

SPS Testbeam Data Analysis & Online Beam Monitoring

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Fabrizio Salvatore
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The logo of the University of Sussex, featuring the letters 'US' in a large, dark blue, serif font.

UNIVERSITY
OF SUSSEX

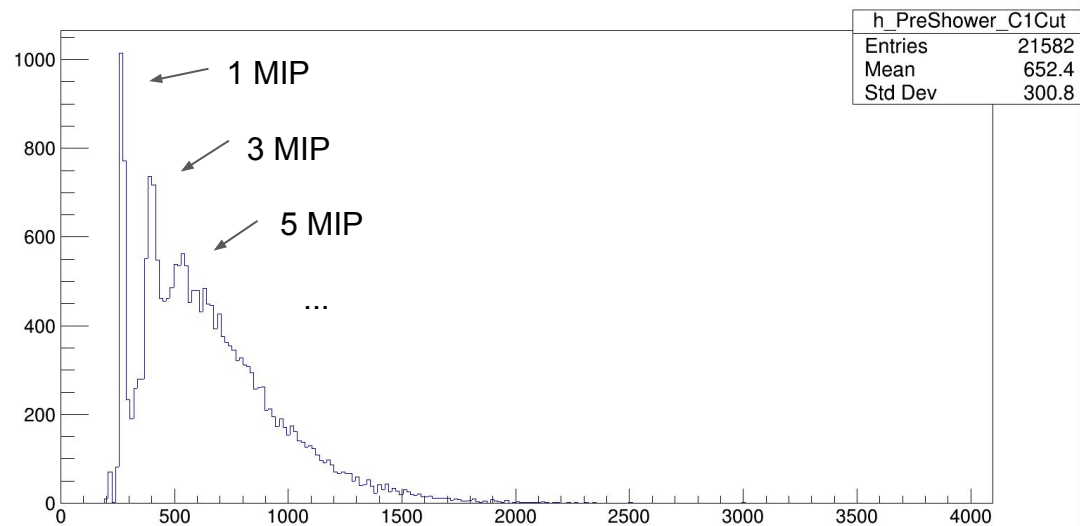
Analysis of 20 GeV Data (Run 670)

At 20 GeV:

- Cherenkov Counters still functional
- From first tests: acceptable beam contamination

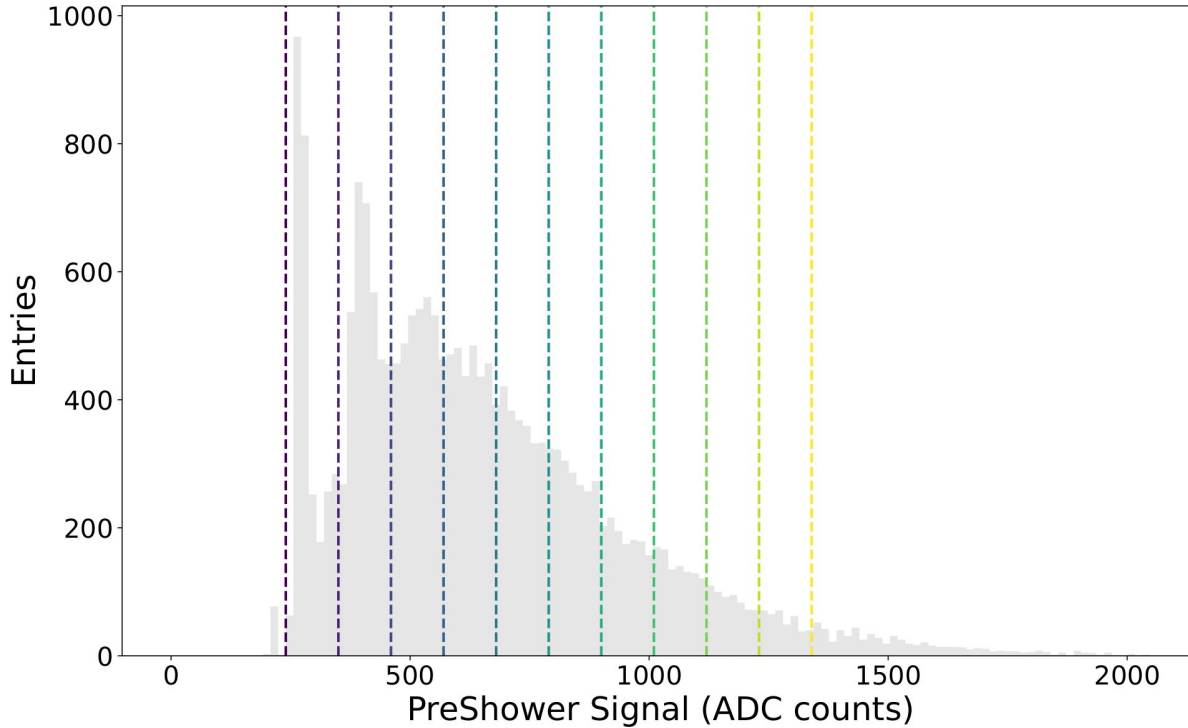
⇒ Can hopefully extract significant electron signal

