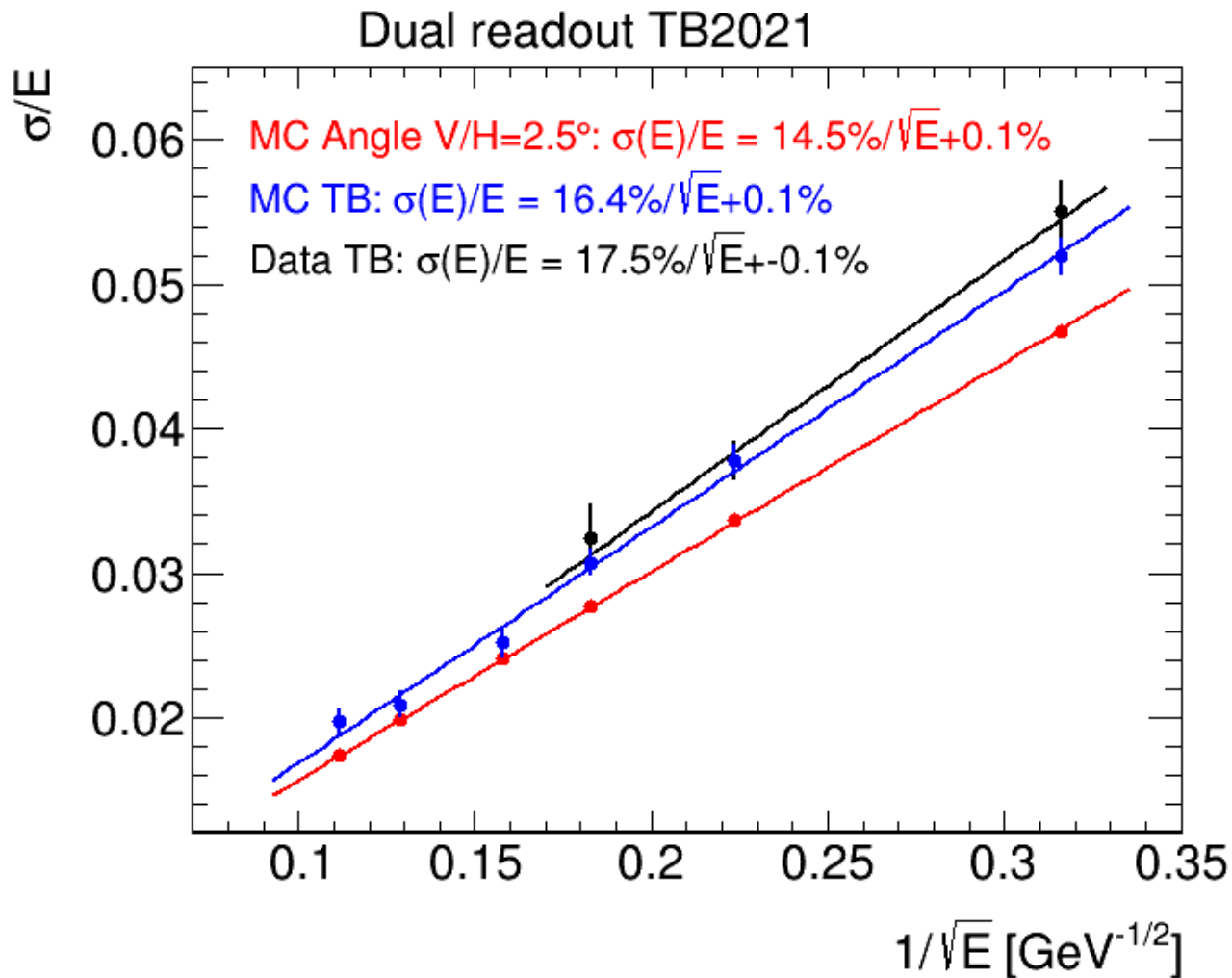


Progress on tb analysis

Giacomo Polesello
INFN, Sezione di Pavia
On behalf of the Pavia group

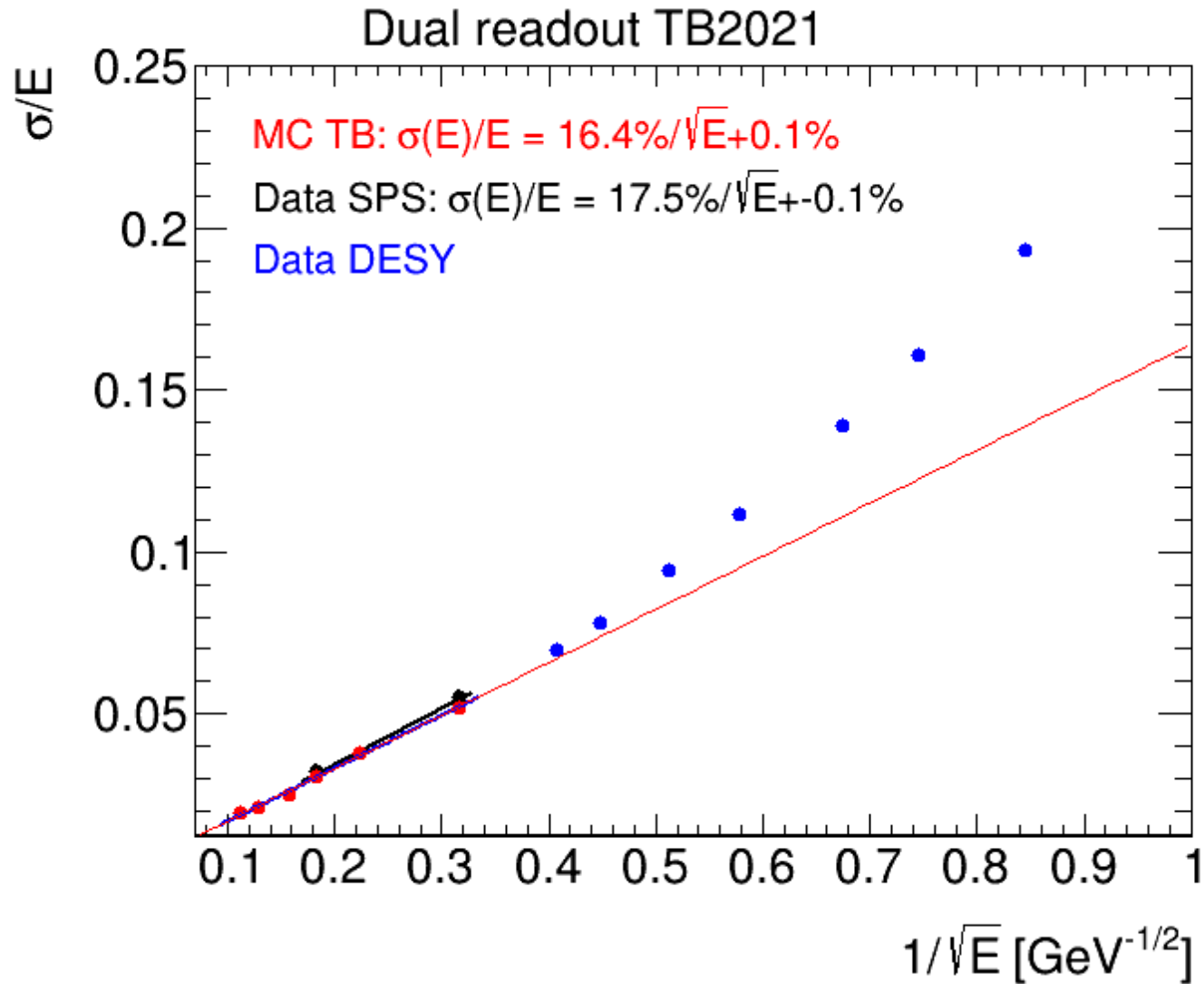
Work in progress slides!!

