

# Raw/MC data comparison for detector response function ( $^{16}\text{O} \rightarrow ^{12}\text{C}$ @ 400 MeV/u)

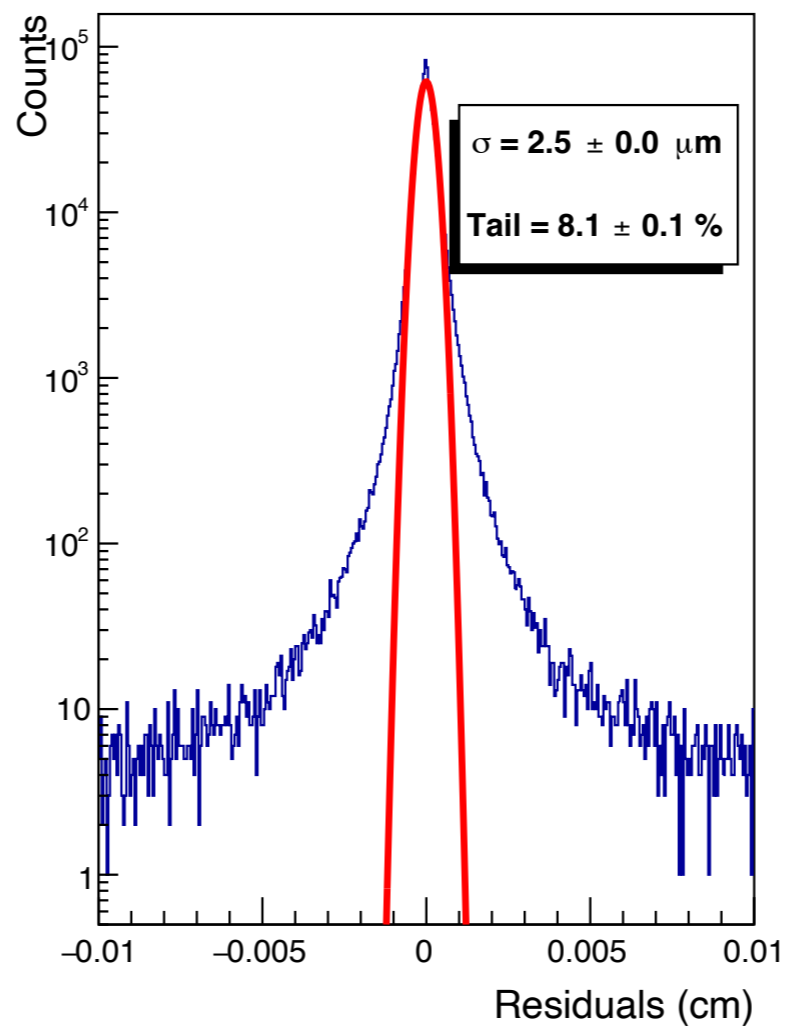
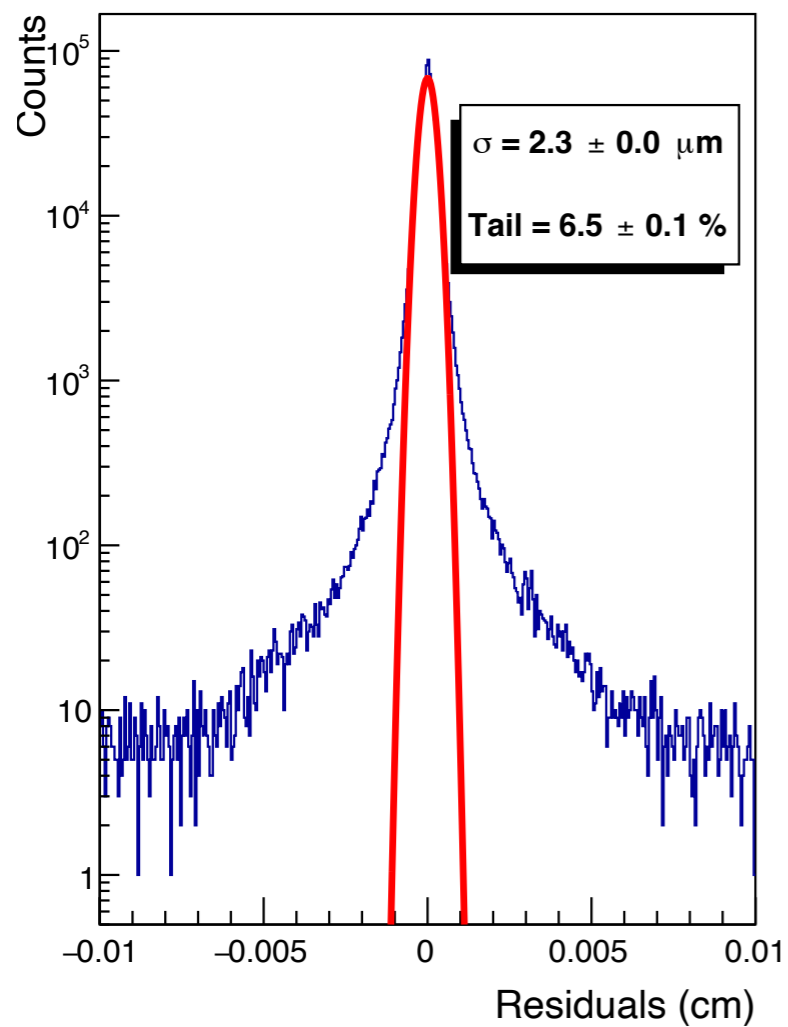
Christian Finck