PreShower Distribution with cut on C1



⇒ Look at Calorimeter signal as function of PreShower signal

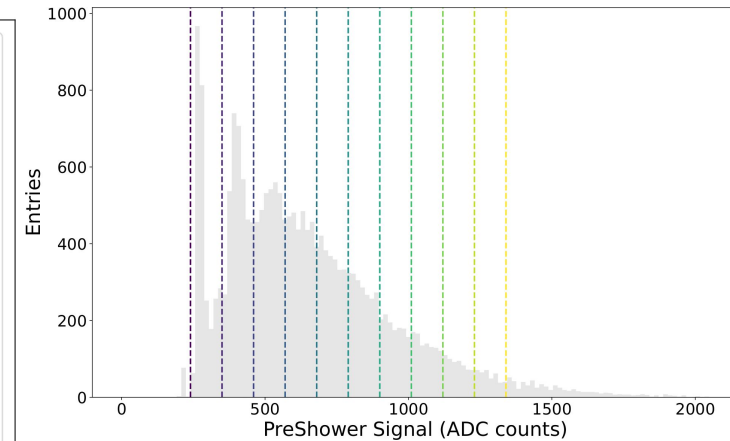
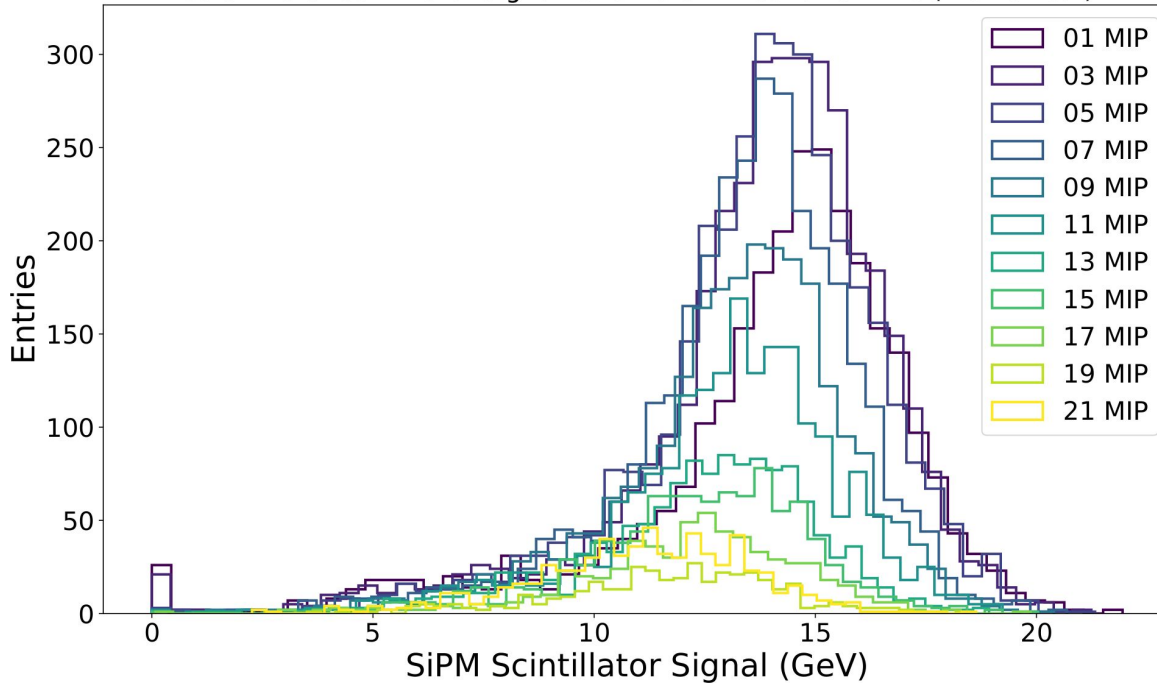
Analysis of 20 GeV Data (Run 670)



- Bin the PreShower Signal
- Bins aligned roughly with MIP peaks

Analysis of 20 GeV Data (Run 670)