Update to new standard production



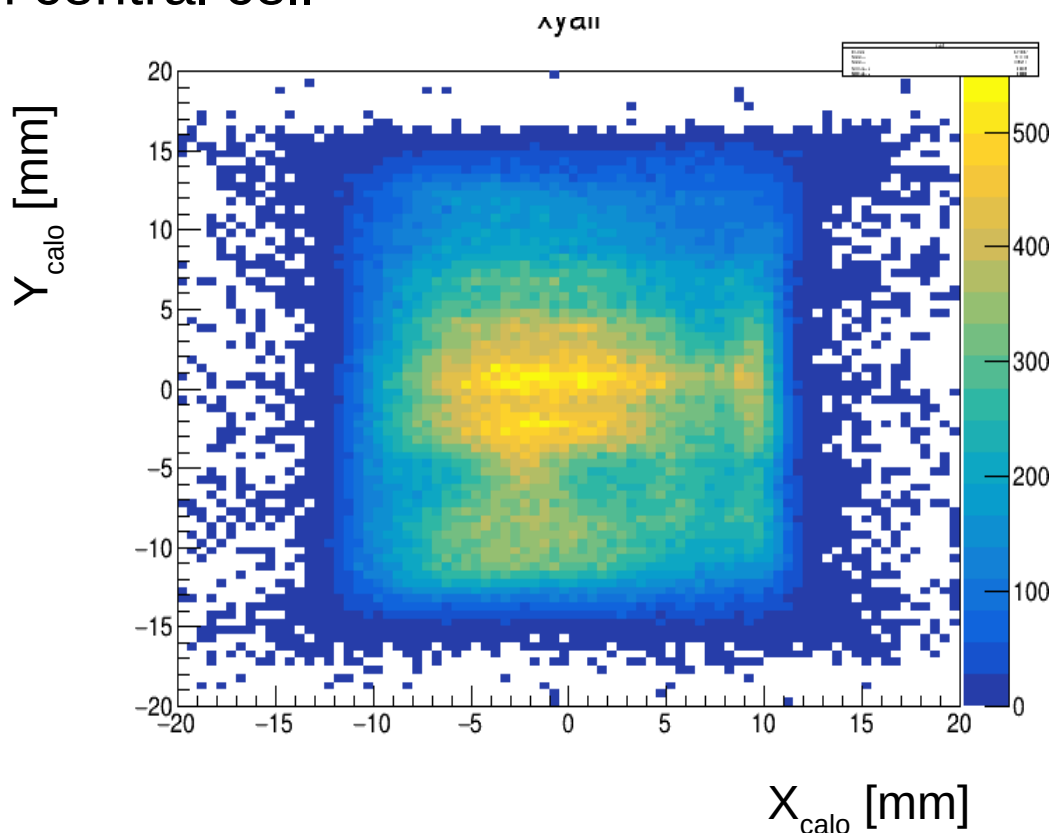
Three data points with large error: large uncertainty on fit parameters

Can we add new points from DESY?



Defining a fiducial

No external detector: rely on barycenter of energy deposition
In central cell



Run 180 6 GeV

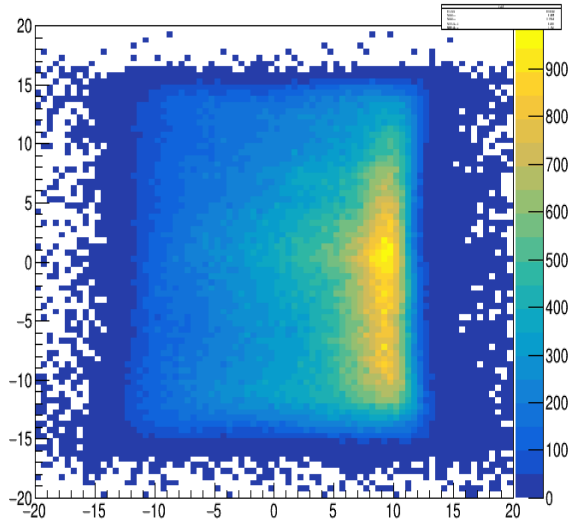
Structure in barycenter
distribution needs
investigation

