



中国科学技术大学
University of Science and Technology of China



Measurement of Zinc spectrum with DAMPE

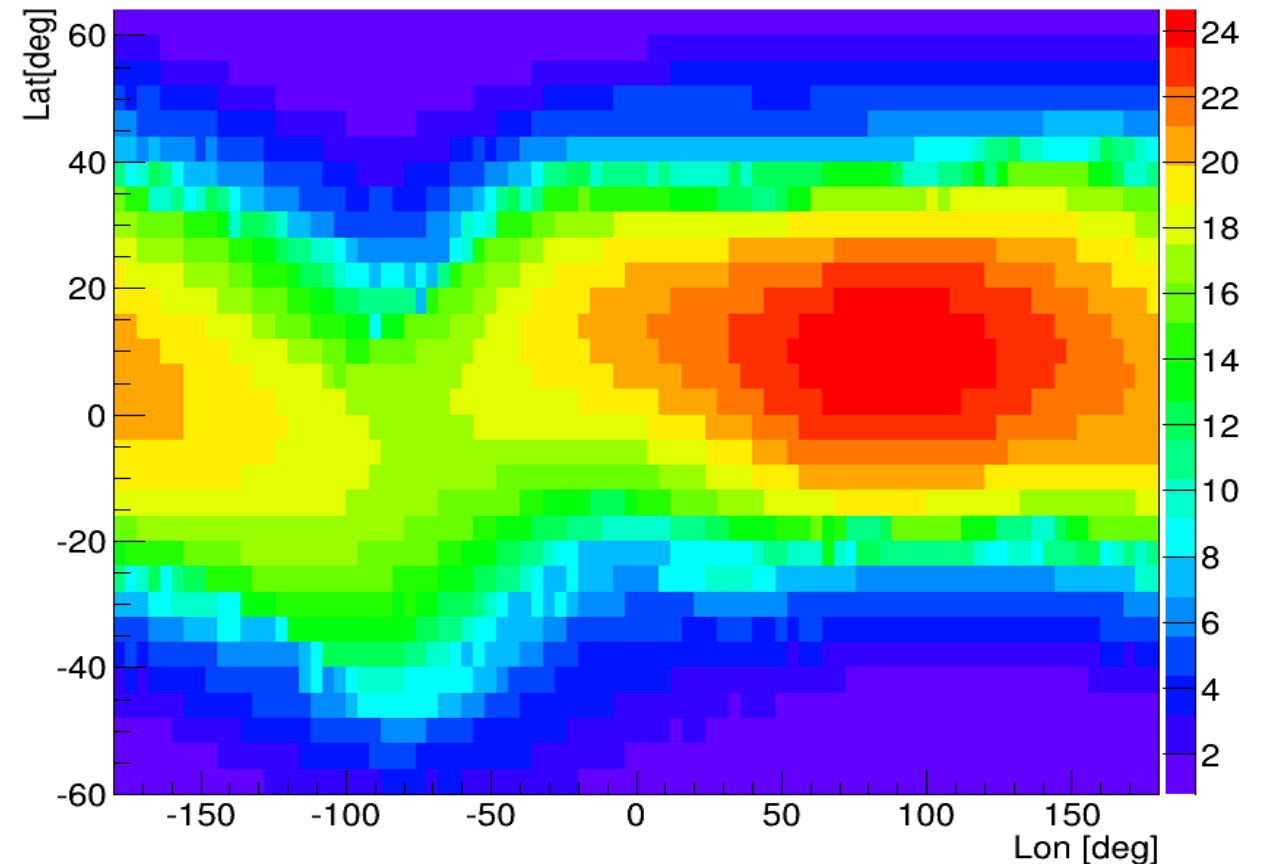
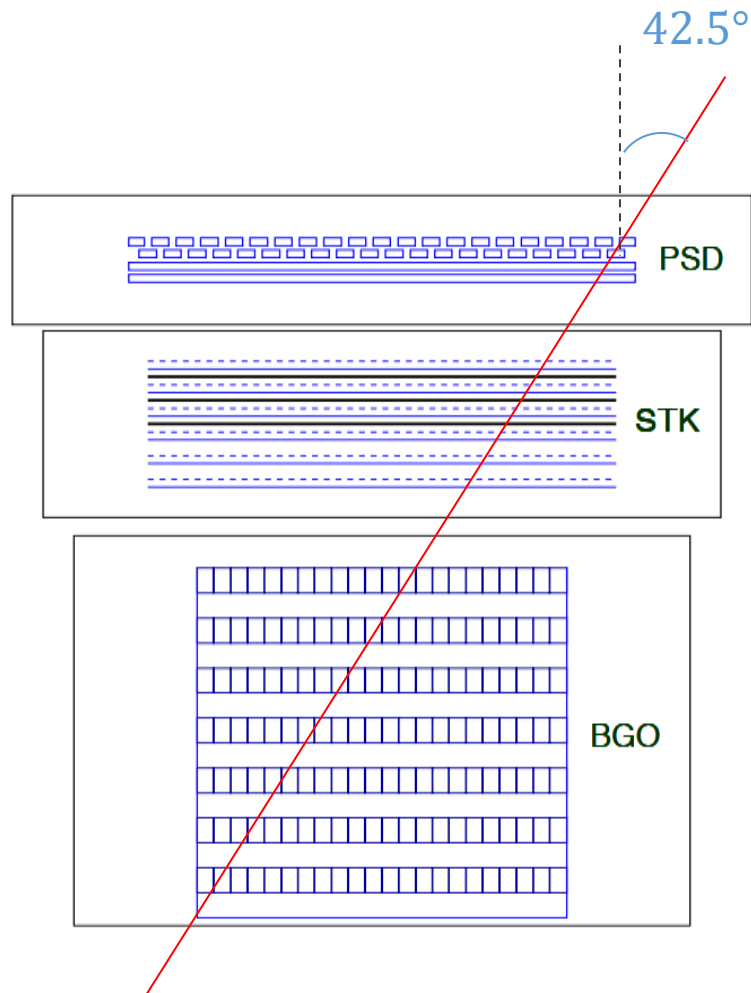
Yu Nie