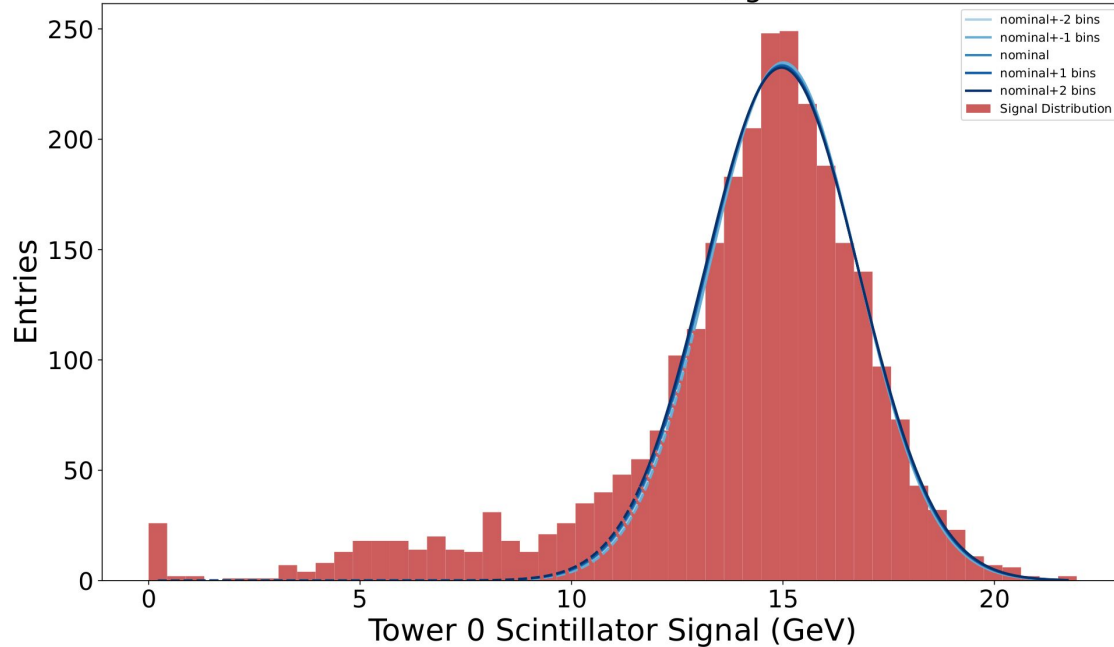
Calorimeter Scintillator Signal for different PreShower Bins (incl. C1 cut)



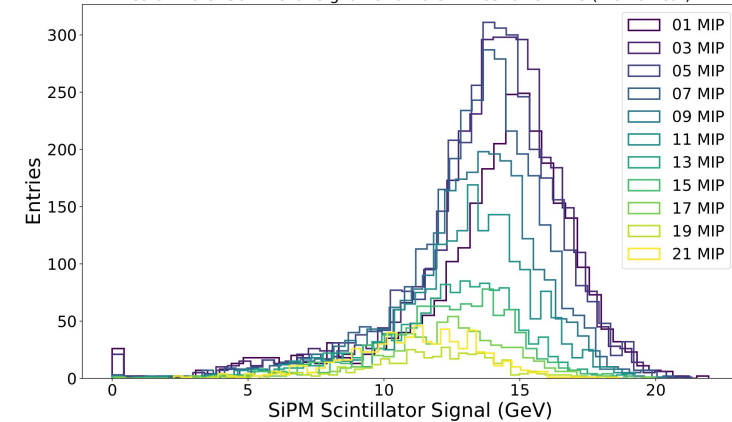
- Get Position of peak though fit

Analysis of 20 GeV Data (Run 670)

Calorimeter Tower0 Scintillator Signal for 01 MIPs



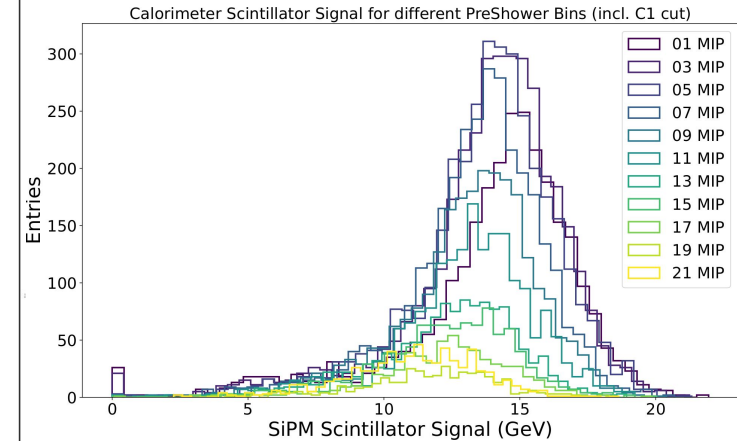
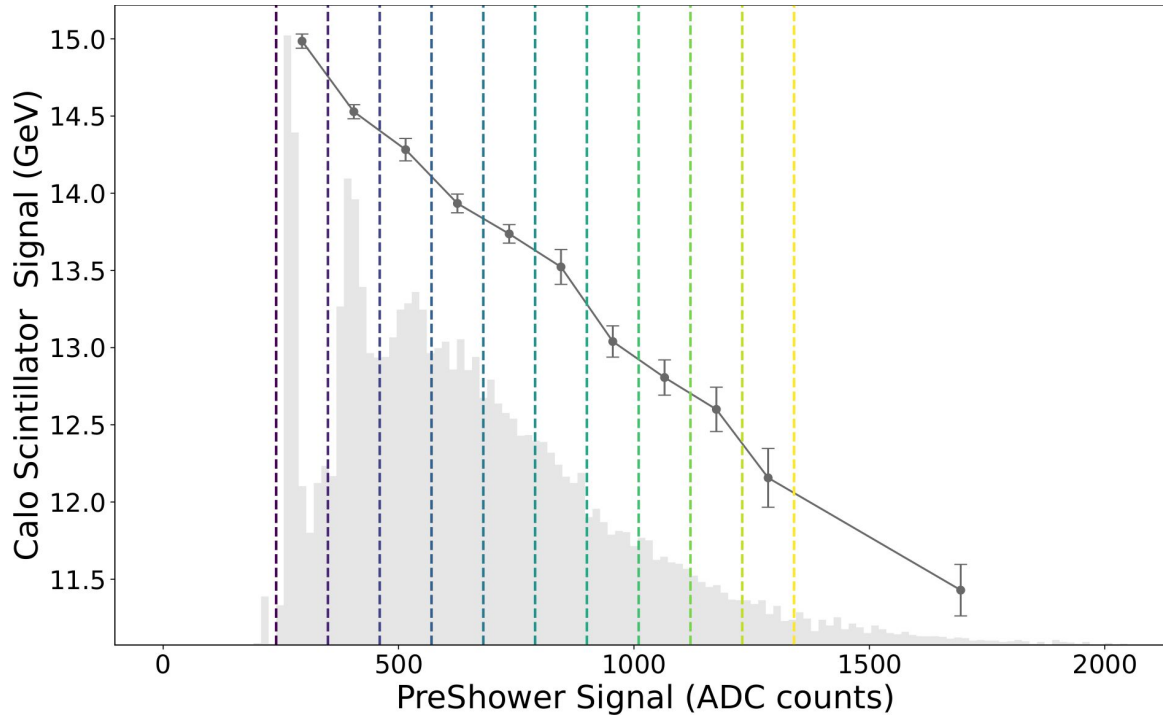
Calorimeter Scintillator Signal for different PreShower Bins (incl. C1 cut)