In X direction require $X_{\text{calo}} > -1$ mm && $X_{\text{calo}} < 1$ mm

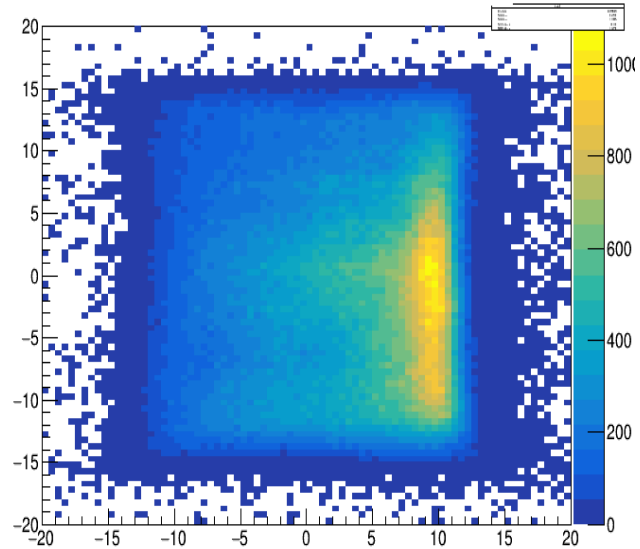
In Y direction require $|Y_{\text{calo}}| < 3$ mm