2025/11/5



Geomagnetic Cutoff Map

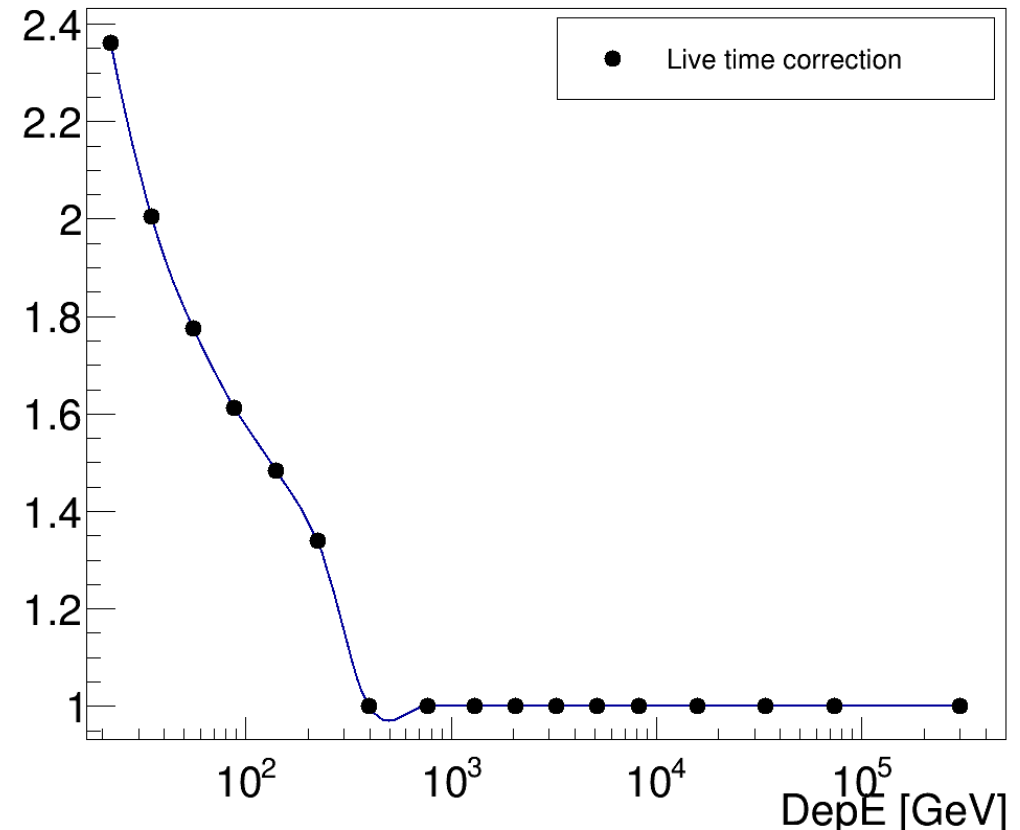
- Geomagnetic field model: IGRF-14



Binning and Live time correction

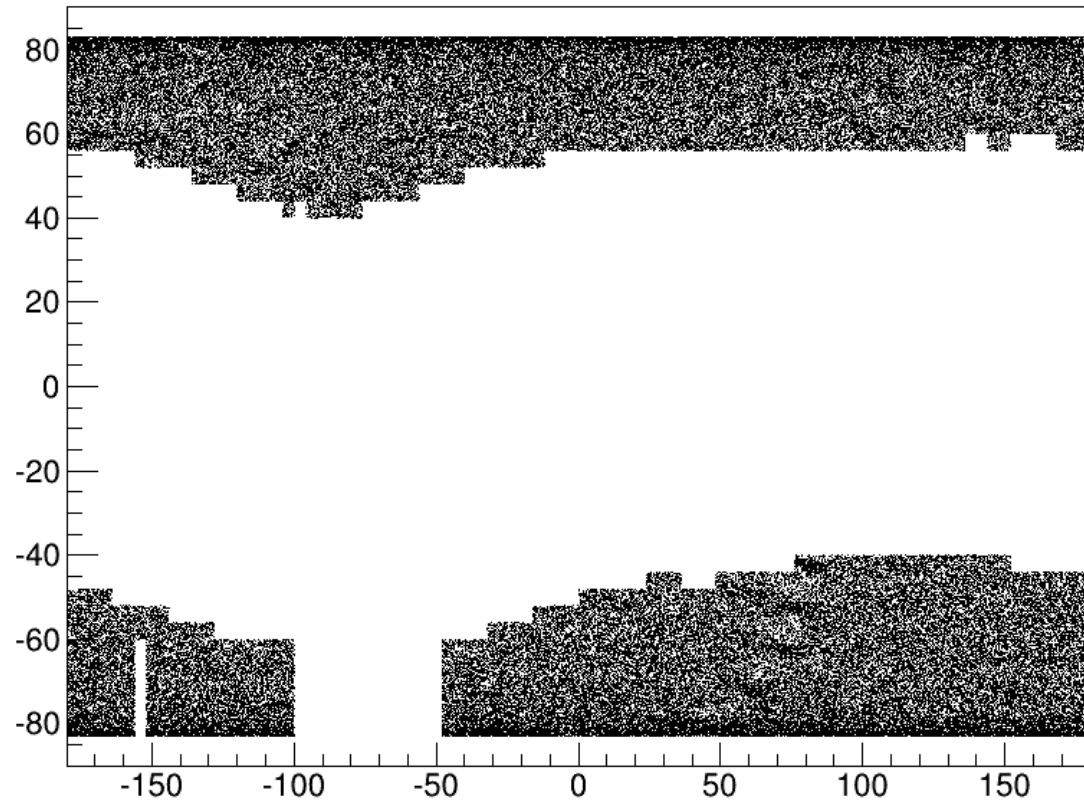
Deposited Energy

```
*****i = 560*****  
16.7885  
*****i = 759*****  
26.8335  
*****i = 999*****  
42.6508  
*****i = 1223*****  
67.8891  
*****i = 1461*****  
107.883  
*****i = 1806*****  
171.556  
*****i = 2789*****  
272.721
```