- Variation of fitting range for total uncertainty
- Distribution for 1 MIP signal yields estimate for purity of C1:
 - $p_{C1} \approx 0.8$

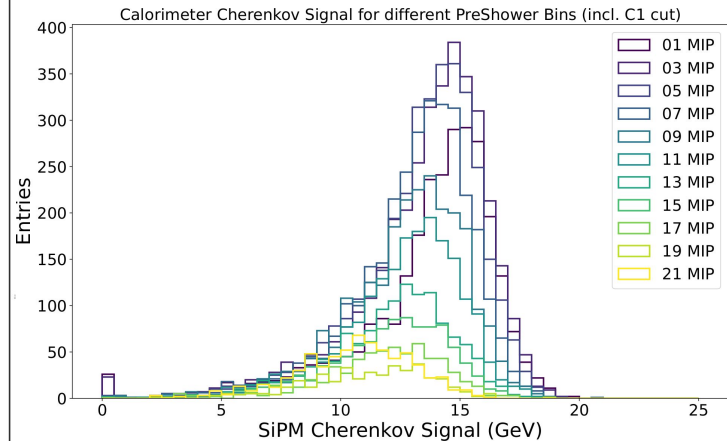
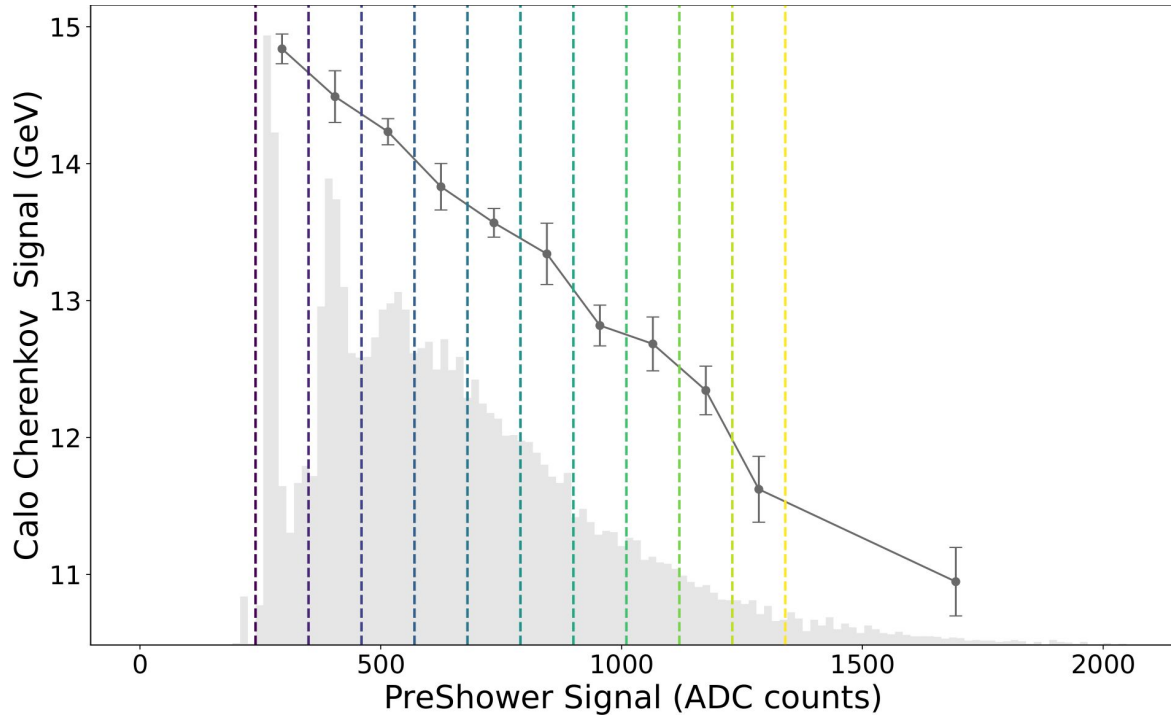
Analysis of 20 GeV Data (Run 670)