VTX

# w/o target

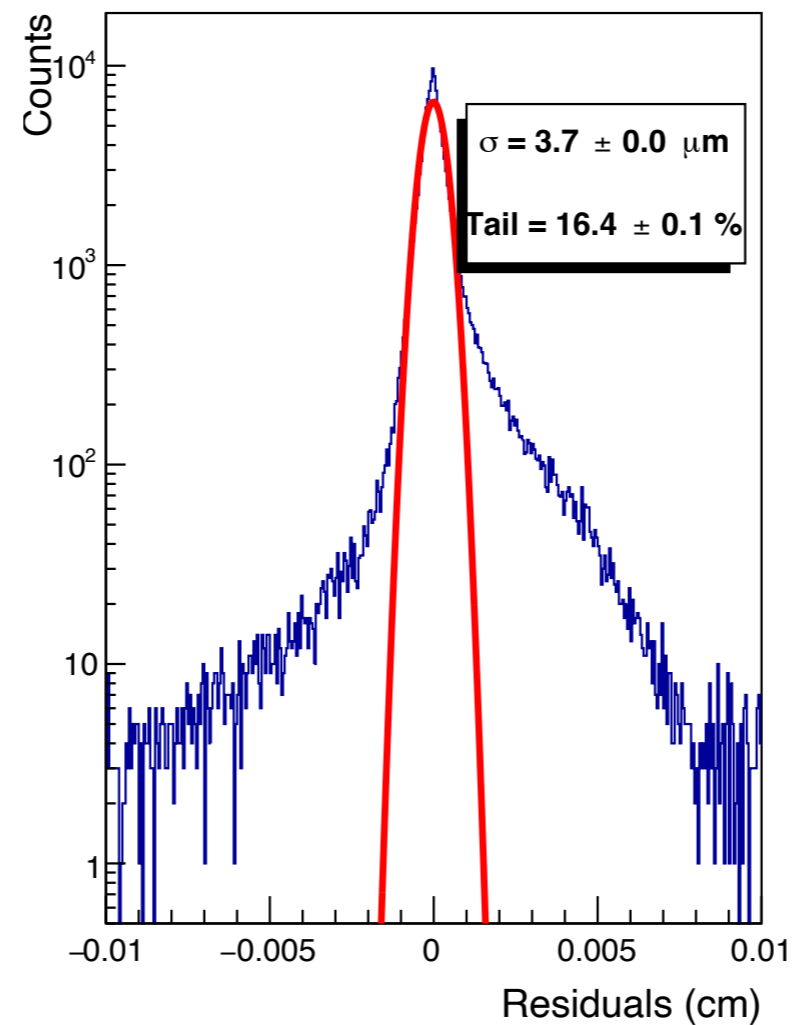
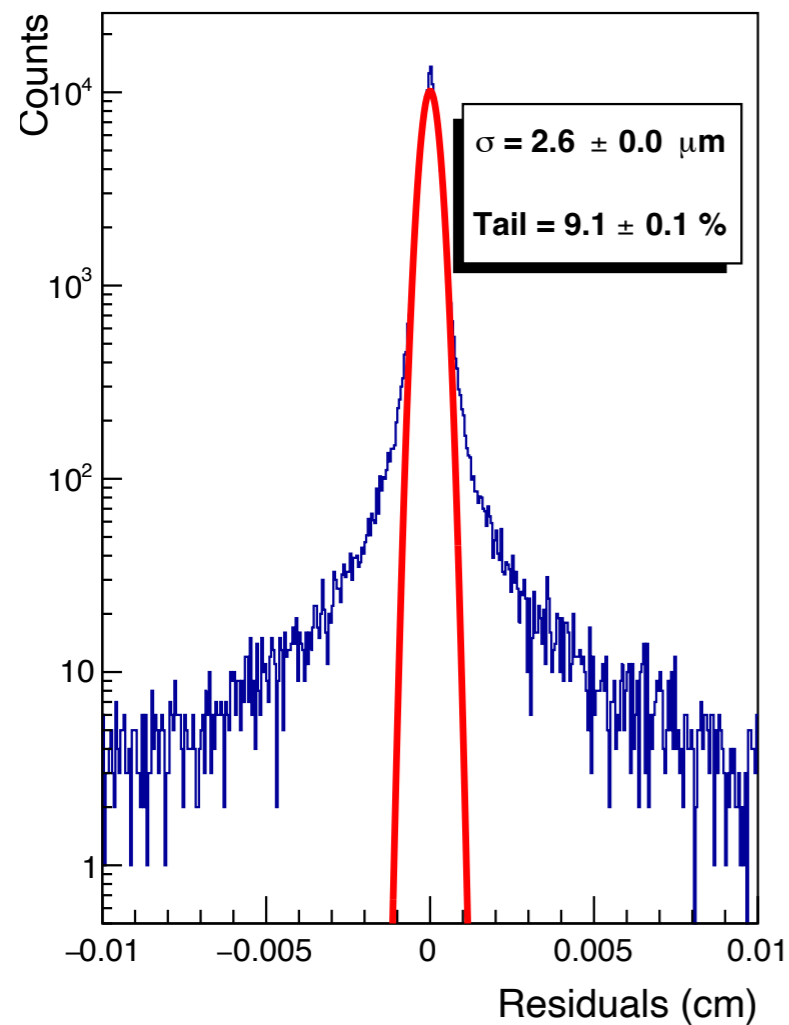
Alignment (cluster size > 20):



➔ Good alignment !

# with target (i)

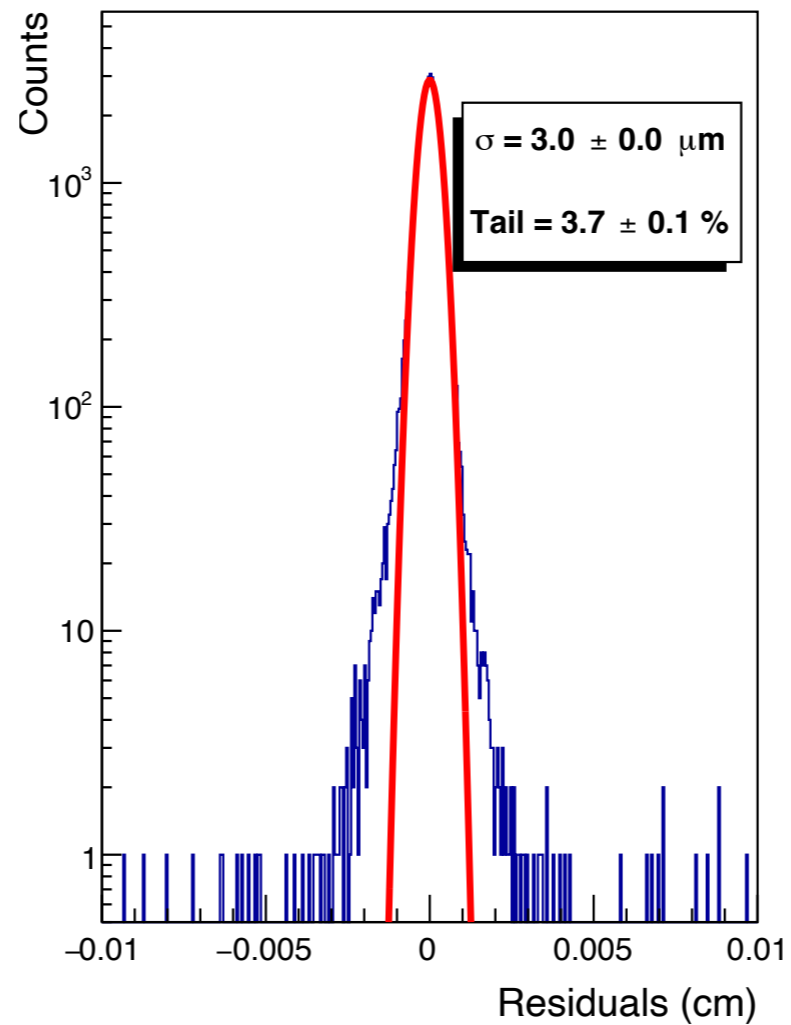
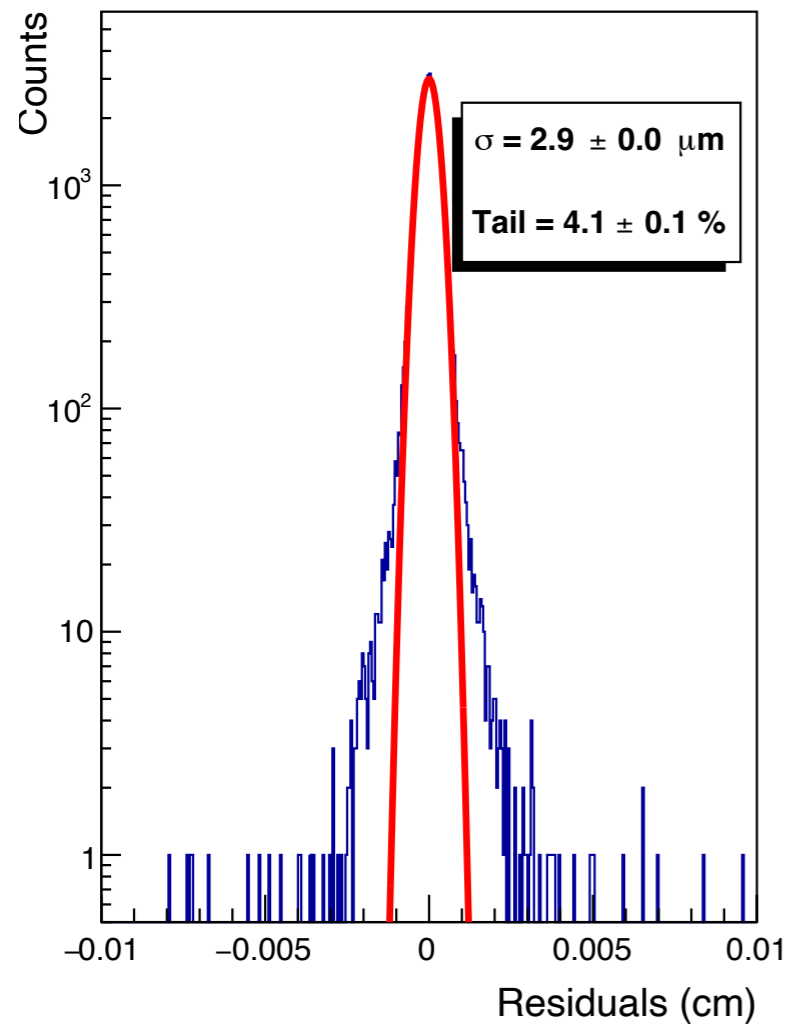
## Rawdata Residuals:



➔ Sensor moved in Y while placing target

# with target (ii)

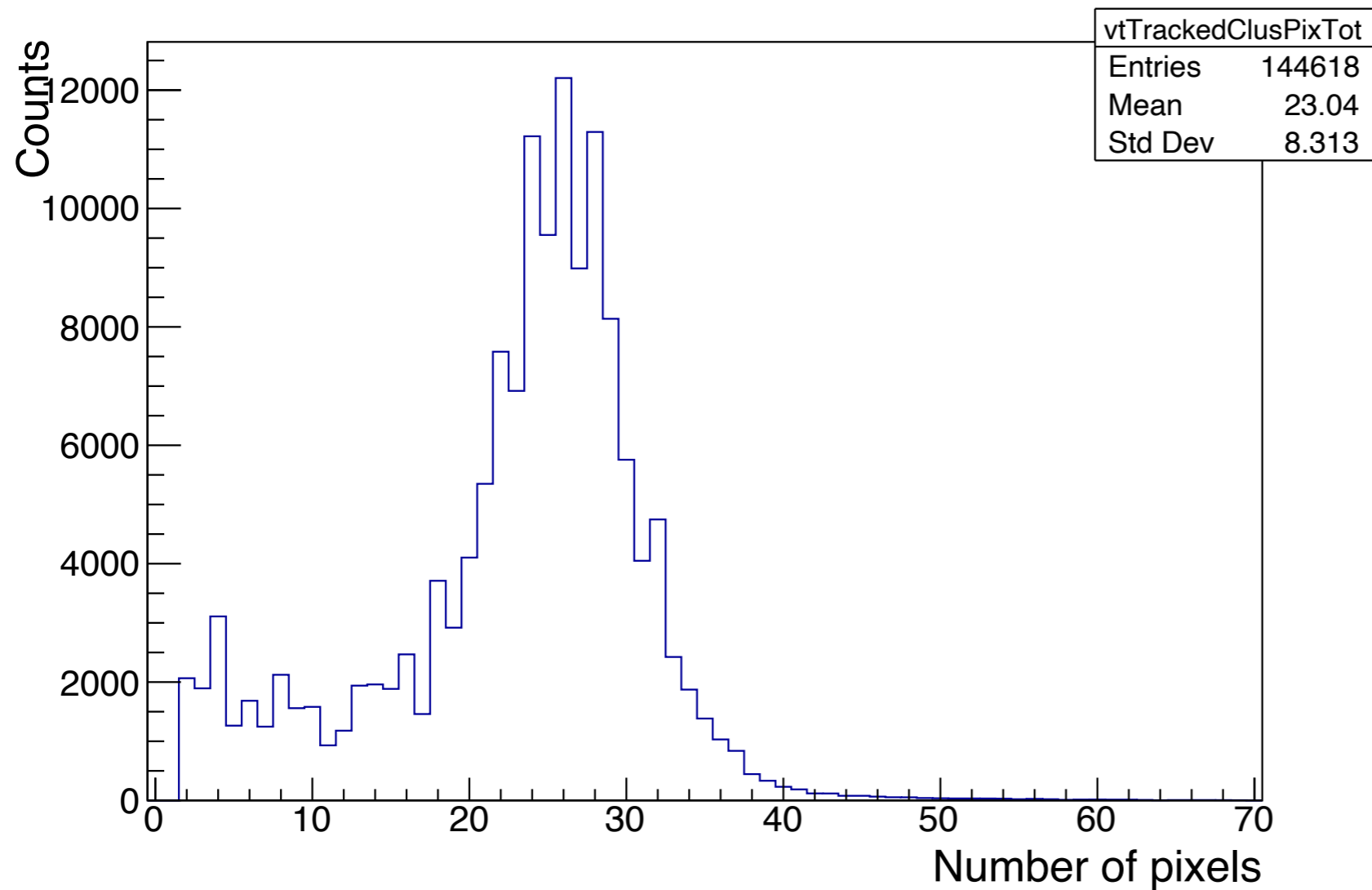
## MC data Residuals:



→ Sigma ok, tail too low, no variation of cluster shape with angle

# with target (i)

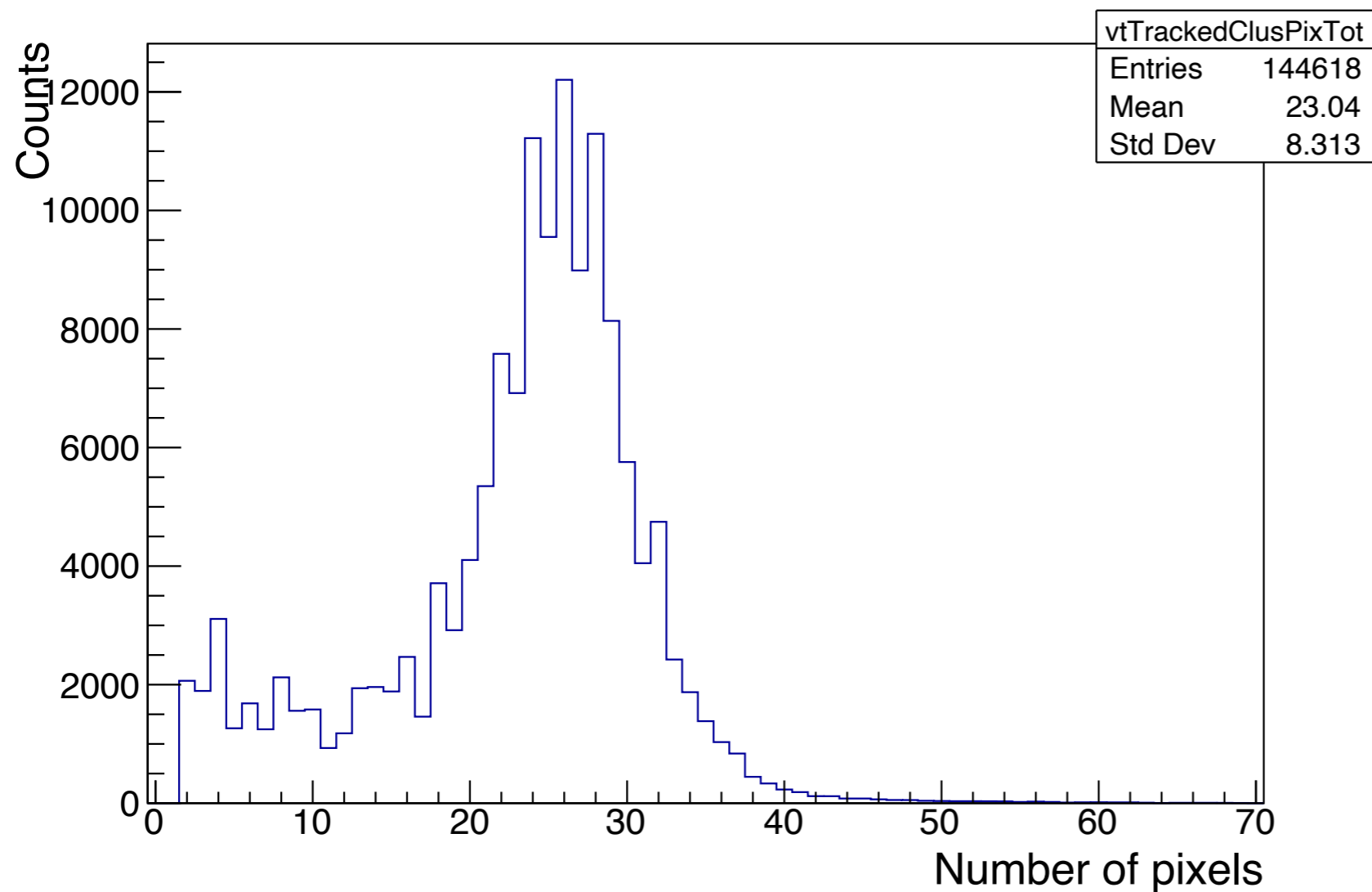
Raw data tracked cluster size (total):