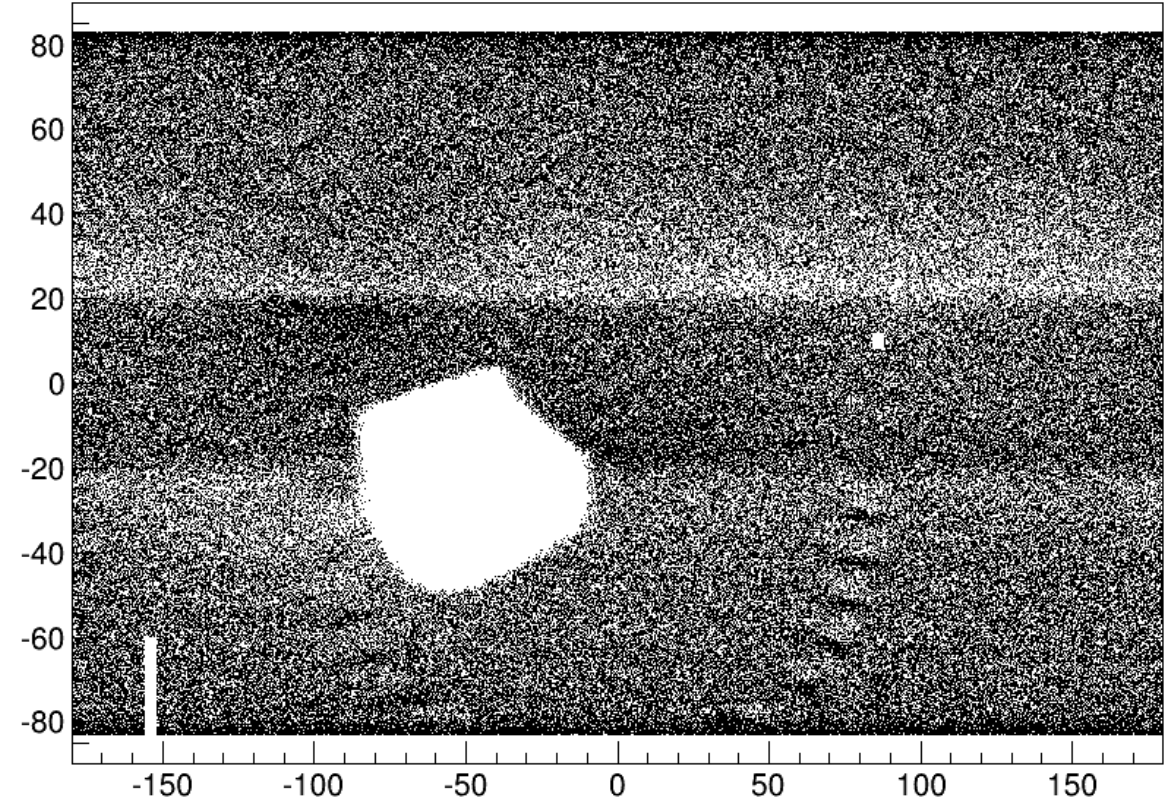


Live time correction

Bin 1

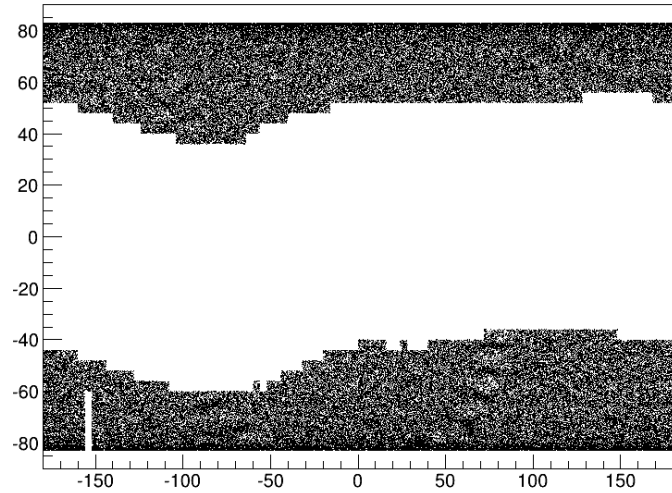


Bin 7

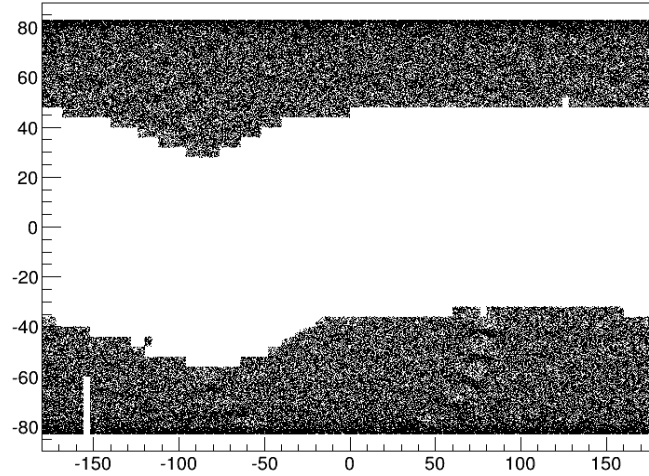


Live time correction

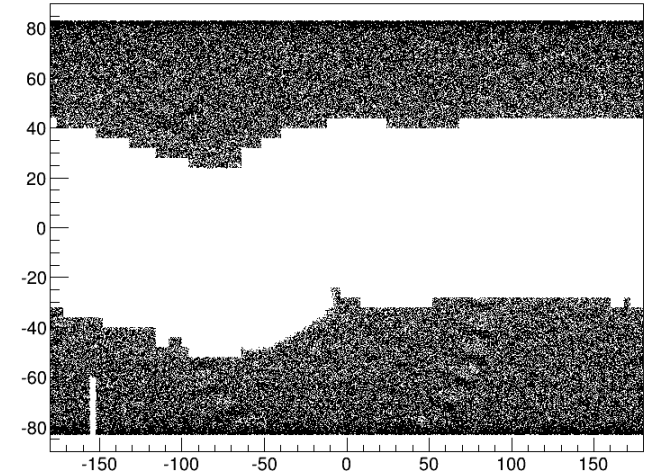
Bin 2



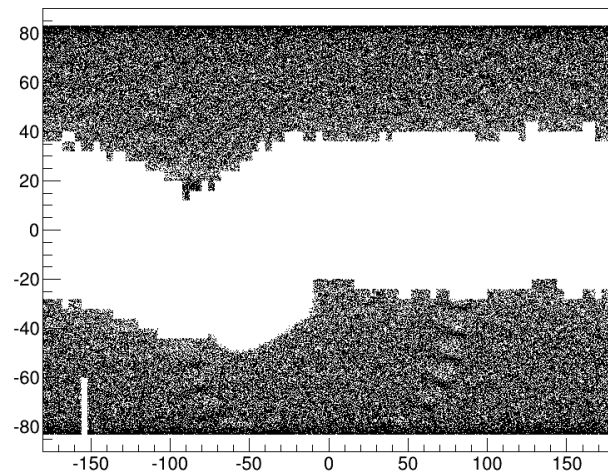
Bin 3



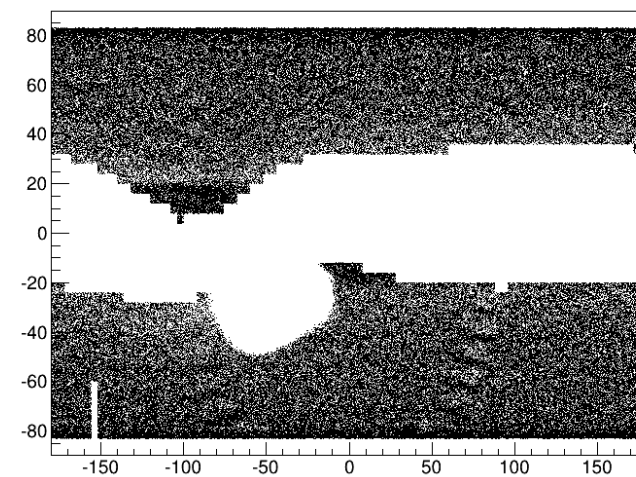
Bin 4



Bin 5



Bin 6



Selections

1. Not in SAA

2. High Energy Trigger (HET)

3. Fiducial : Machine-Learning based STK track

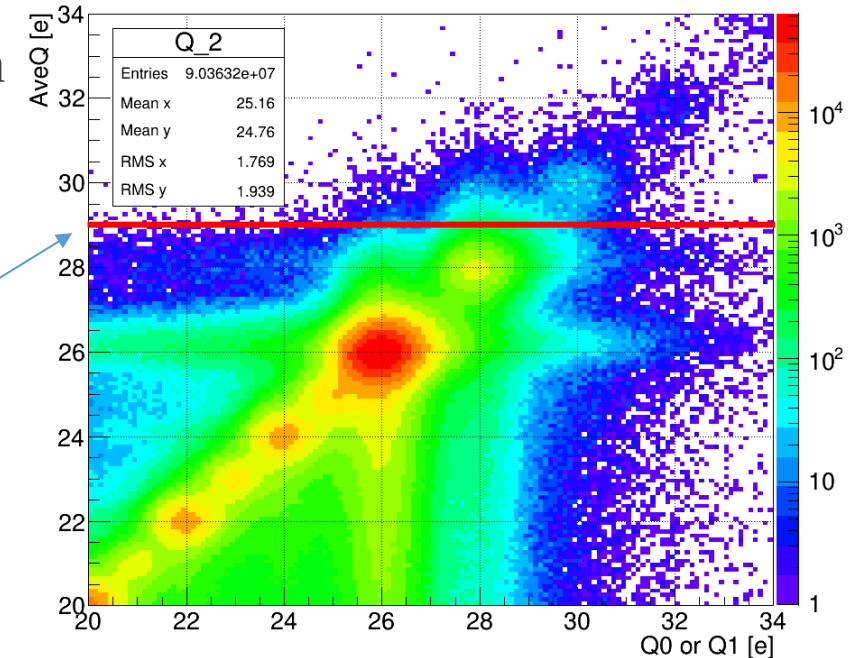
- STK track should be fully contained in (PSD + STK +BGO)
- Distance at top of PSD between STK and BGO Track: < 120 mm
- Average distance from energy center at first 4 BGO layers: < 25 mm
- Track pass through the max energy bar of PSD on both layers

4. BGO :

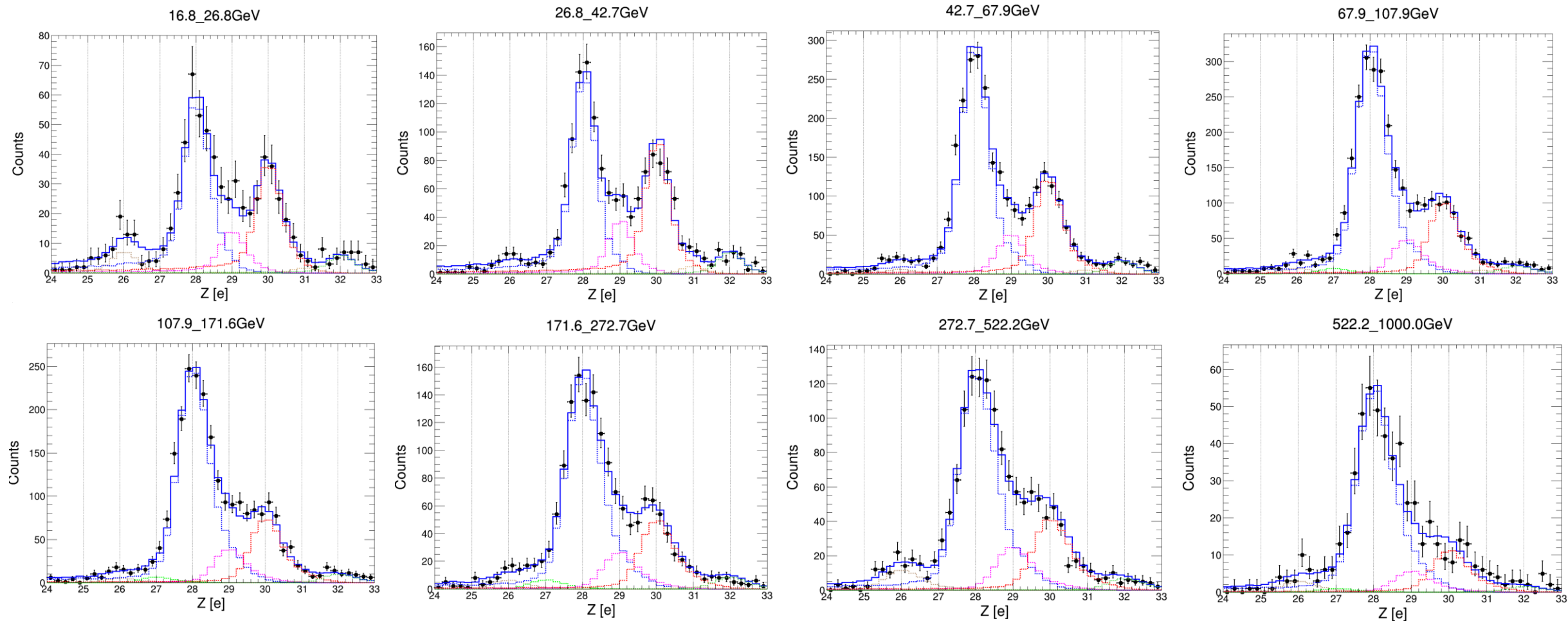
- $E_{\text{dep}} > \text{Energy cutoff}$
- Bars with max energy deposition are not at edge

5. PSD :

- $\text{PSDQ} = (\text{QsubL1} + \text{QsubL2})/2$
- Average Q of subL3 and subL4 ≥ 29.0