Beam position seems rather unstable

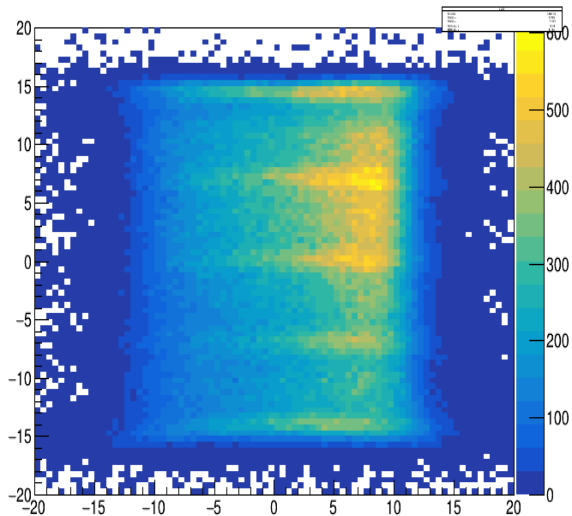
Run 196 3 GeV



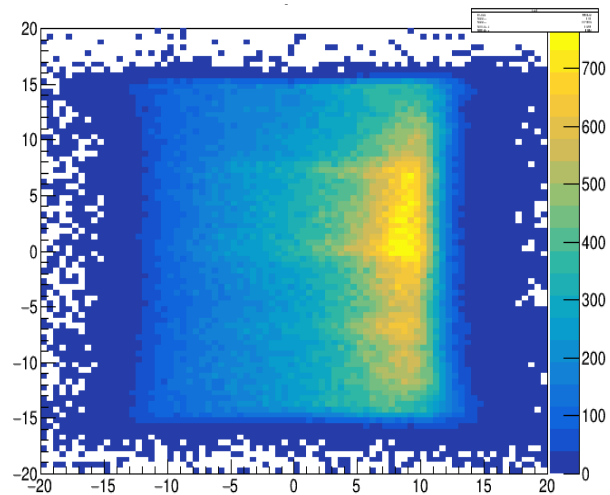
Run 194 3.8 GeV



Run 201 1 GeV

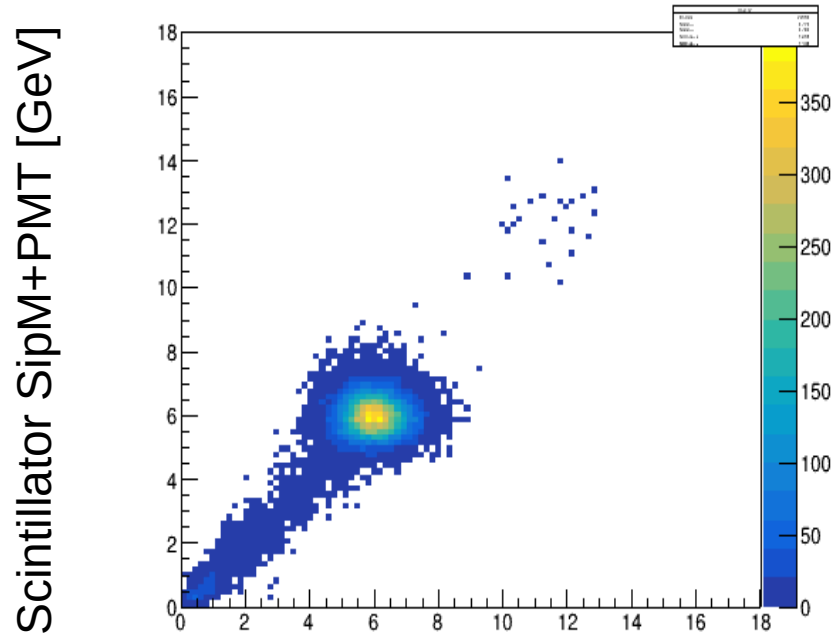


Run 19 1.8 GeV

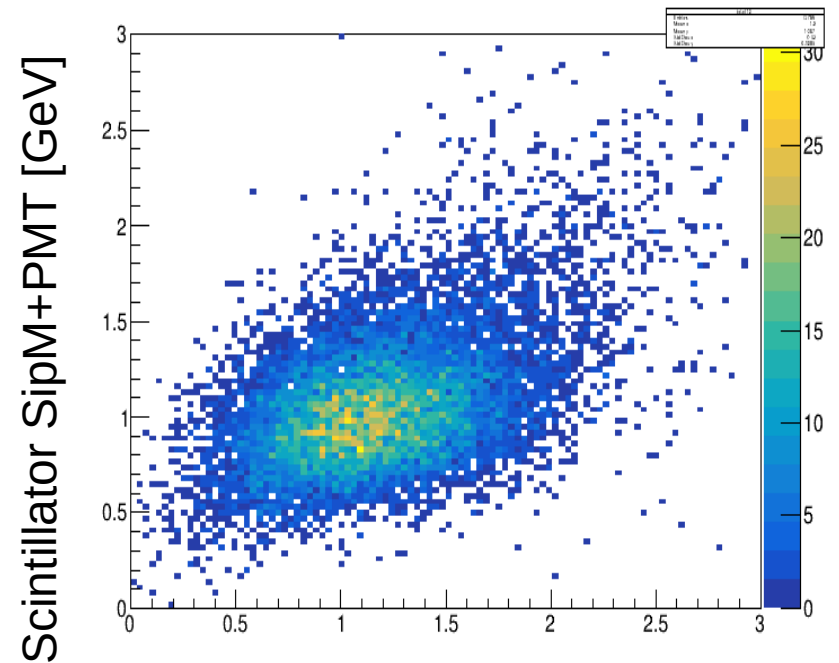


Pileup

Run 180 6 GeV



Run 201 1 GeV



Cerenkov and Scintillator after all corrections

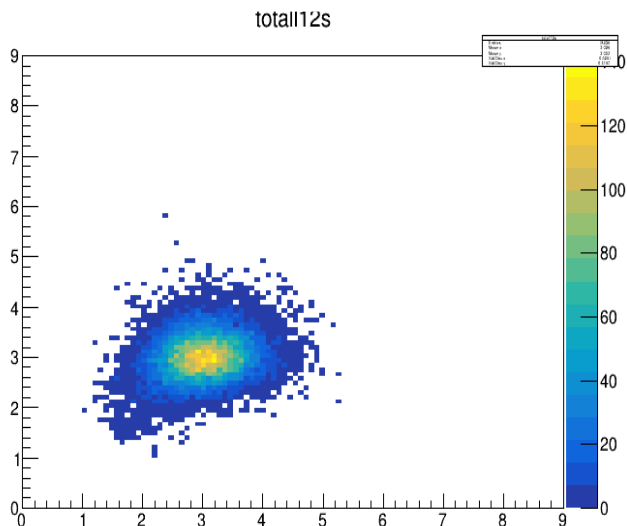
Larger pileup at low energies, and difficult to disentangle from main signal

Also issue with tails to low energies

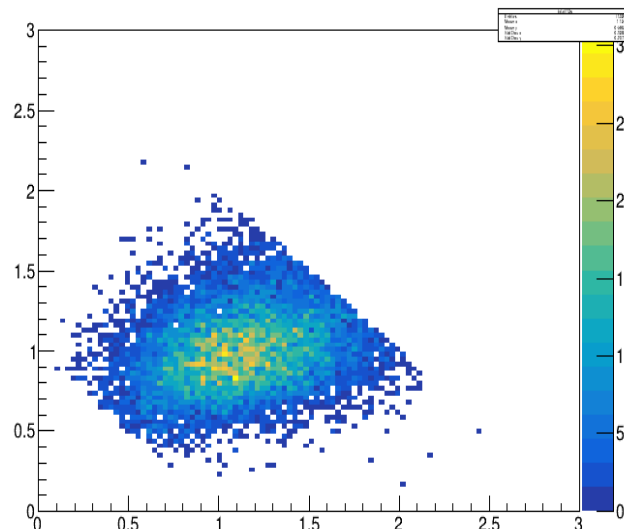
Use cut $ENE < CER+SCI < 3 ENE$ with ENE nominal beam energy

Scintillator SipM+PMT [GeV]

Run 196 3 GeV



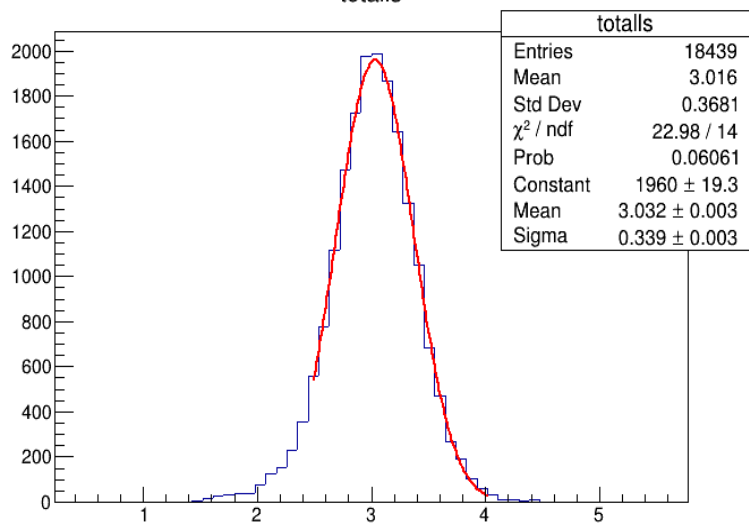
Run 201 1 GeV



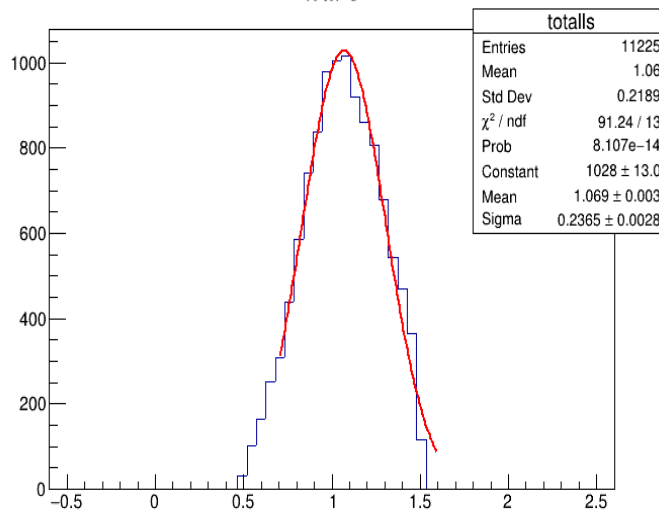
Trying to remove
Pileup distorts peak
At low energies