Scintillating Channel of SiPM (Tower 0)



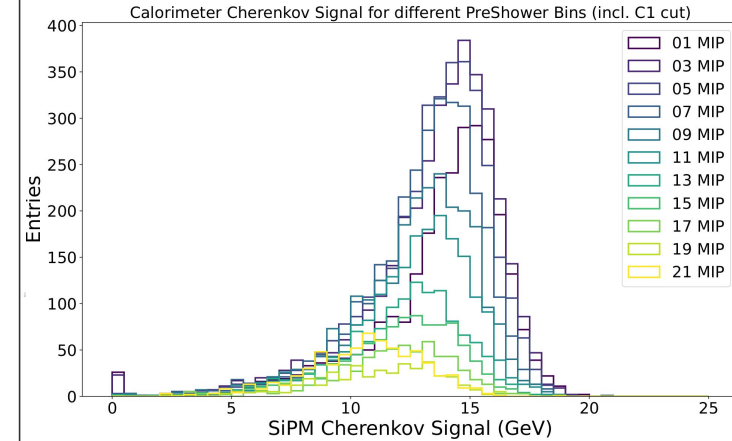
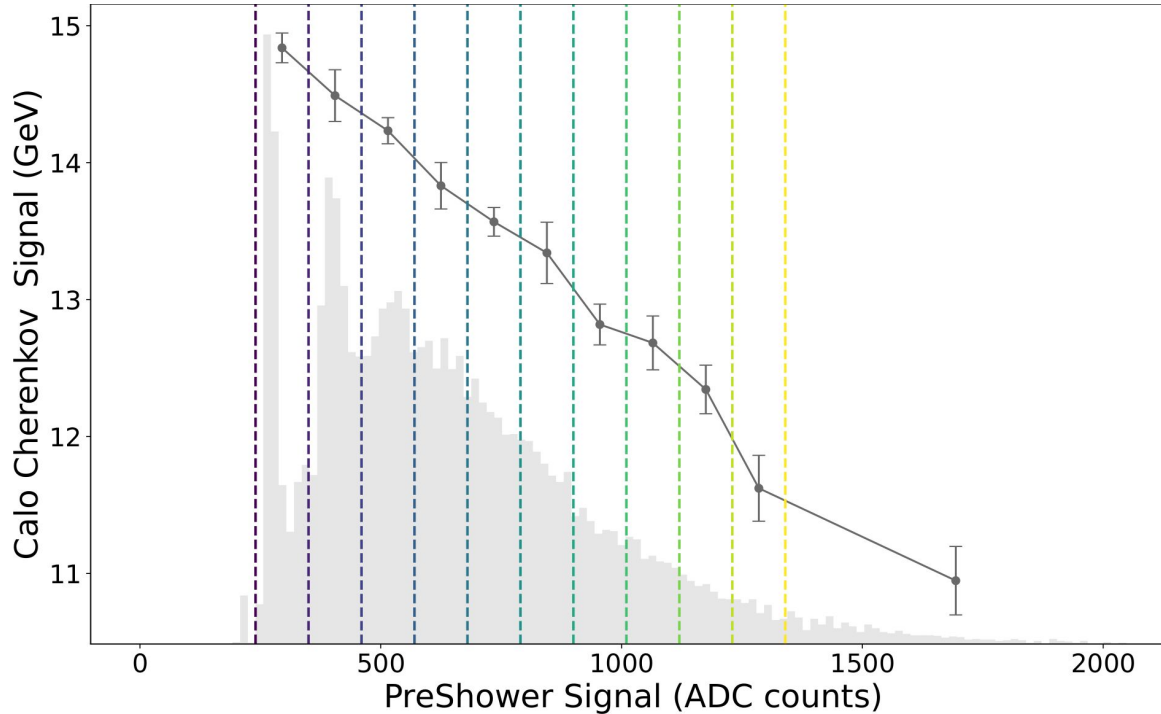
Analysis of 20 GeV Data (Run 670)

Cherenkov Channel of SiPM (Tower 0)



Analysis of 20 GeV Data (Run 670)

Cherenkov Channel of SiPM (Tower 0)



**Significant energy leakage for events with large PreShower signal.
 ⇒ see if shower is picked up by surrounding towers**

Calibration of Towers 1-8

master DREMTubes / TBDataPreparation / 202108_SPS / scripts / RunXXX.json

Go to file

...

lopezzot first energy measurements

Latest commit f2df4a8 on Aug 22 [History](#)