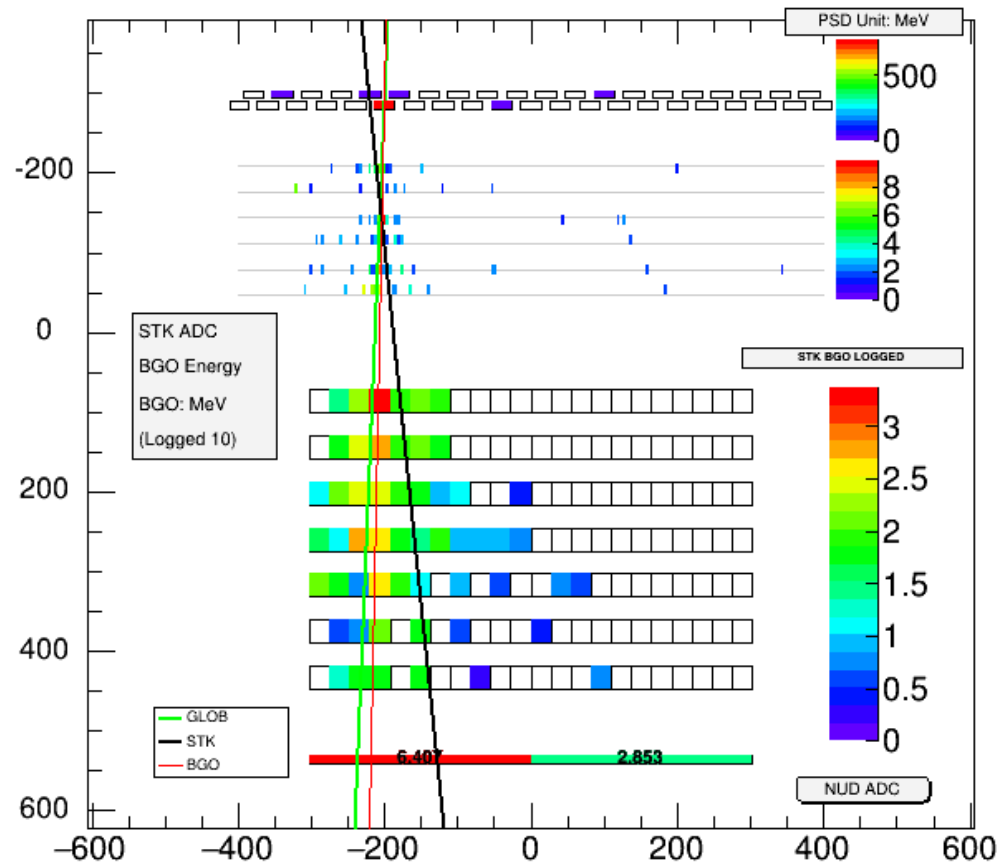
Template fits



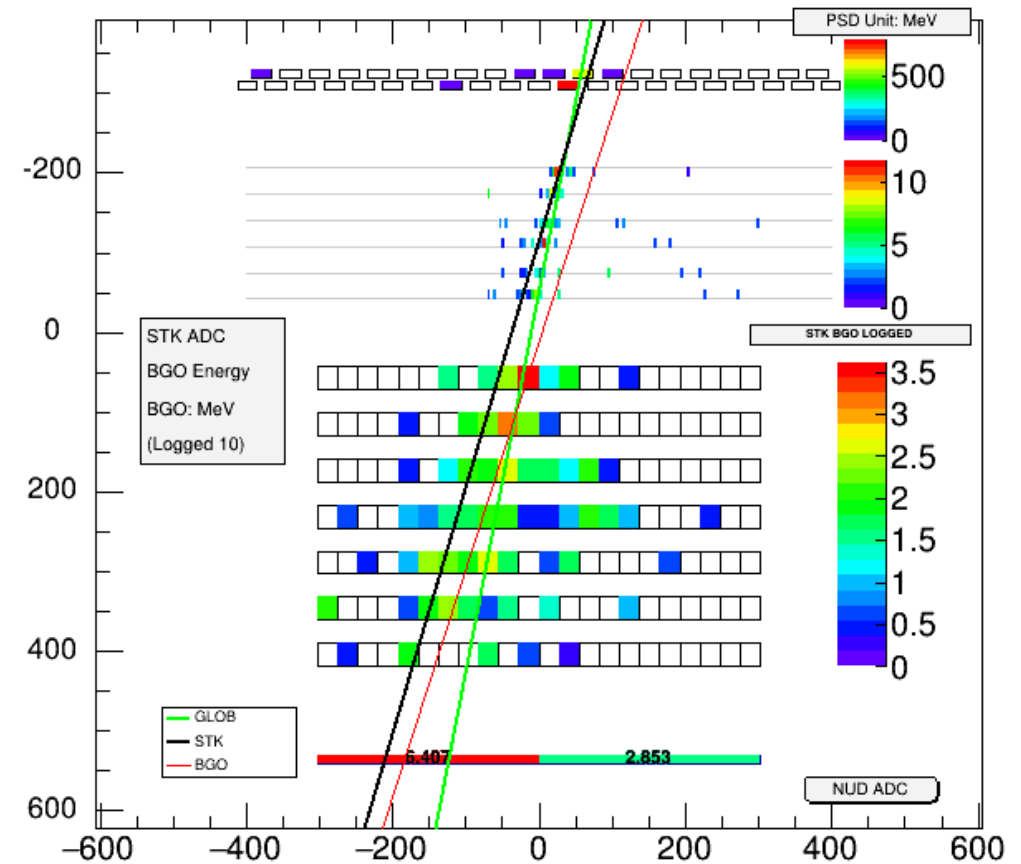
Event display

- Energy: 16.8 GeV; Z: 26.01

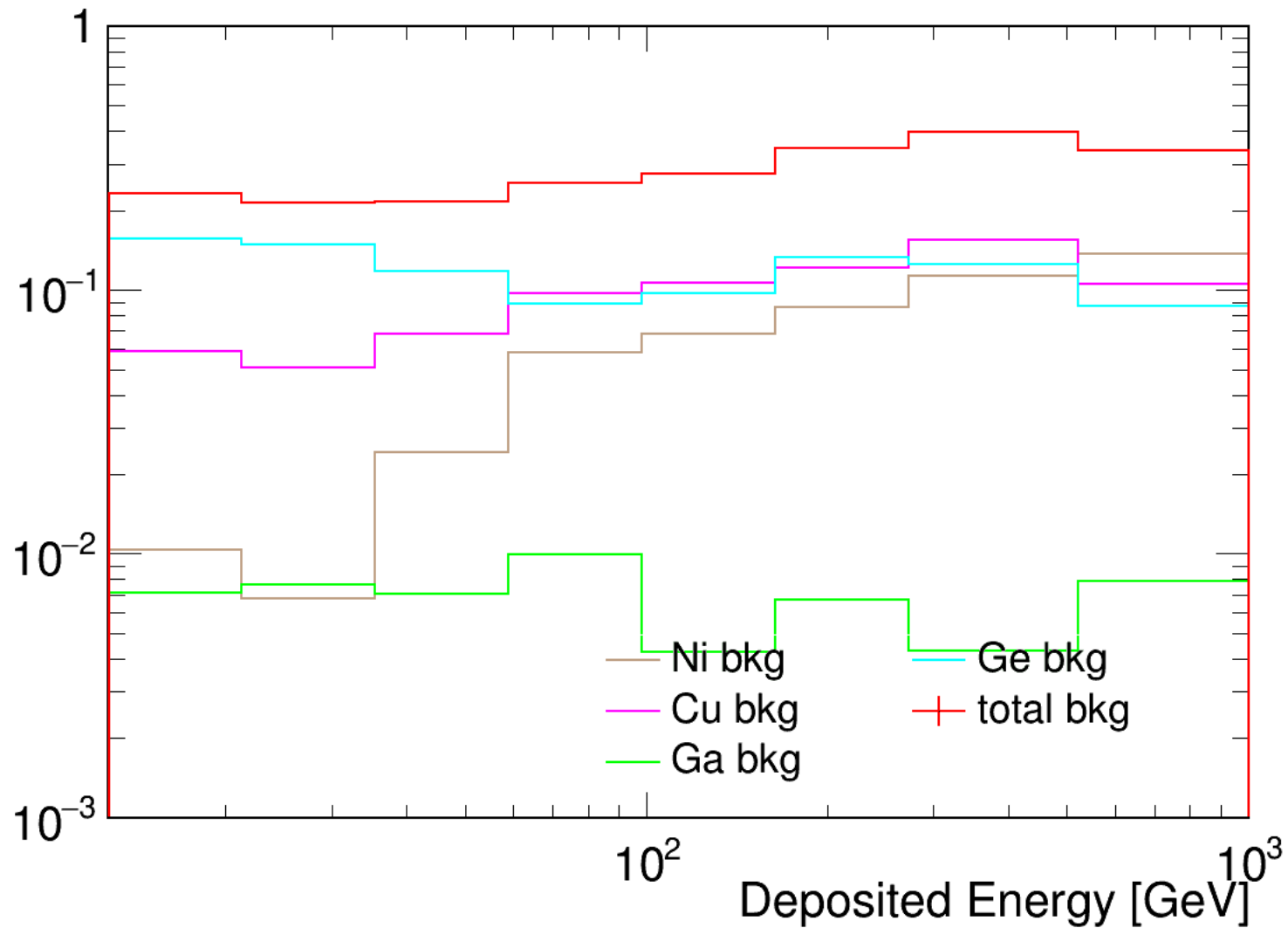
XOZ (Reversed Z)



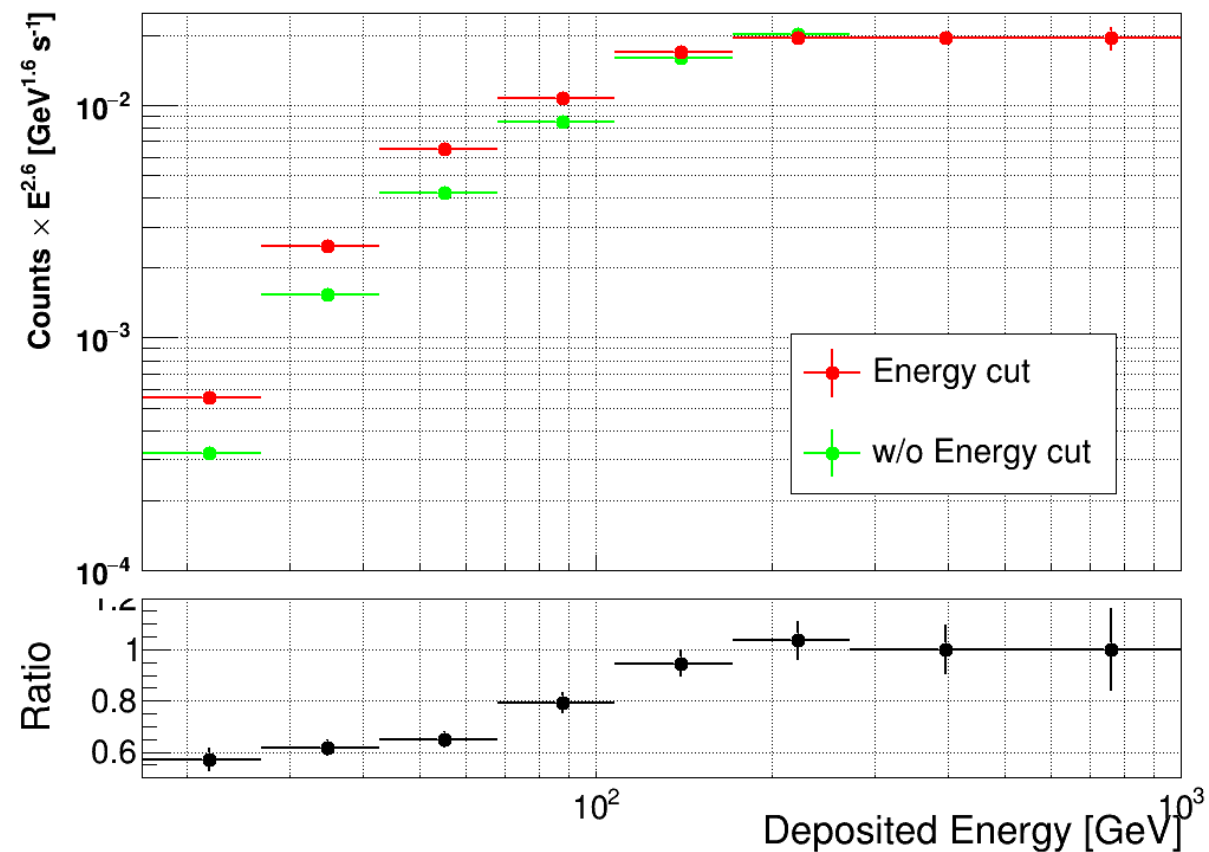
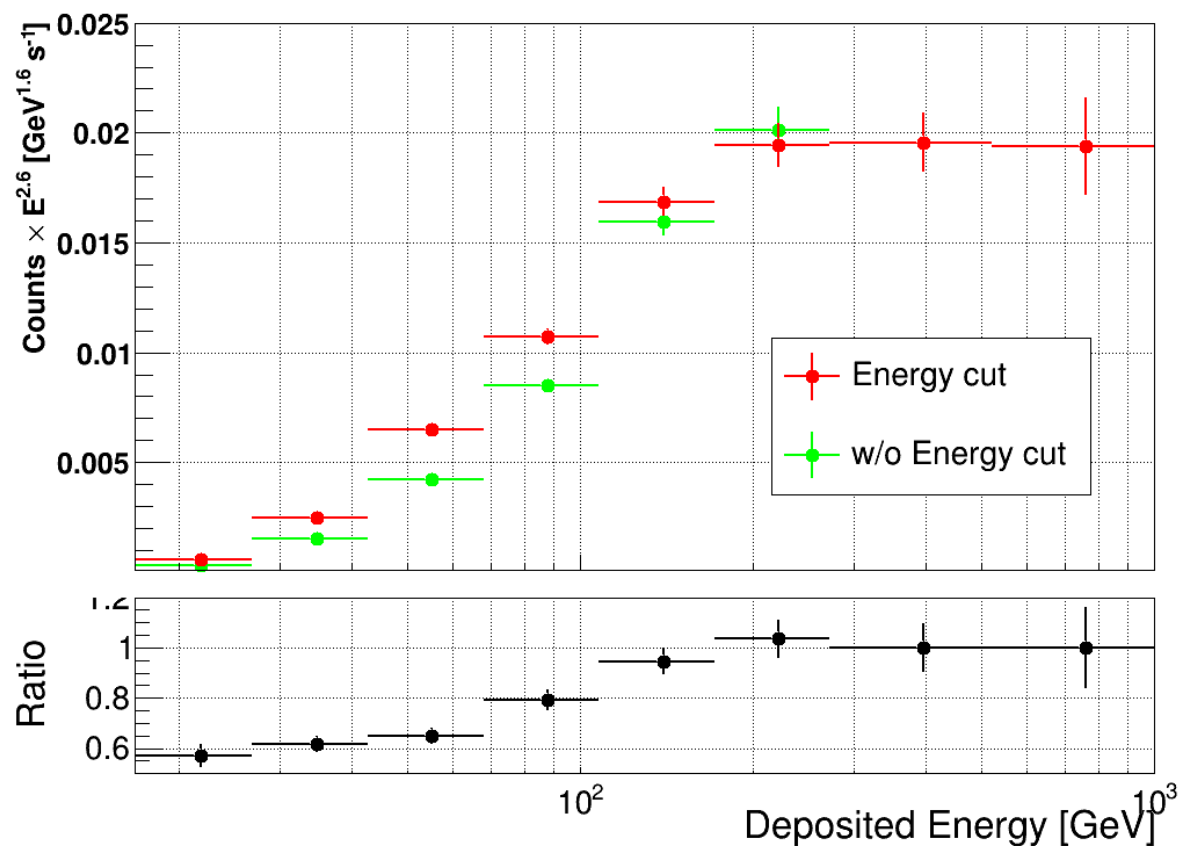
YOZ (Reversed Z)