→ Cut at 2 pixels

# with target (ii)

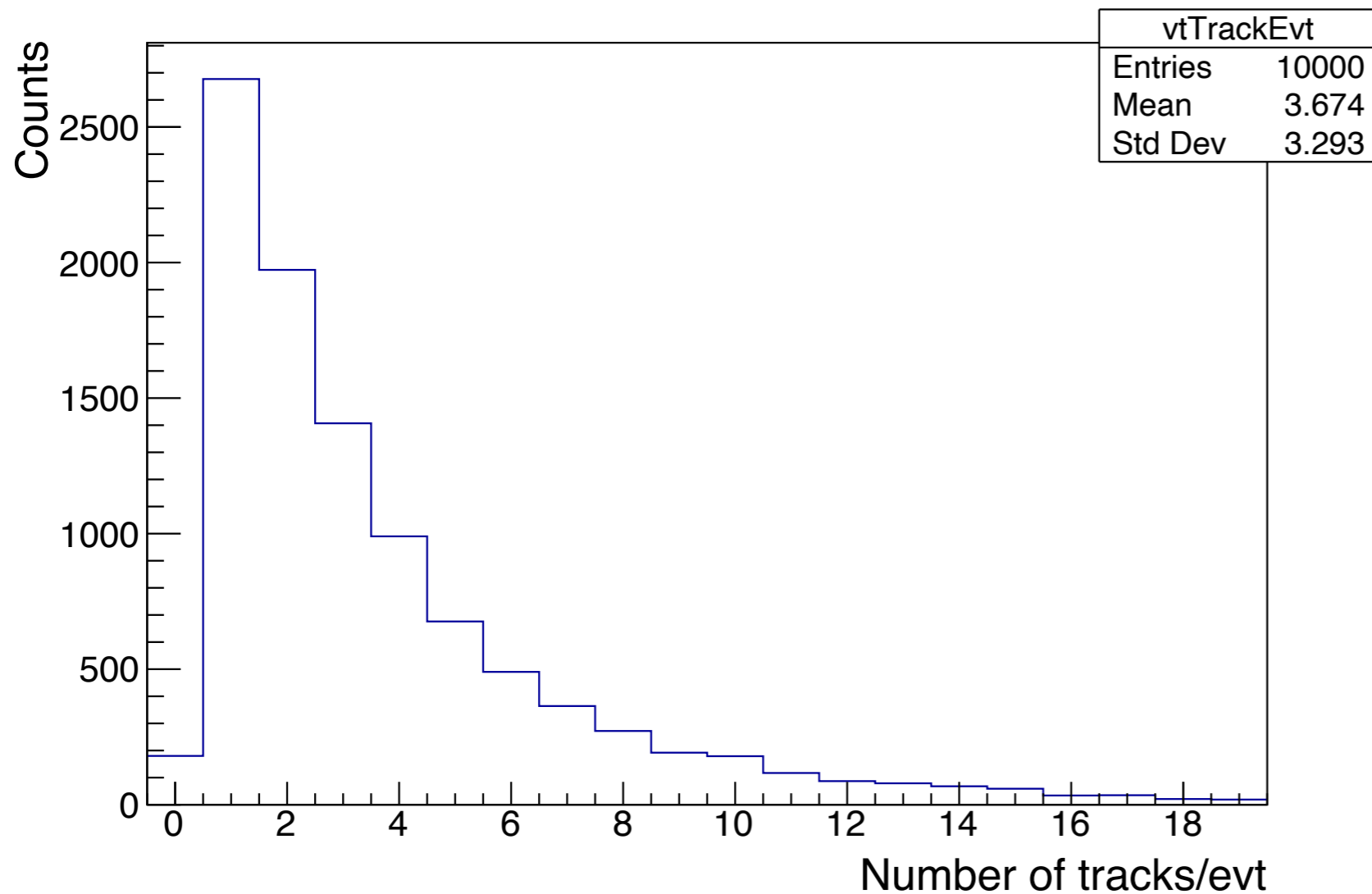
MC data tracked cluster size



- Less noise (not in simulation)
- ➔ Have to adjust the  $\Delta E$  (seems that the value is for the total and not epitaxial layer)

# with target (i)

Raw data tracks per events:

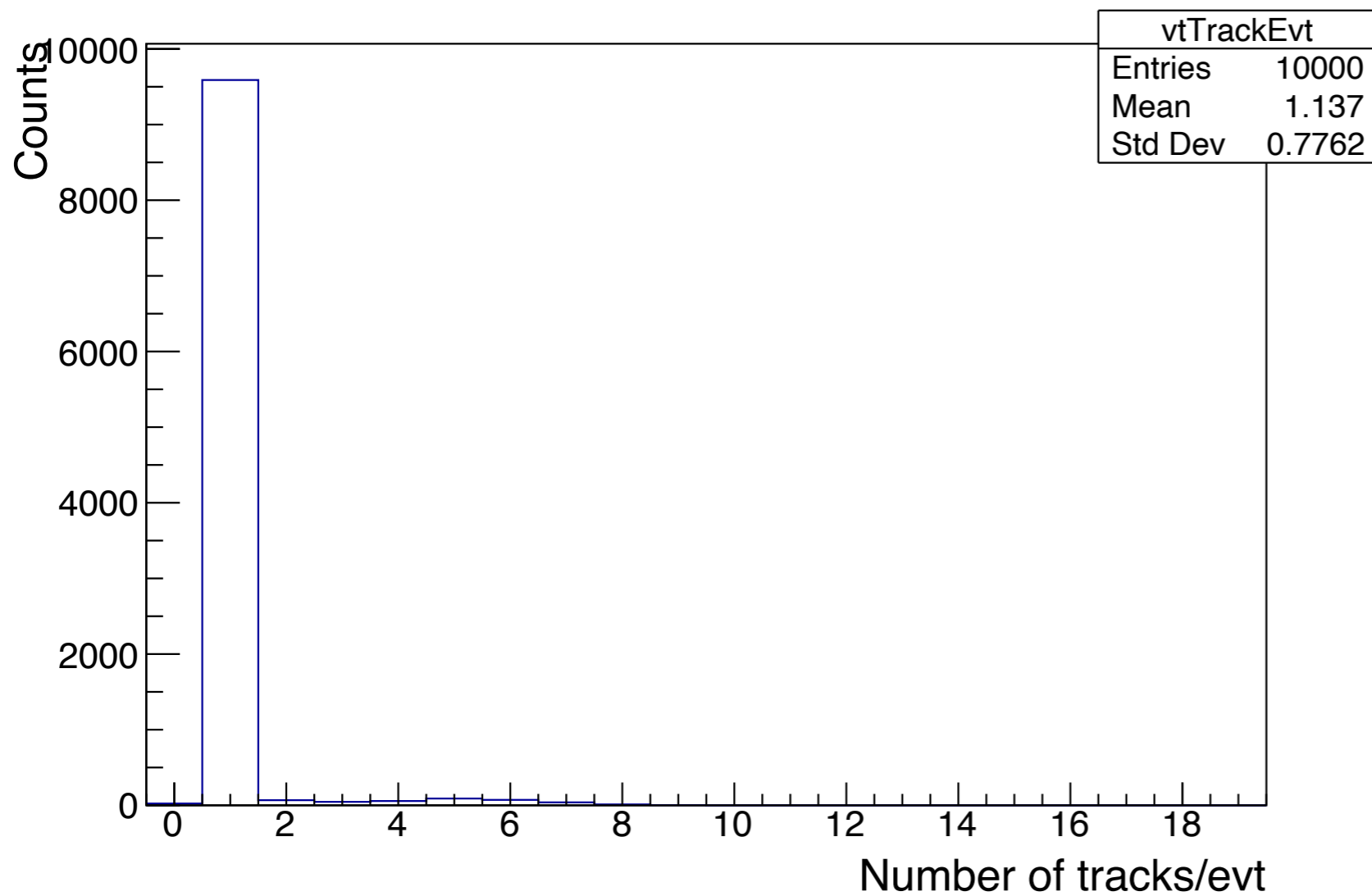


- Tracks presence in 98.2% of cases,
- Important proportion of pileup (70.6%)



# with target (ii)

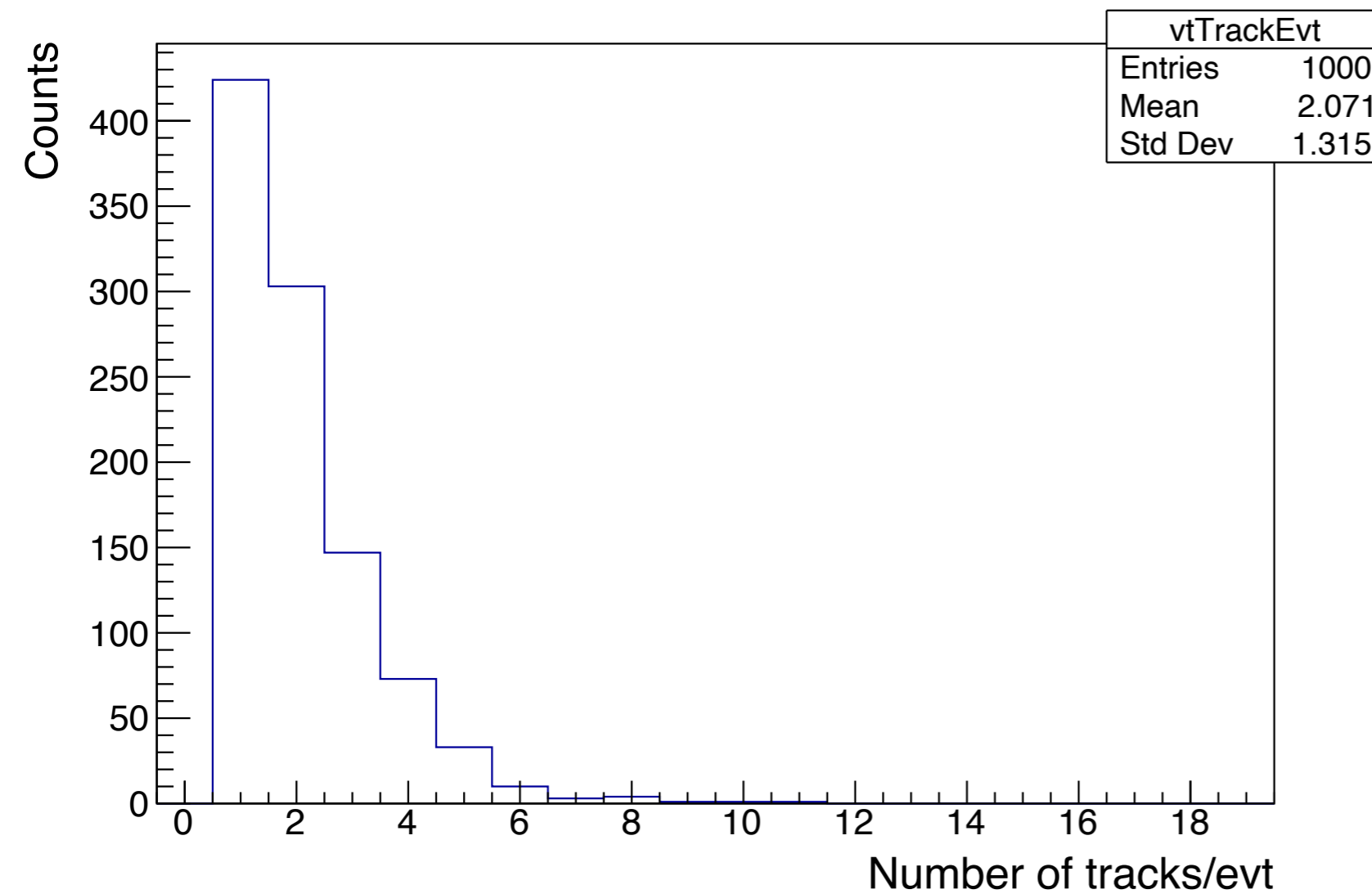
MC data tracks per events:



- Only one track per event in 96%
- No pileup flag on in simulation

# with target (iii)

MC data tracks per events (with pileup):