Cerenkov SipM+PMT [GeV]

total12s



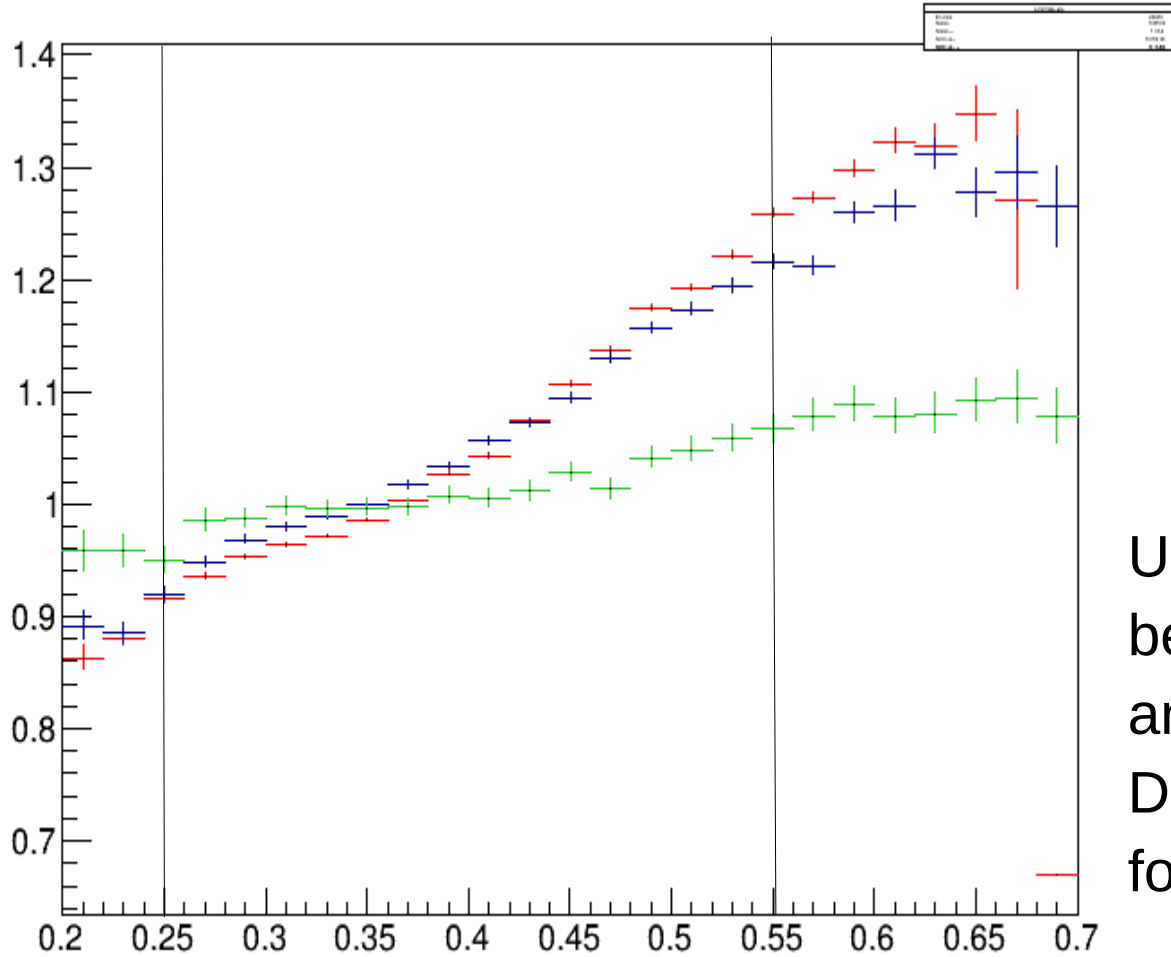
total12s



$(CER+SCI)/2$ [GeV]

Correction factor for y dependence

scisrowsratp



Red: 6 GeV
Blue: 3 GeV
Green: 1 GeV

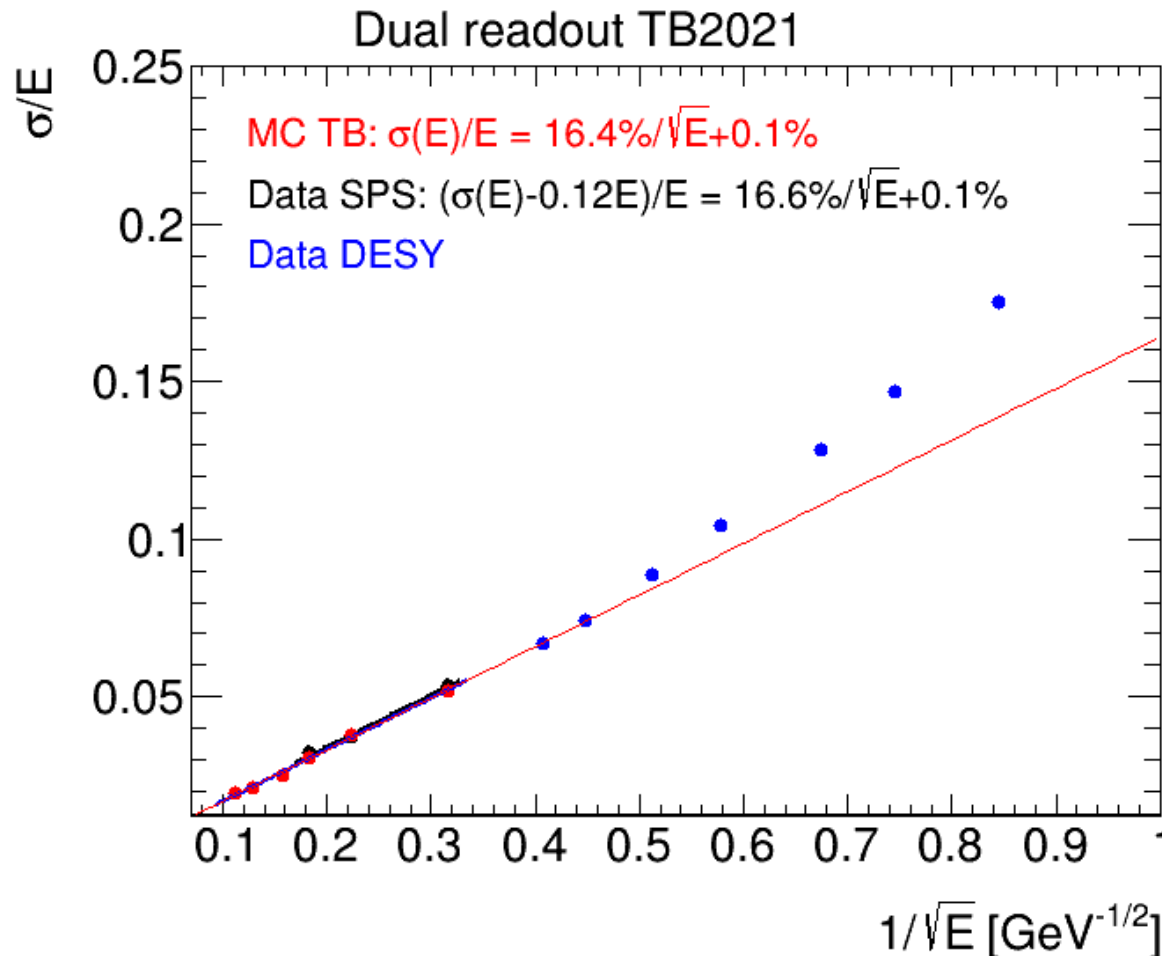
Universal
between 6
and 3 GeV
Does not work
for 1 GeV