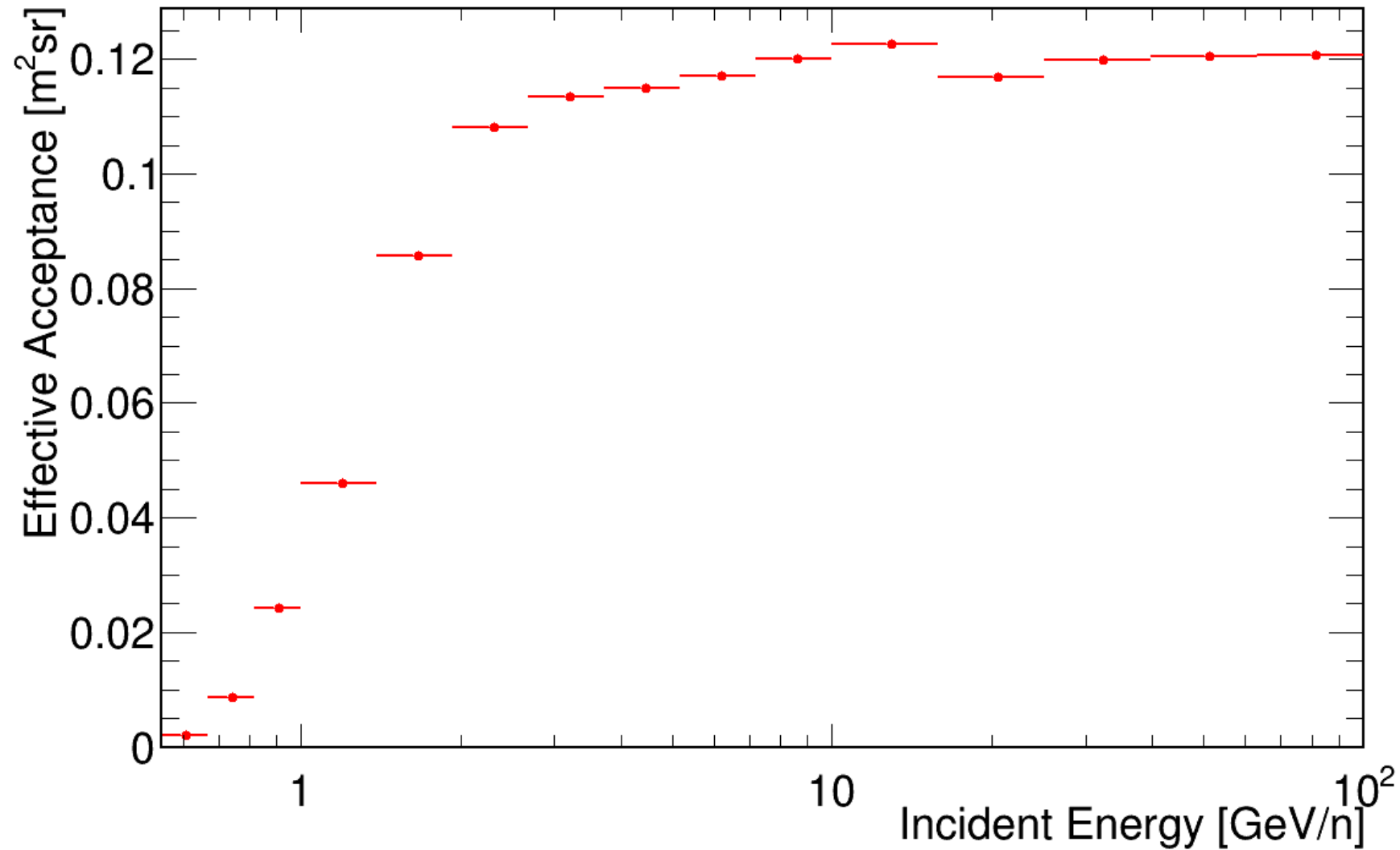
Background Estimation



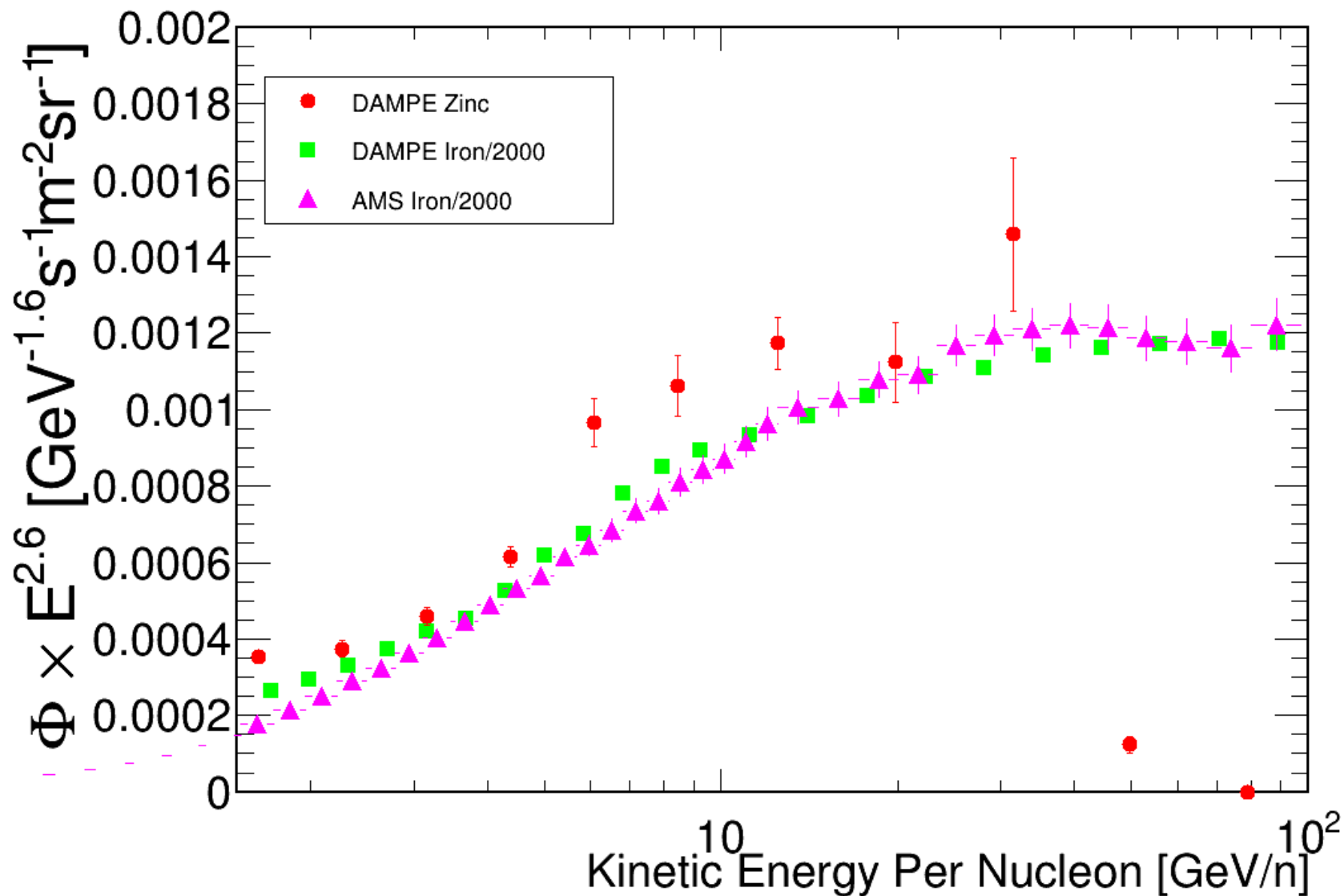
Counts distribution



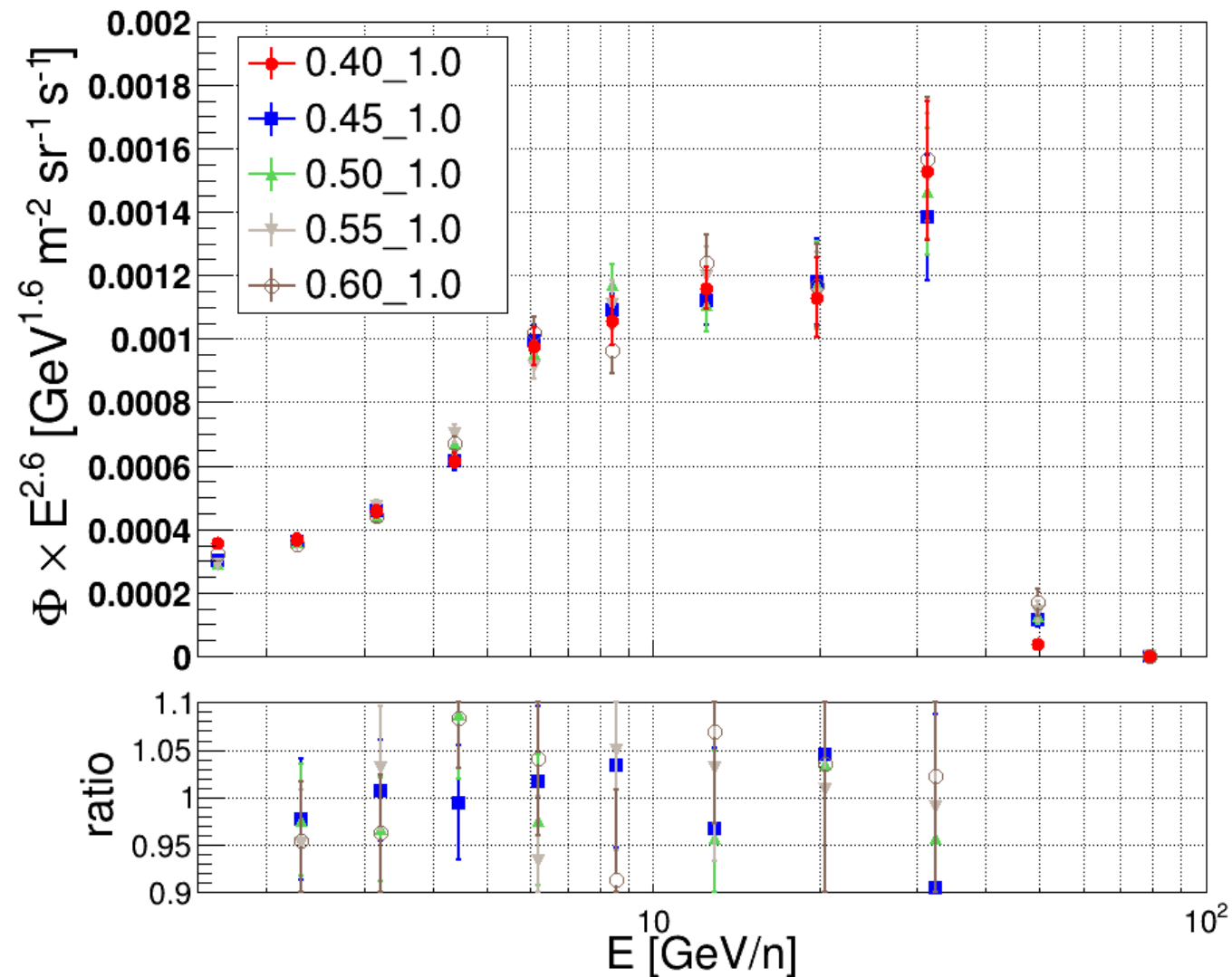
Acceptance



Preliminary



Cutoff factor



Selections For Iron and Nickel

1. Not in SAA

2. High Energy Trigger (HET)