2 contributors

22 lines (22 sloc) | 7.63 KB

Raw Blame

```

1  {
2    "Calibrations" :
3  {
4    "SiPM" :
5    {
6      "highGainPedestal" : [64.61,59.20,59.40,60.16,60.09,61.02,60.45,59.72,60.26,61.24,60.26,60.58,59.83,60.26,59.04,58.77,58.31,58.17,59.55,59.38,59.71,60.03,
7      "lowGainPedestal" : [60.74,59.62,59.23,60.04,58.39,60.25,59.94,59.80,58.71,60.57,59.51,59.60,59.03,59.23,60.86,59.88,60.61,60.91,60.42,59.35,57.29,57.30,6
8      "highGainDpp" :
9      [24.63,26.31,25.78,24.86,23.84,23.56,24.54,24.53,28.43,24.19,24.68,25.36,23.92,22.86,24.17,24.34,27.60,27.27,25.54,25.62,26.52,24.40,25.02,26.38,25.84,26.
10     "lowGainDpp" : [0.86,0.98,0.90,0.92,0.80,0.88,0.85,0.86,1.00,0.86,0.92,0.89,0.84,0.83,0.80,0.82,1.03,1.10,0.99,1.00,0.97,0.90,0.80,0.99,0.96,0.97,0.96,0.8
11     "PhetoGeV5" : [200],
12     "PhetoGeV6" : [82]
13   },
14   "PMT" :
15   {
16     "PMT5_pd" : [196,180,236,212,220,156,188,196],
17     "PMT5_pk" : [657,650,781,726,642,763,623,808],
18     "PMT6_pd" : [235,235,220,228,196,172,220,164],
19     "PMT6_pk" : [800,754,816,744,733,835,725,782]
20   }
21 }
22 }
```

} calibration done during Testbeam (on-site),
need to double check

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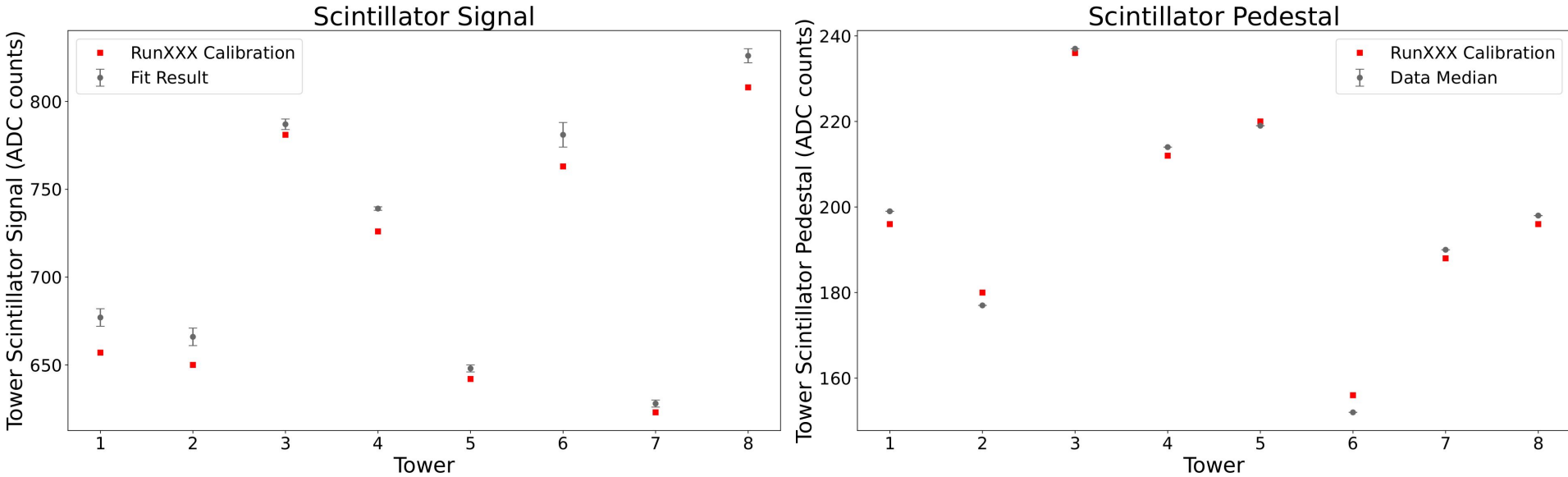
Raw Blame