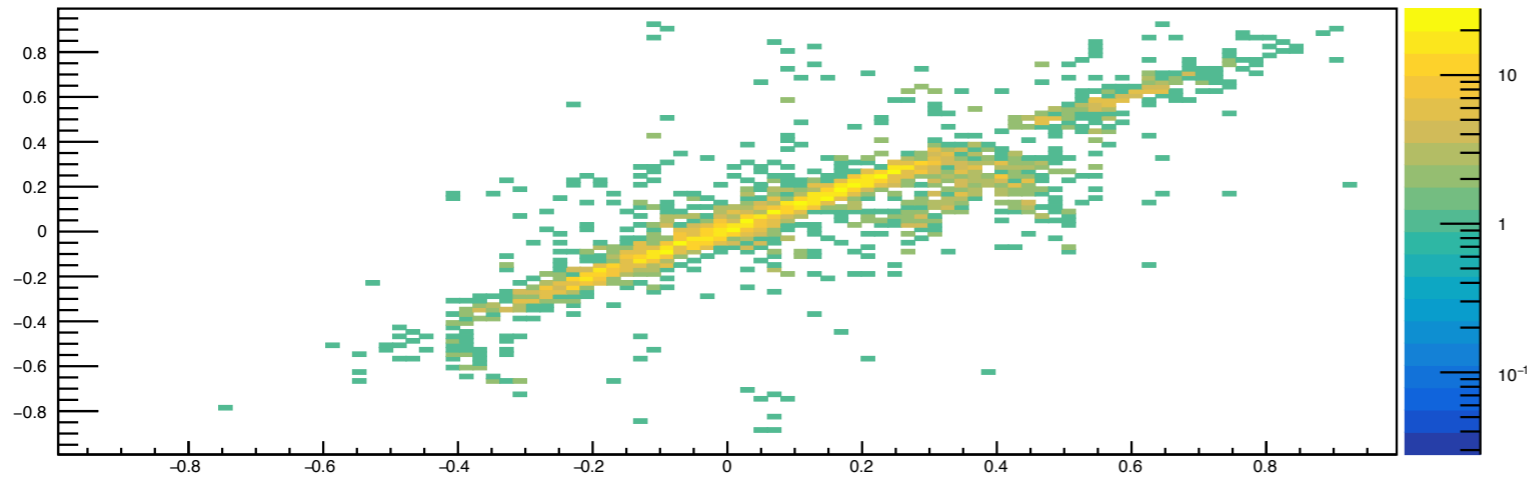


- Poisson distribution can NOT reproduce the data

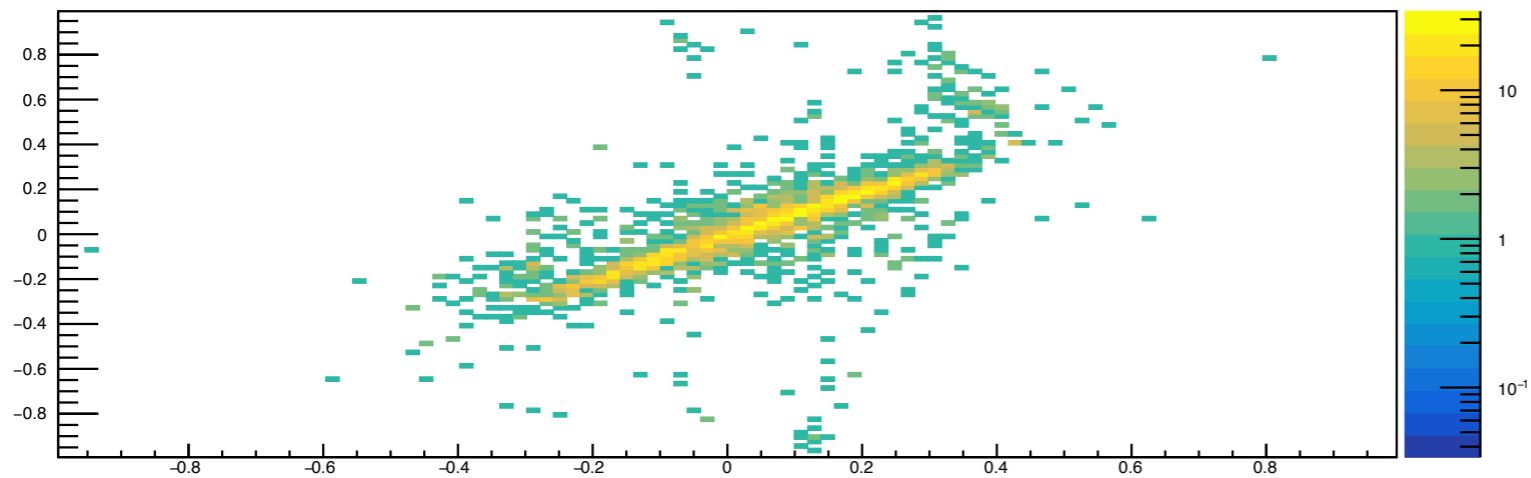
# Correlations

## Correlation with BM

Map X correlation for VTX tracks and BM tracks



Map Y correlation for VTX track and BM track

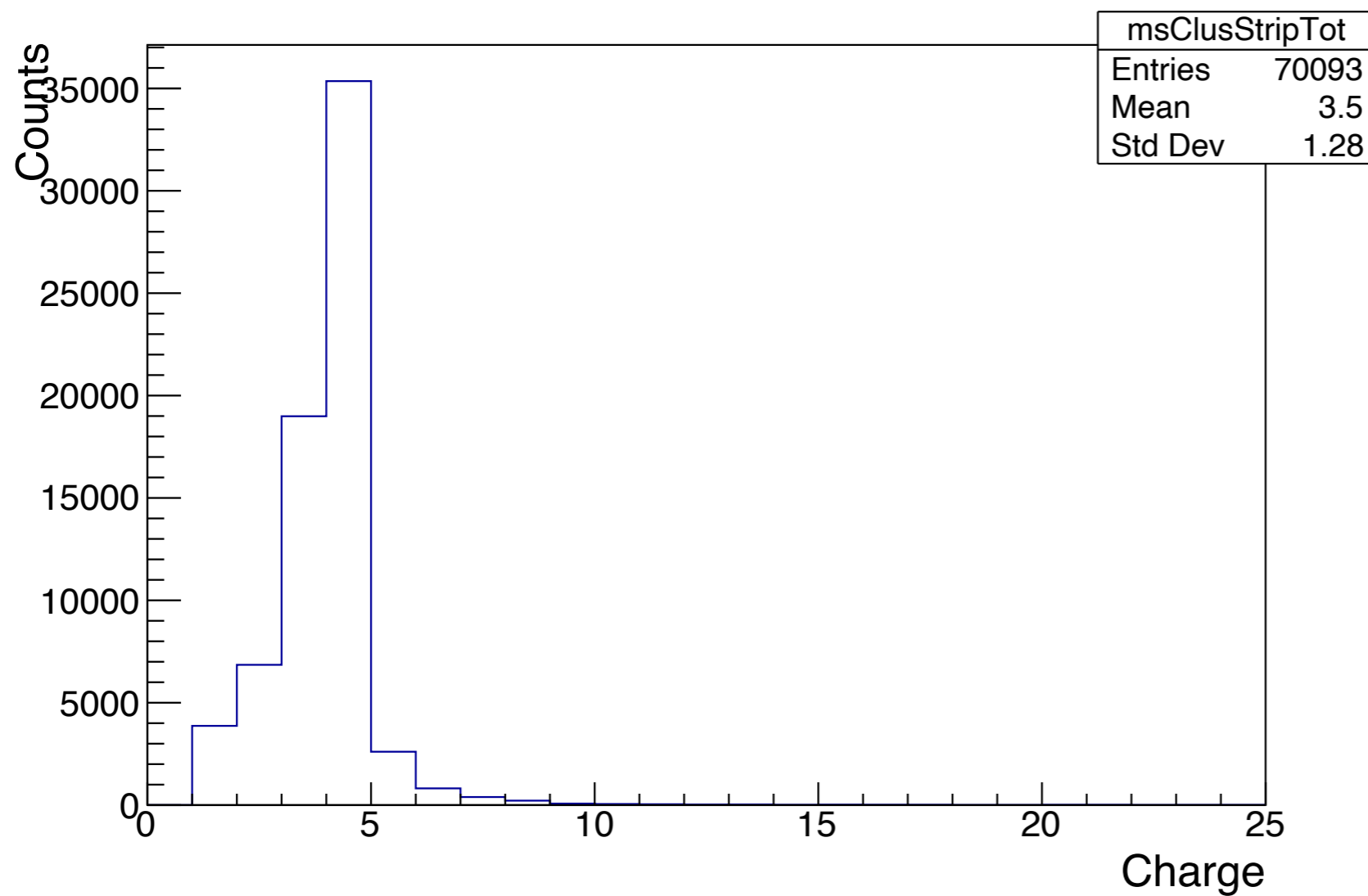


- Correlation btw tracks of BM and VTX til the end of run (~570 000 events)