3. Fiducial : Machine-Learning based STK track

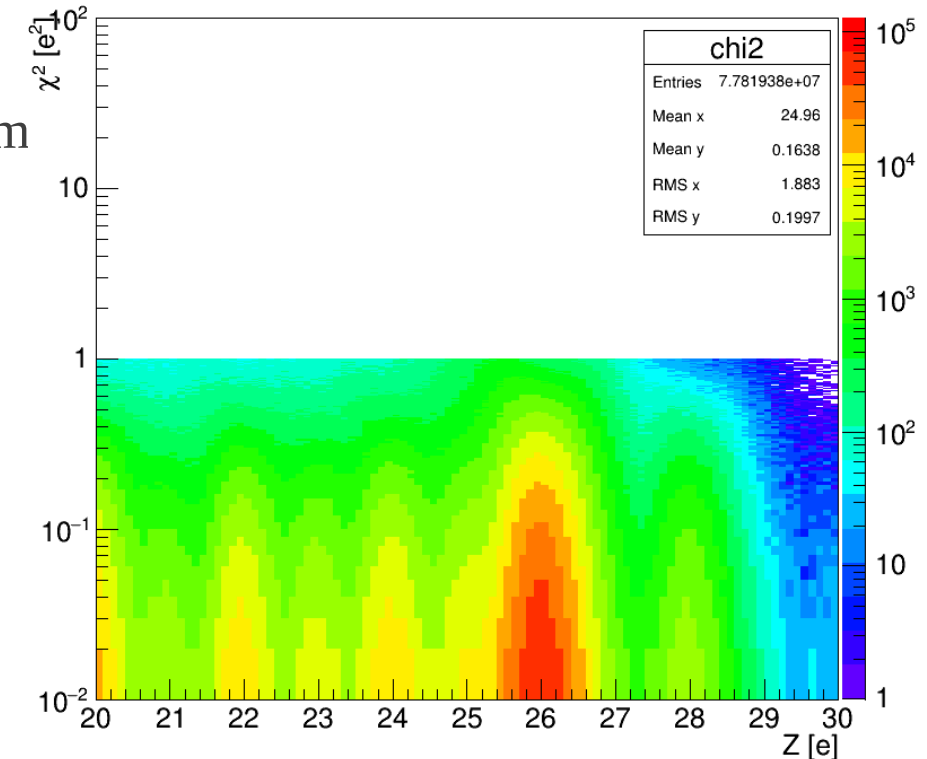
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4. BGO :

- $E_{\text{dep}} > \text{Energy cutoff}$
- Bars with max energy deposition are not at edge

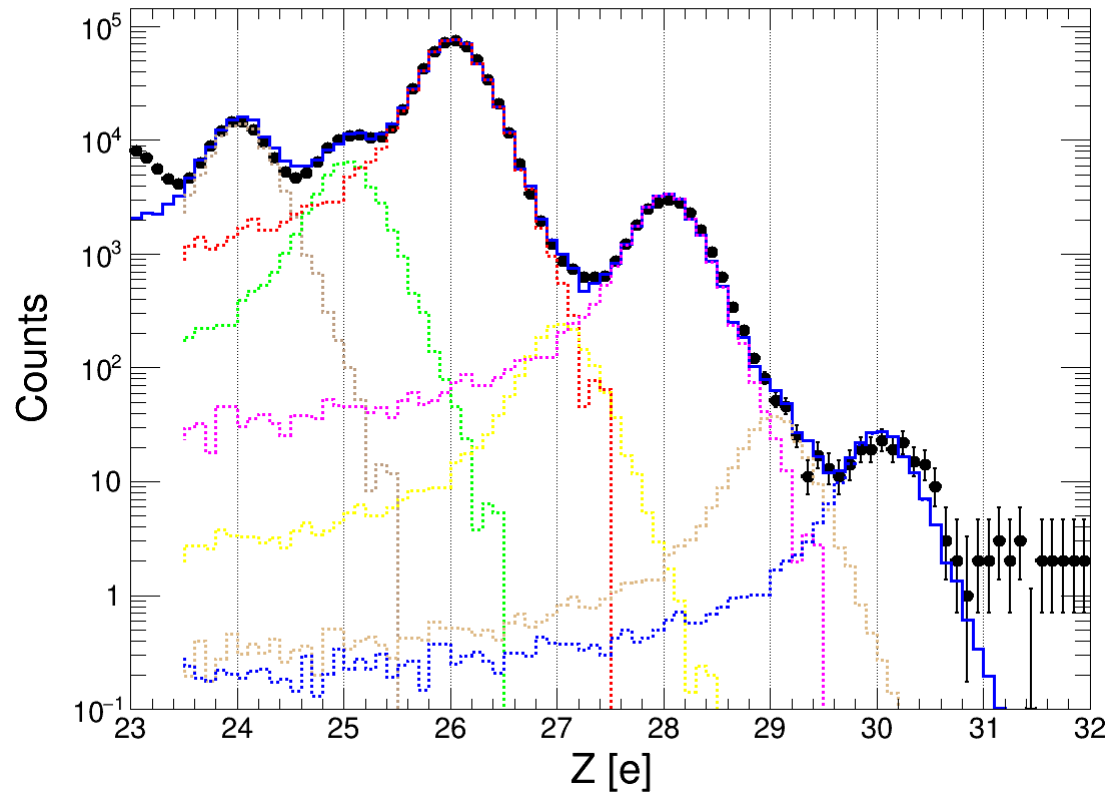
5. PSD :

