3D voxelization
- Single spatial cluster
- Number of voxels between 6 - 12 (quite arbitrary)
- PCA Linearity > 0.9

Excluding the number of voxels cut, the efficiency is about 80%

PE distributions (with CERN gain calibration)



Time distribution since the scintillator pad t0

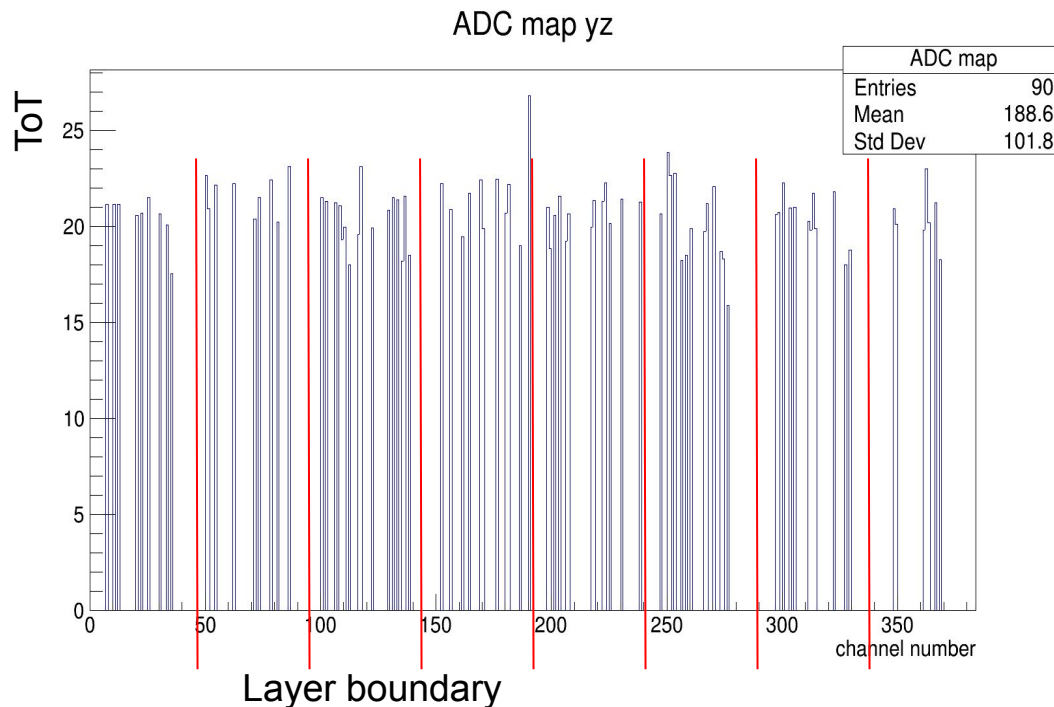


Calibration for each channel

Plot tot as an example

More sample can provide a calibration for all channels

Require at least 5 events for each channel so a lot them are missing here.



Time resolution

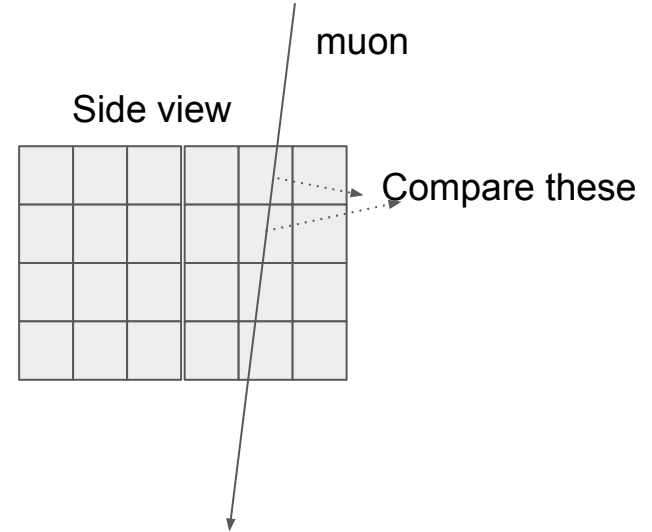
Require same xz location for different y layers

Look at two adjacent x fibers

The voxel total PE between 180 and 220

The difference would tell the time resolution

Need more samples to obtain this result



Summary

A lot of comics have been taken and a variety of studies, especially calibration can be done with them.