**MSD**

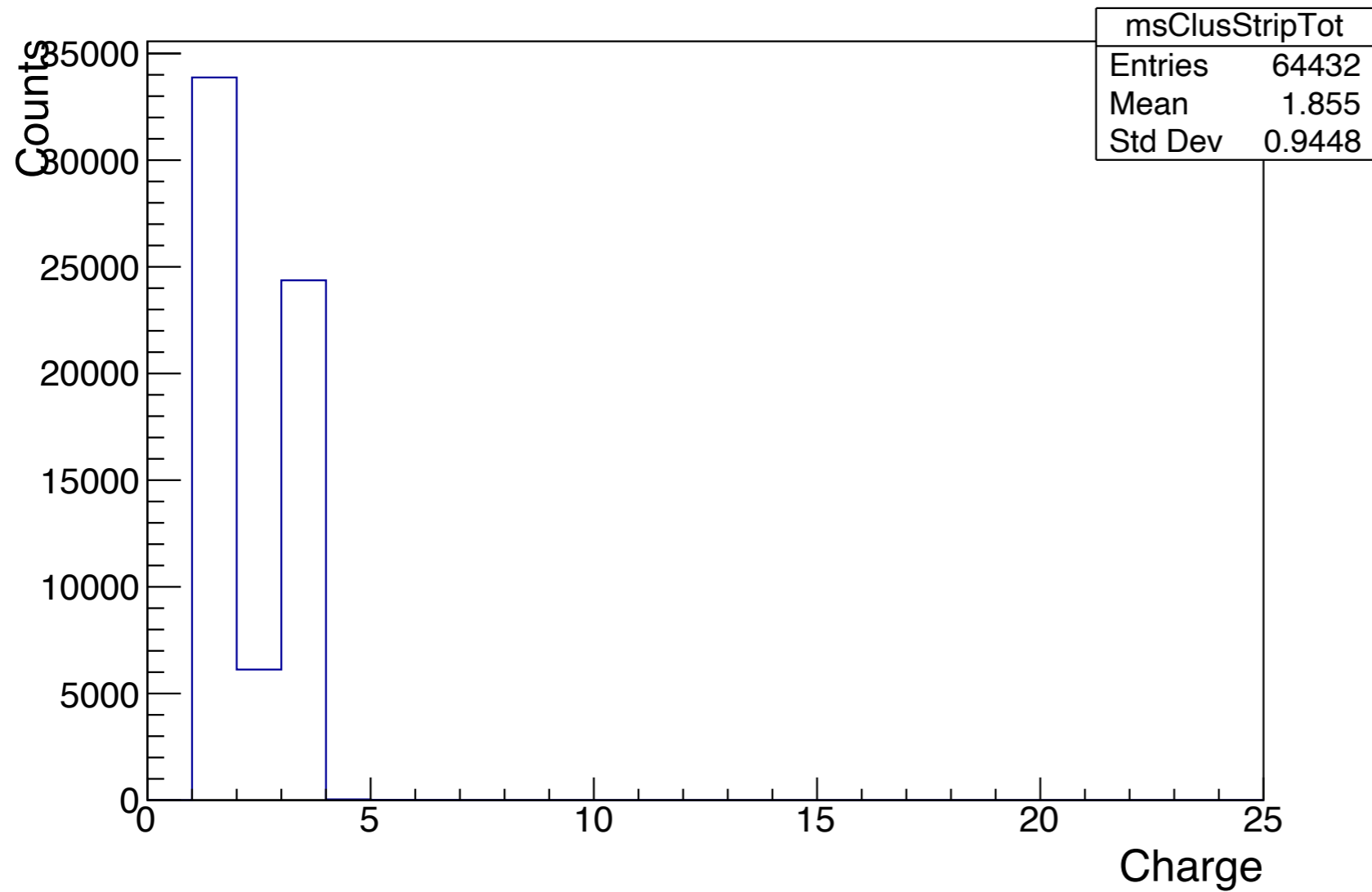
# with target (i)

- Raw data tracked cluster size (total):



# with target (ii)

MC data cluster size (total):

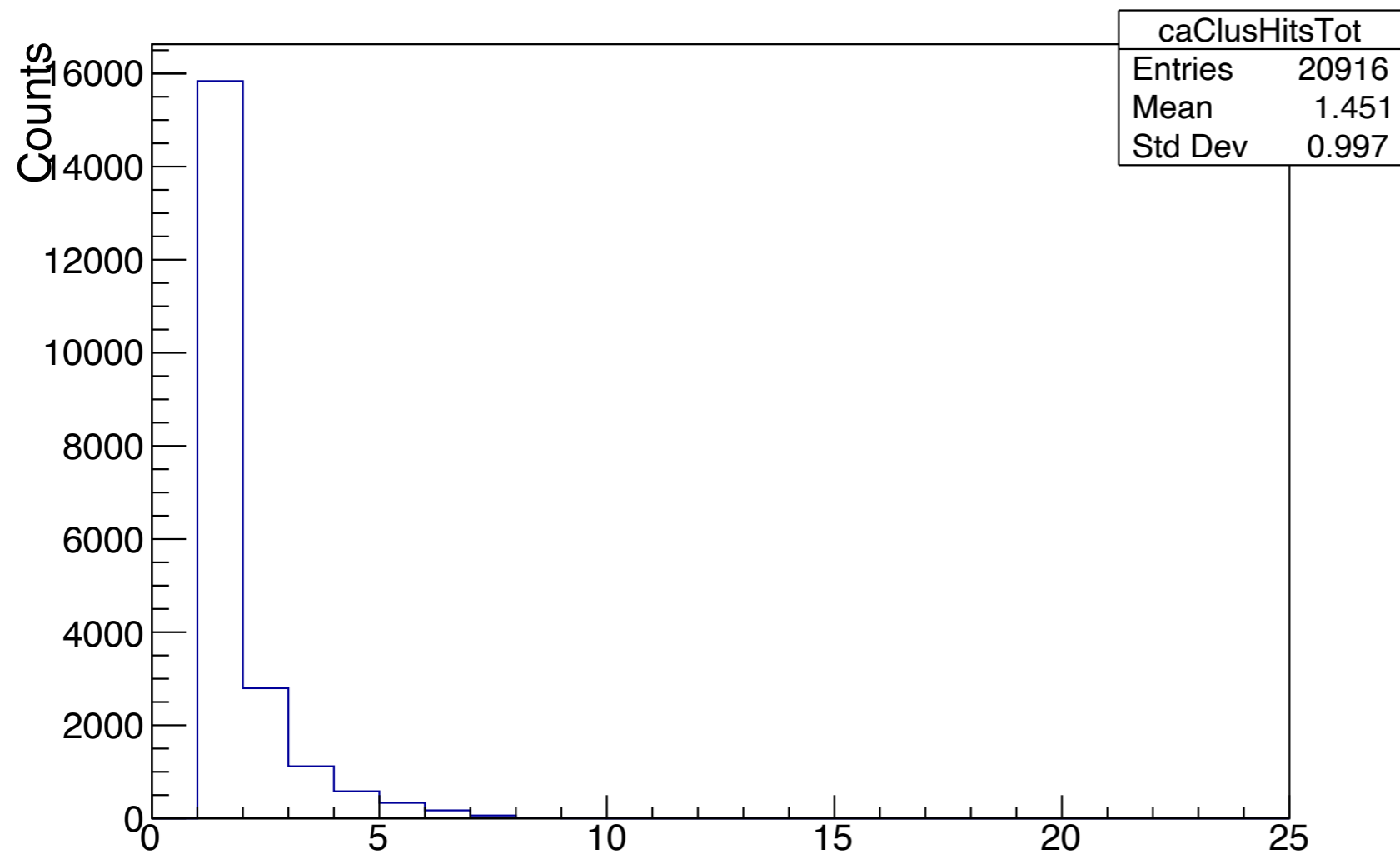


➔ Dummy Eta function in simulation !