- $Q = \frac{\sum_i \text{sub}Q_i}{n}, i = 0, 1, 2, 3$
- $Var \leq 1$

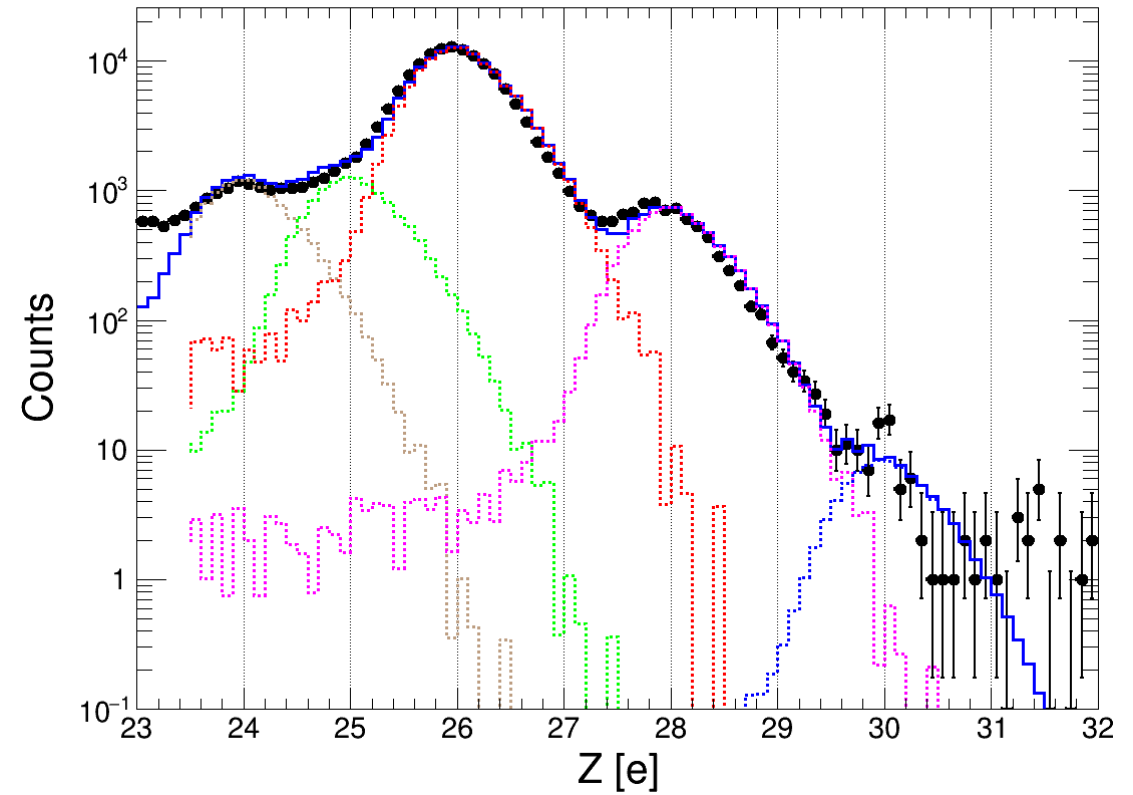


Templates

16.8_26.8GeV

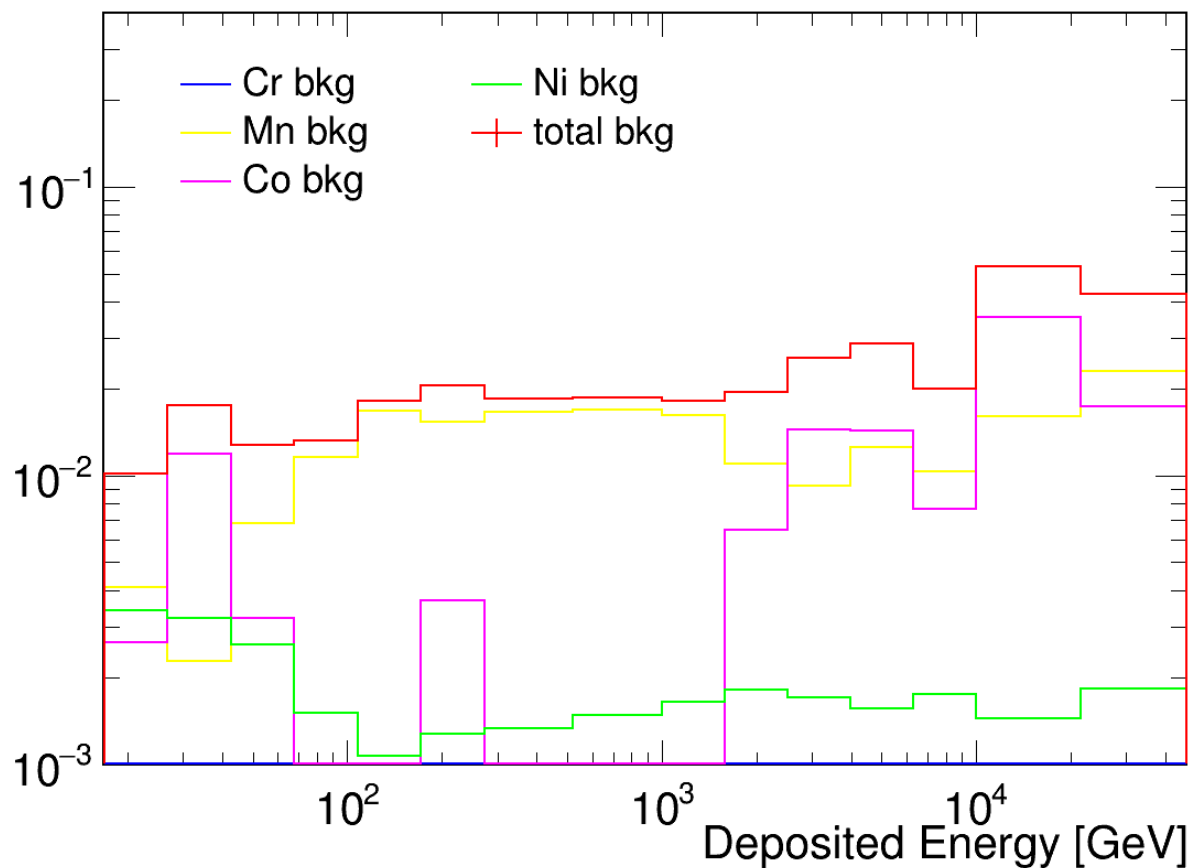


522.2_1000.0GeV

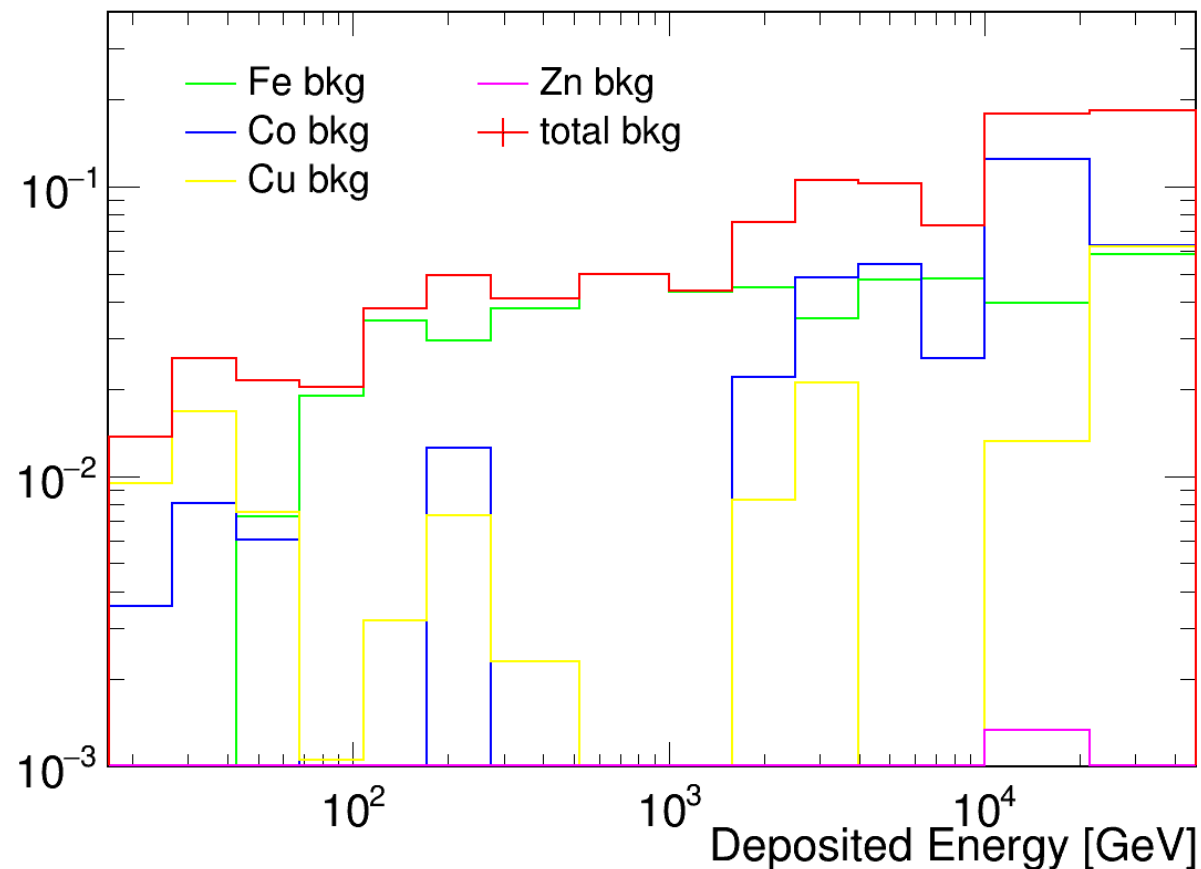


Background

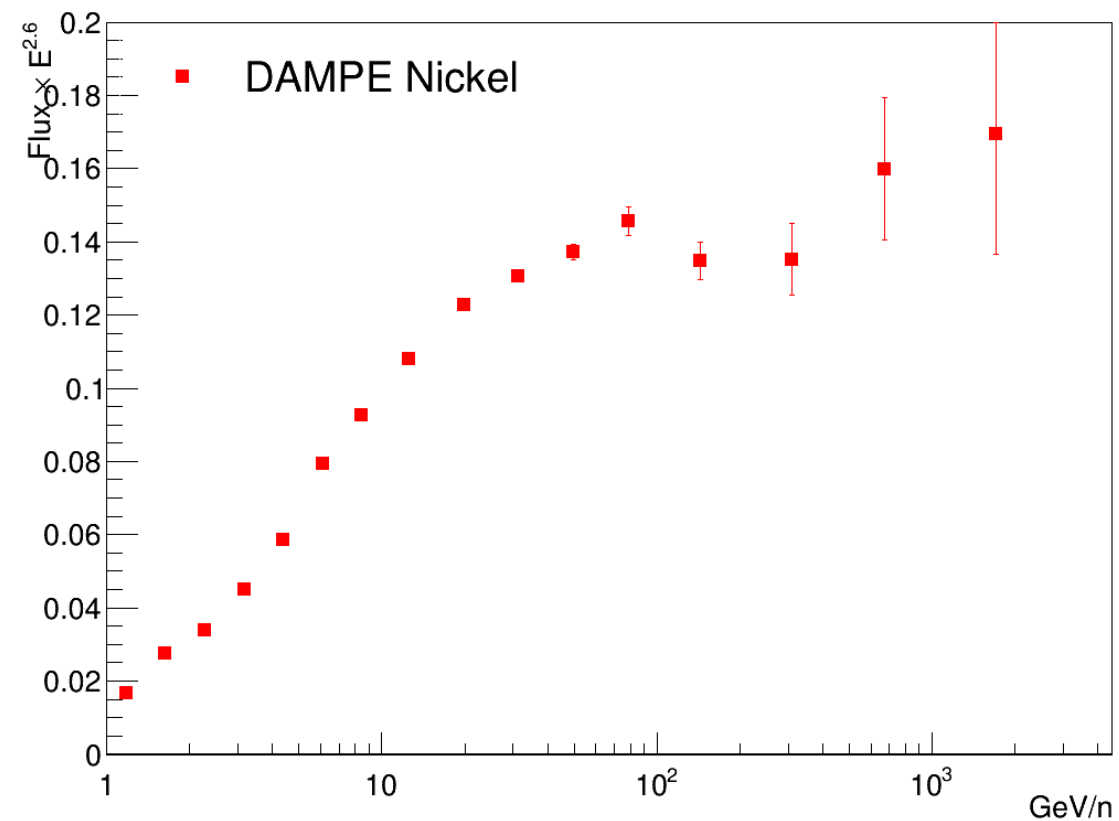
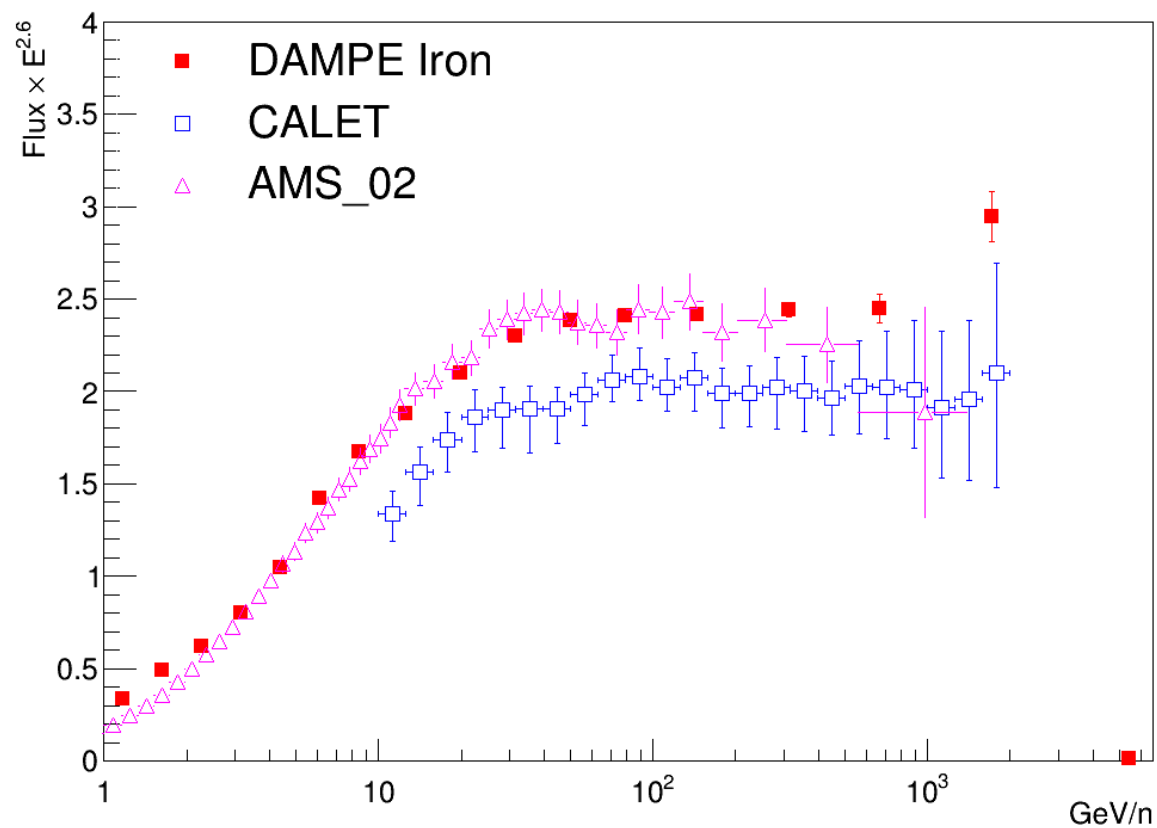
Iron