SCI ene in cell 0 normalised to MC energy deposition

Ratio of hottest sci row to total sci

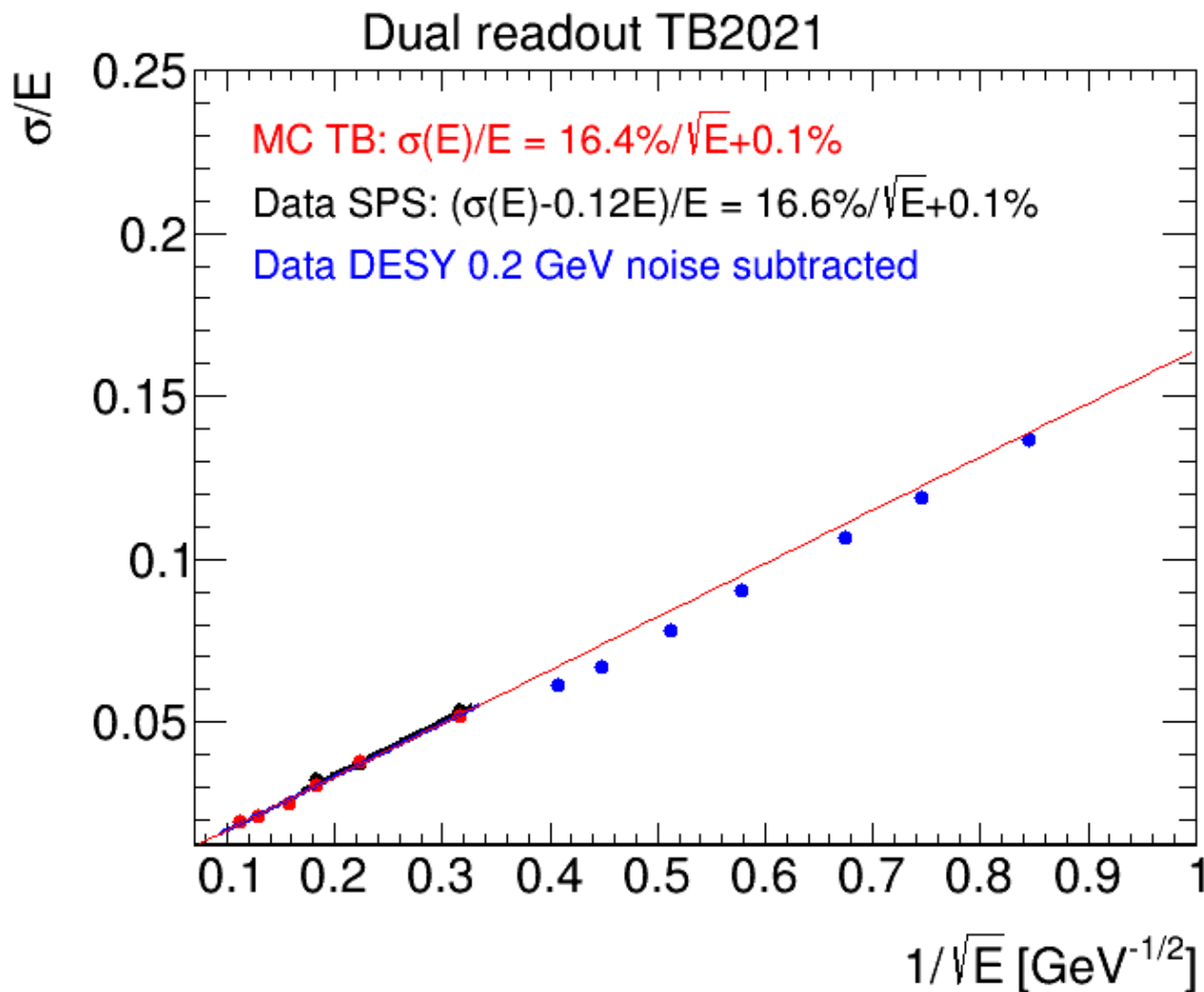
Can we correct resolution with a noise term?