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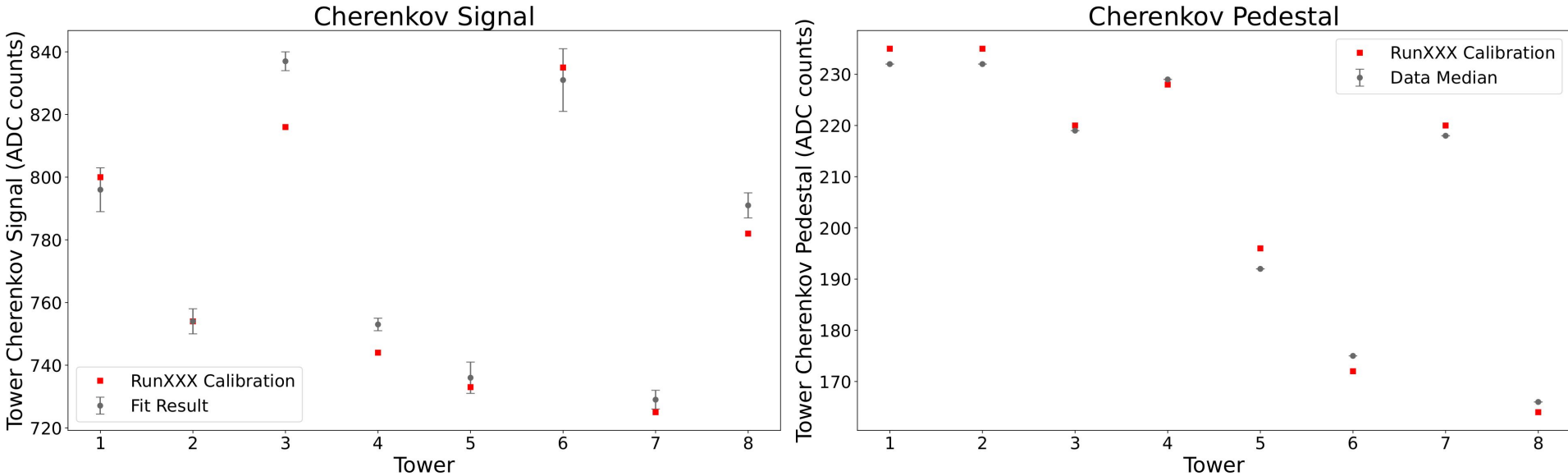
1  {
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8      "highGainDpp" :
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Calibration of Towers 1-8: Scintillating Channel