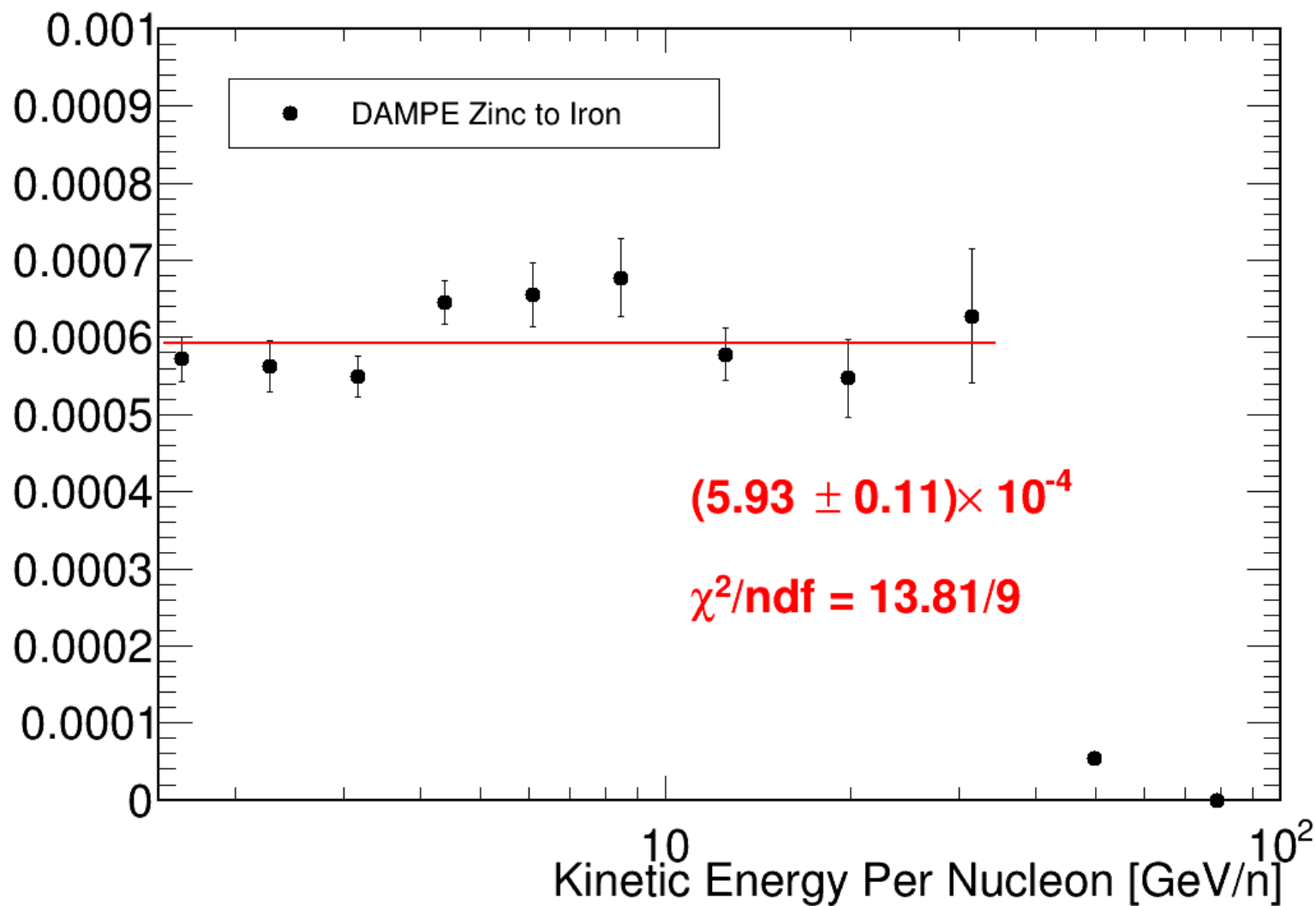
Nickel



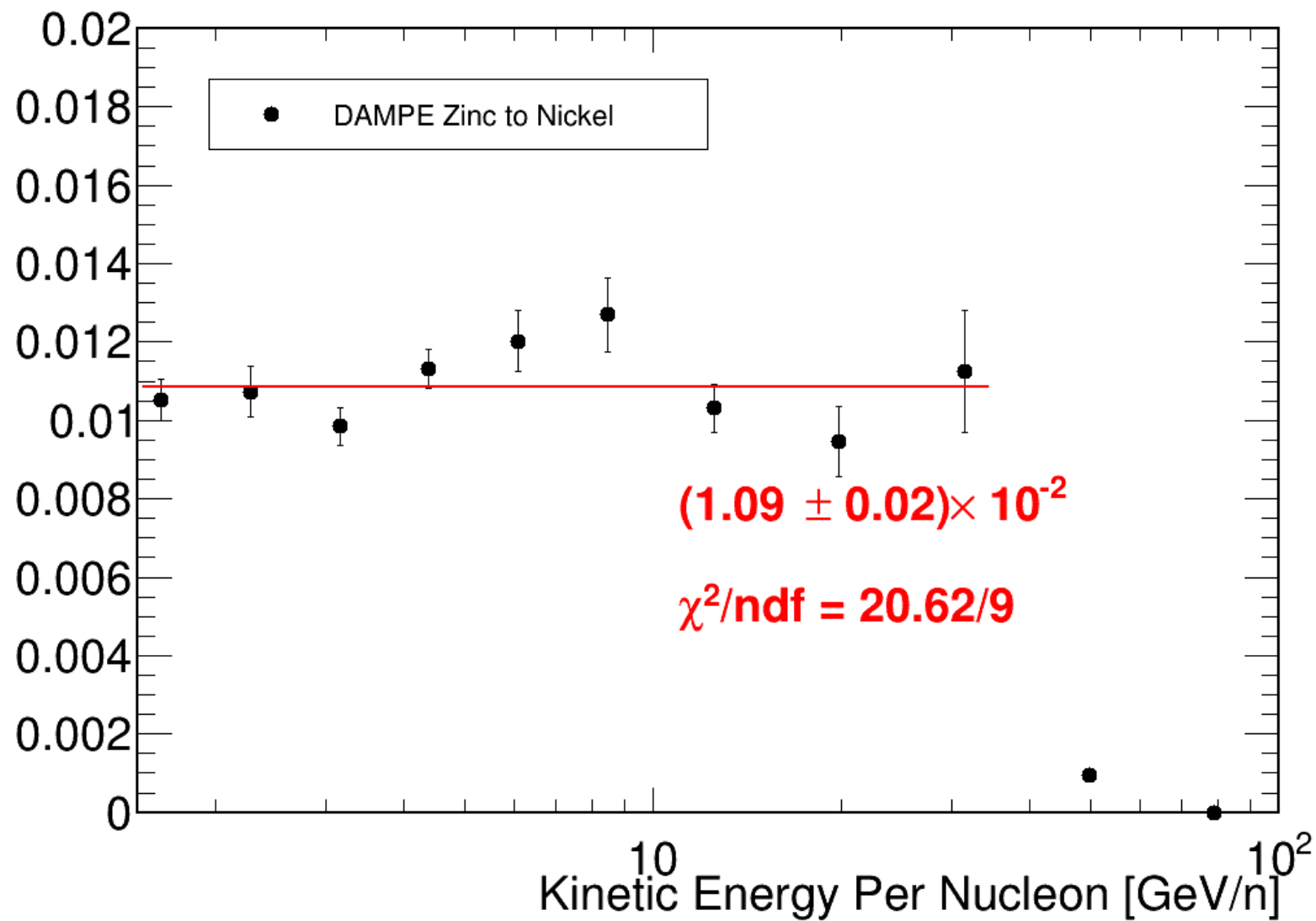
Preliminary results



Preliminary result



Preliminary result



Preliminary result