Try a 120 MeV noise term ($0.12/E$) for both SPS and DESY in quadrature



Excellent fit
only down to 5 GeV

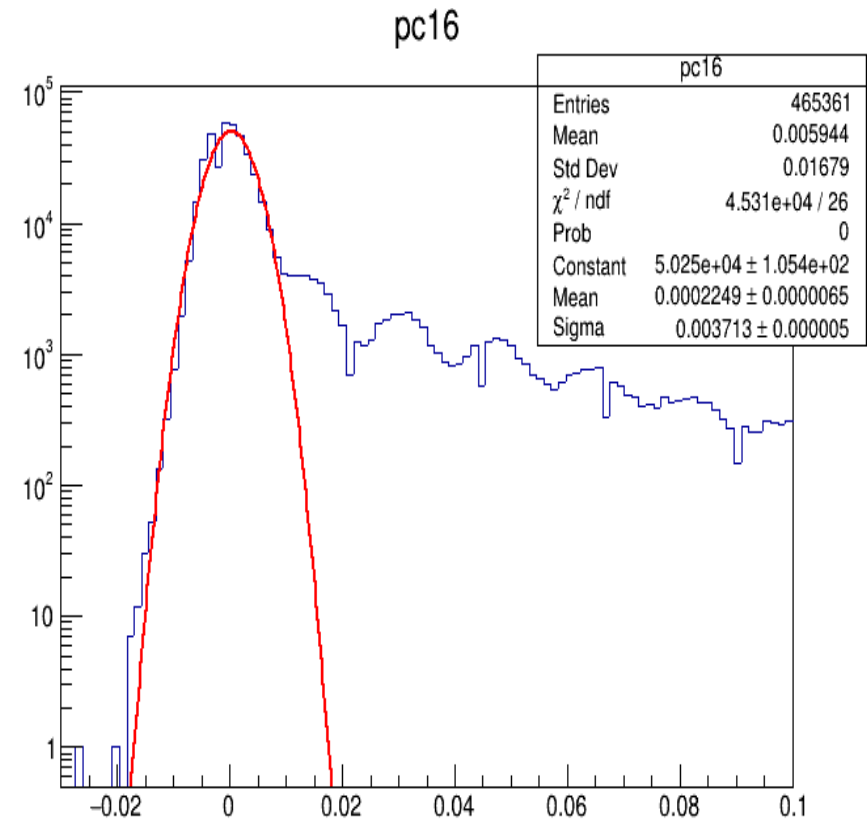
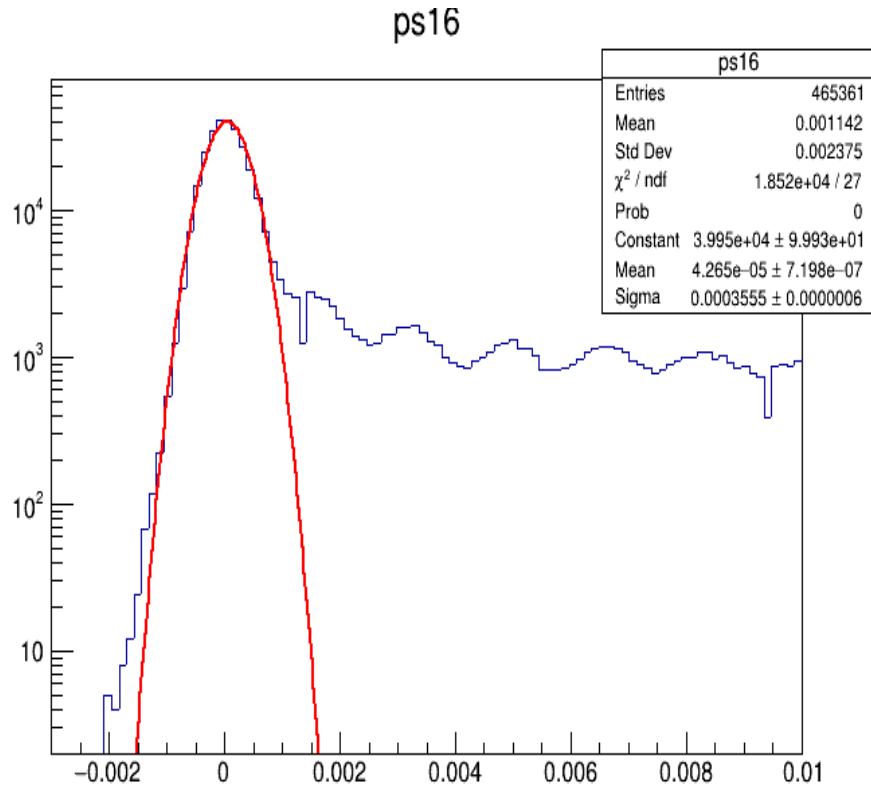
Try with 200 MeV noise



Gain approx
linearity over
DESY range,
but negative
constant term

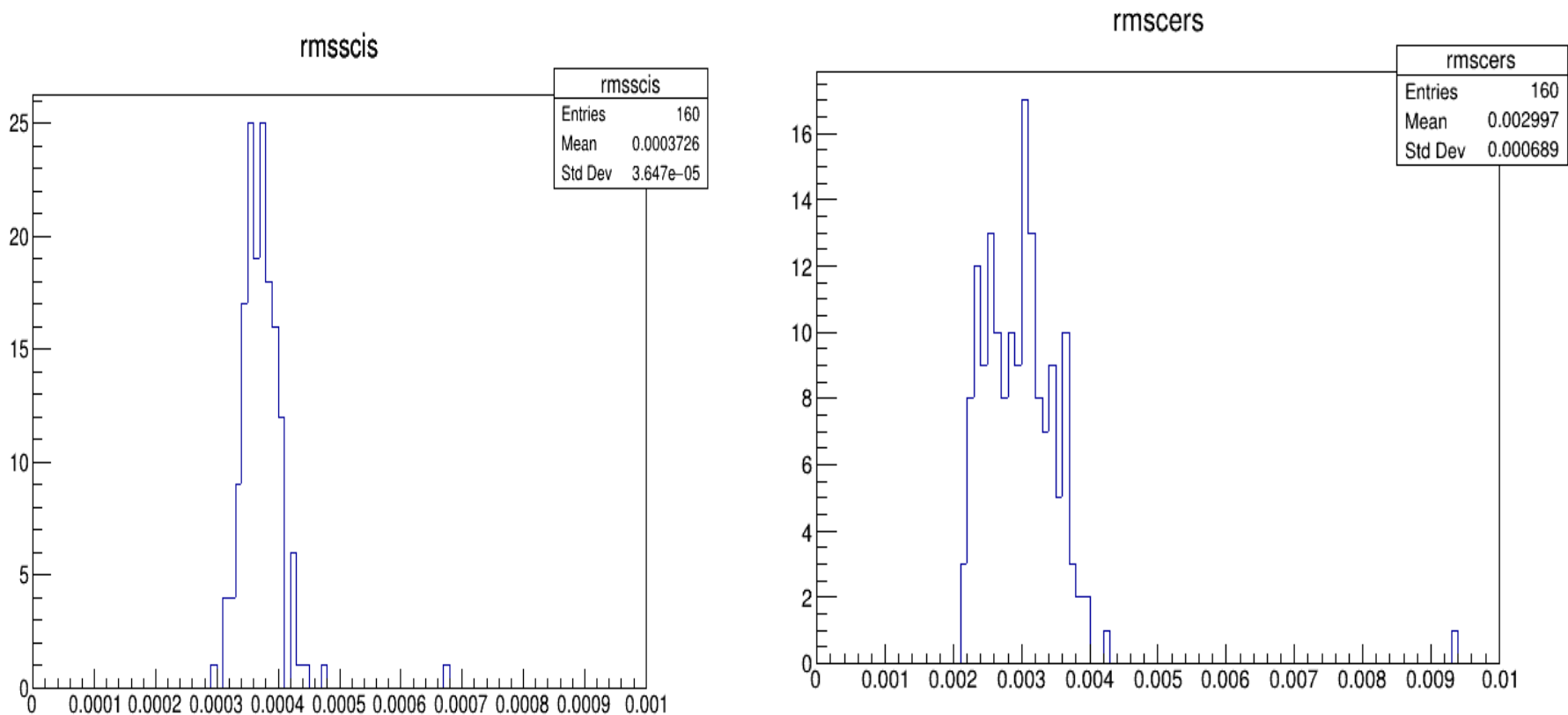
What does noise look like?