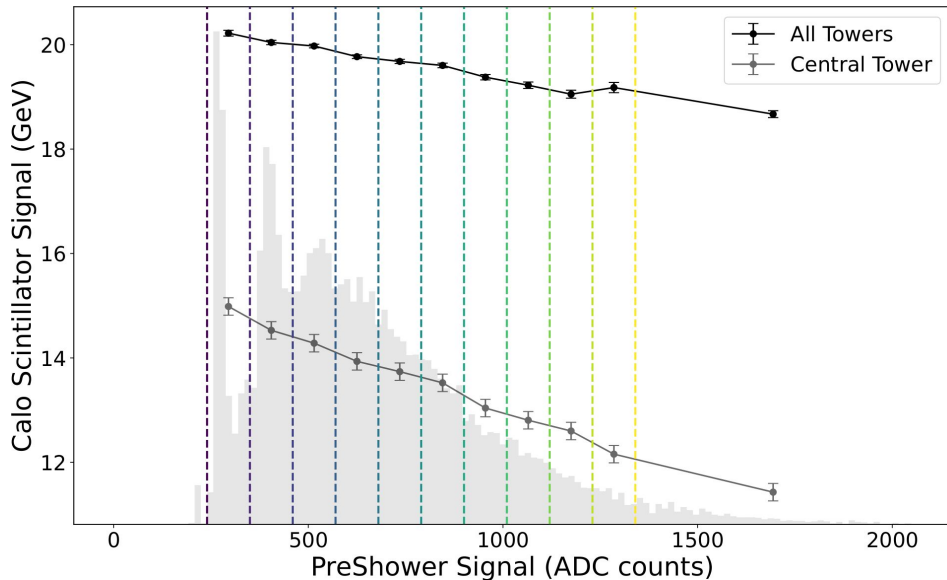


Calibration of Towers 1-8: Cherenkov Channel

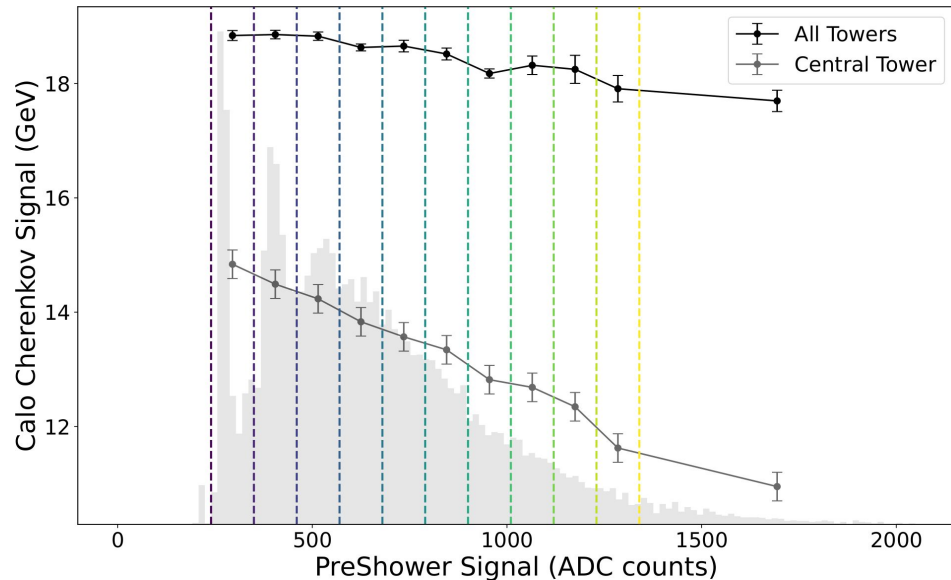


Sum of All Towers

Scintillator

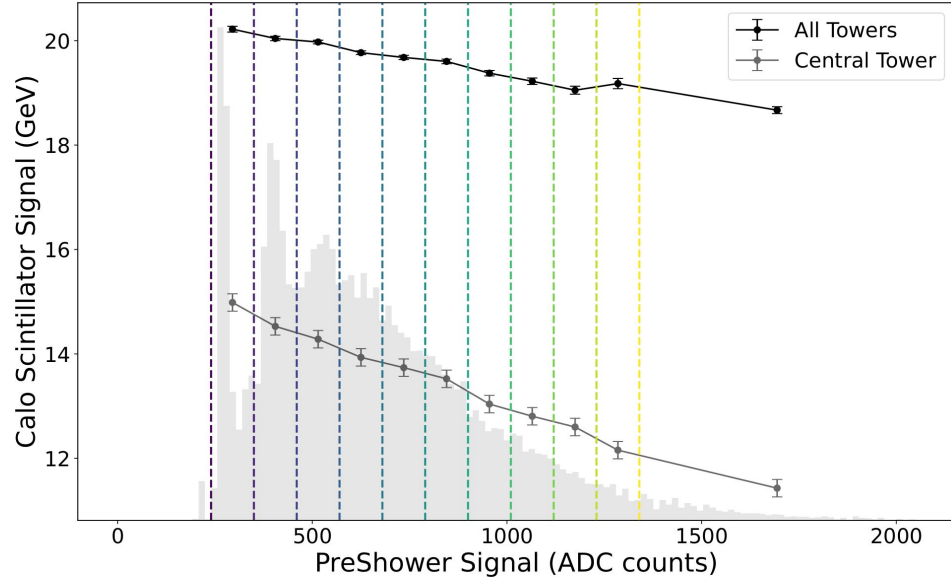


Cherenkov



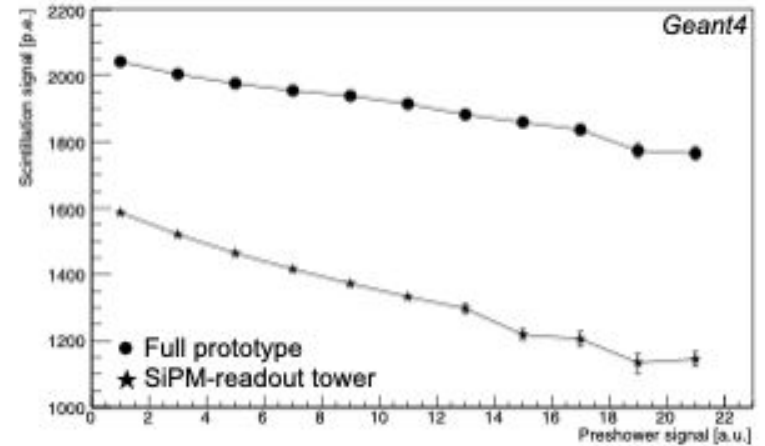
- Considerably less leakage (4 GeV \rightarrow 1.5 GeV), but still some present
- needs to be validated with simulation (Lorenzo)

Sum of All Towers

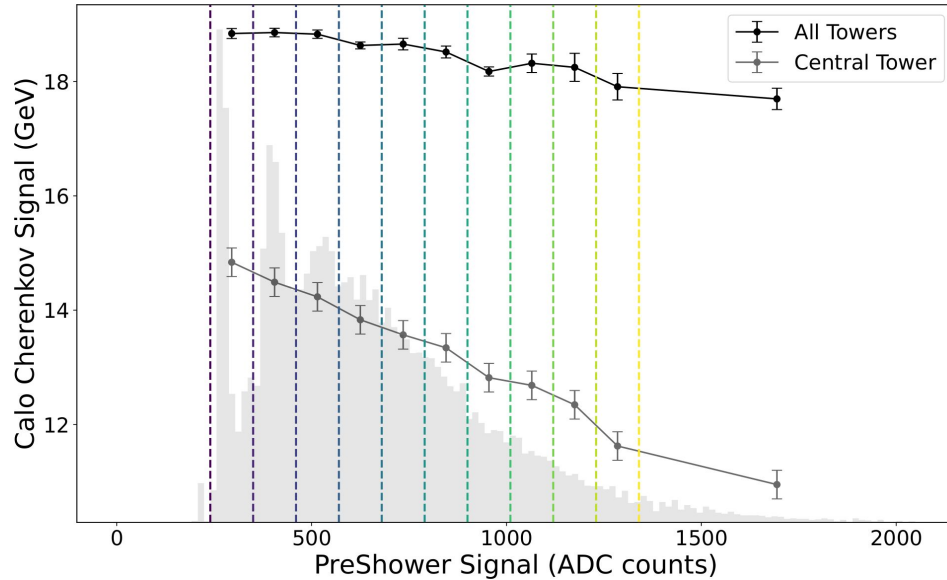


Average scintillation signal

Calculated as the mean scintillation signal, as a function of the preshower signal.



Sum of All Towers



Average Cherenkov signal

Calculated as the mean Cherenkov signal, as a function of the preshower signal.