For SiPM: for each channel use high gain distributions near zero. Fit pedestal peak



Left:scintillator, Right Cerenkov X axis in GeV

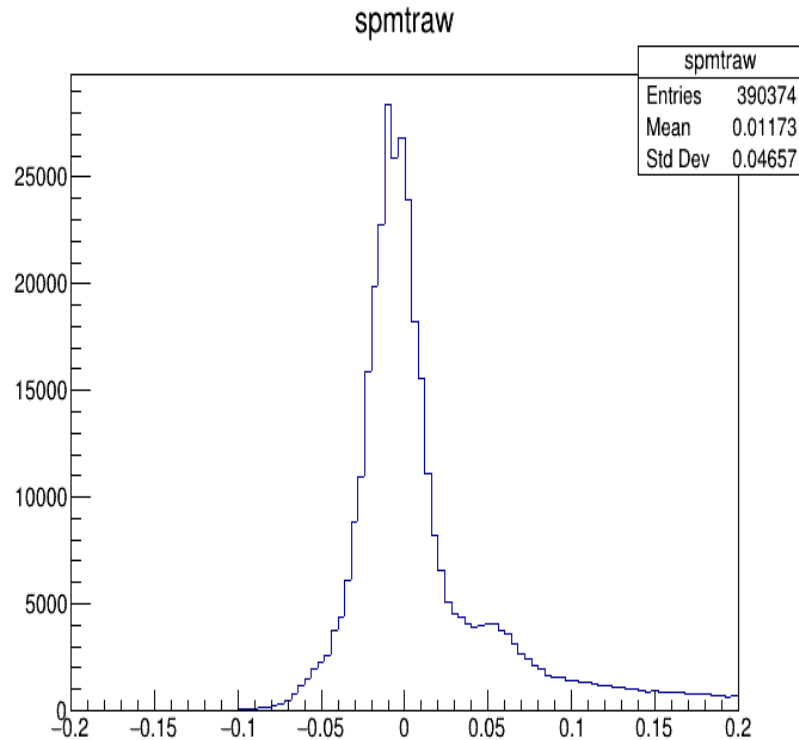
Over all 160 channels



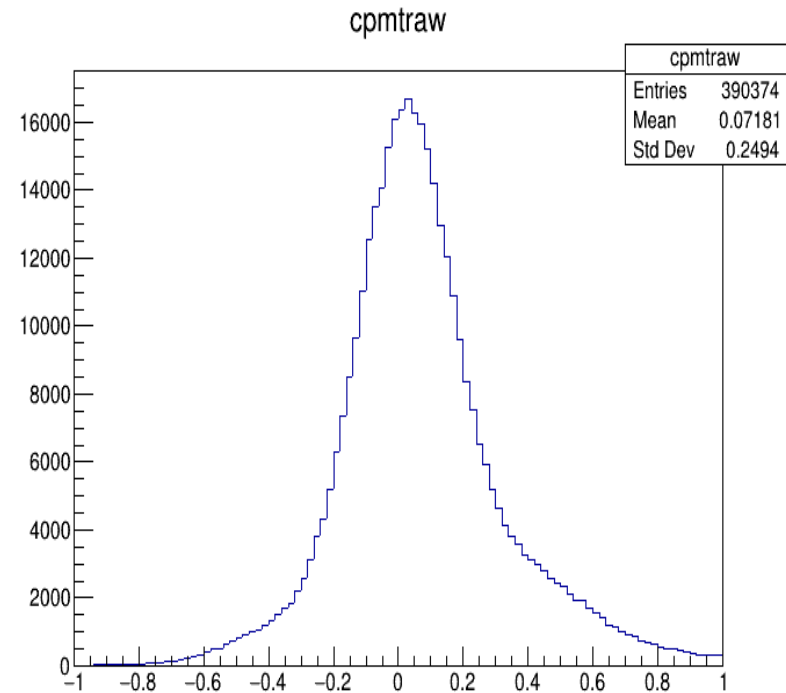
Noise per channel: ~ 0.3 MeV Sci, ~ 3 MeV Cer
1 outlier for each

PMTs

Plot total energy distribution for events where all SiPMs zero



Scintillator: secondary peak
at 50 MeV independent of energy
Width of main peak ~15 MeV



Cerenkov: also secondary peak
at ~500 MeV independent of energy
Width of main peak ~150 MeV

How to treat it? Taking RMS of distributions PMT noise ~170 MeV

Backup