CAL

# with target (i)

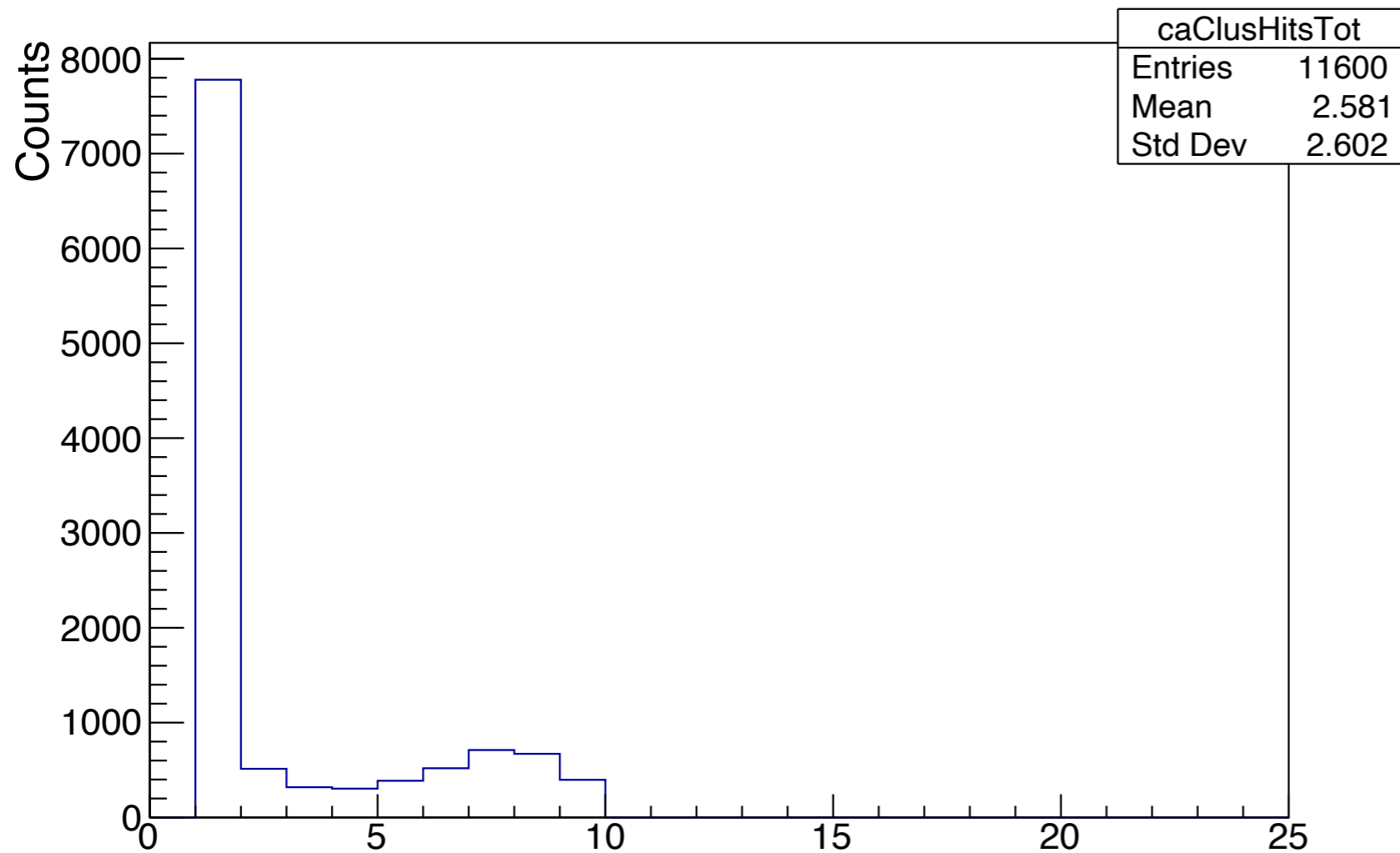
Raw data cluster size (total):





# with target (ii)

MC data cluster size (total):

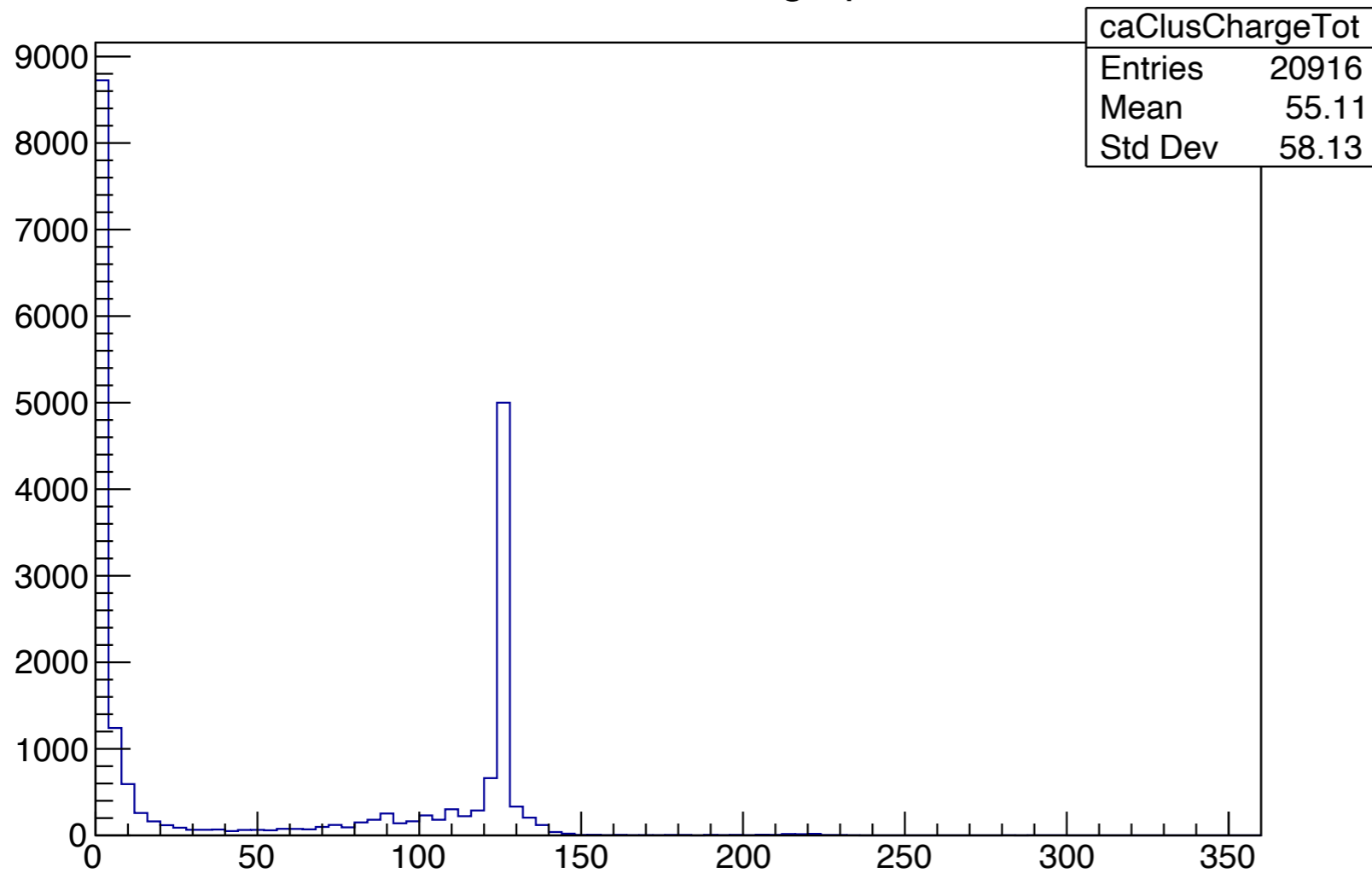


➔ Tune threshold in simulation

# with target (i)

- Raw data cluster charge (total):

Calorimeter - Total charge per cluster

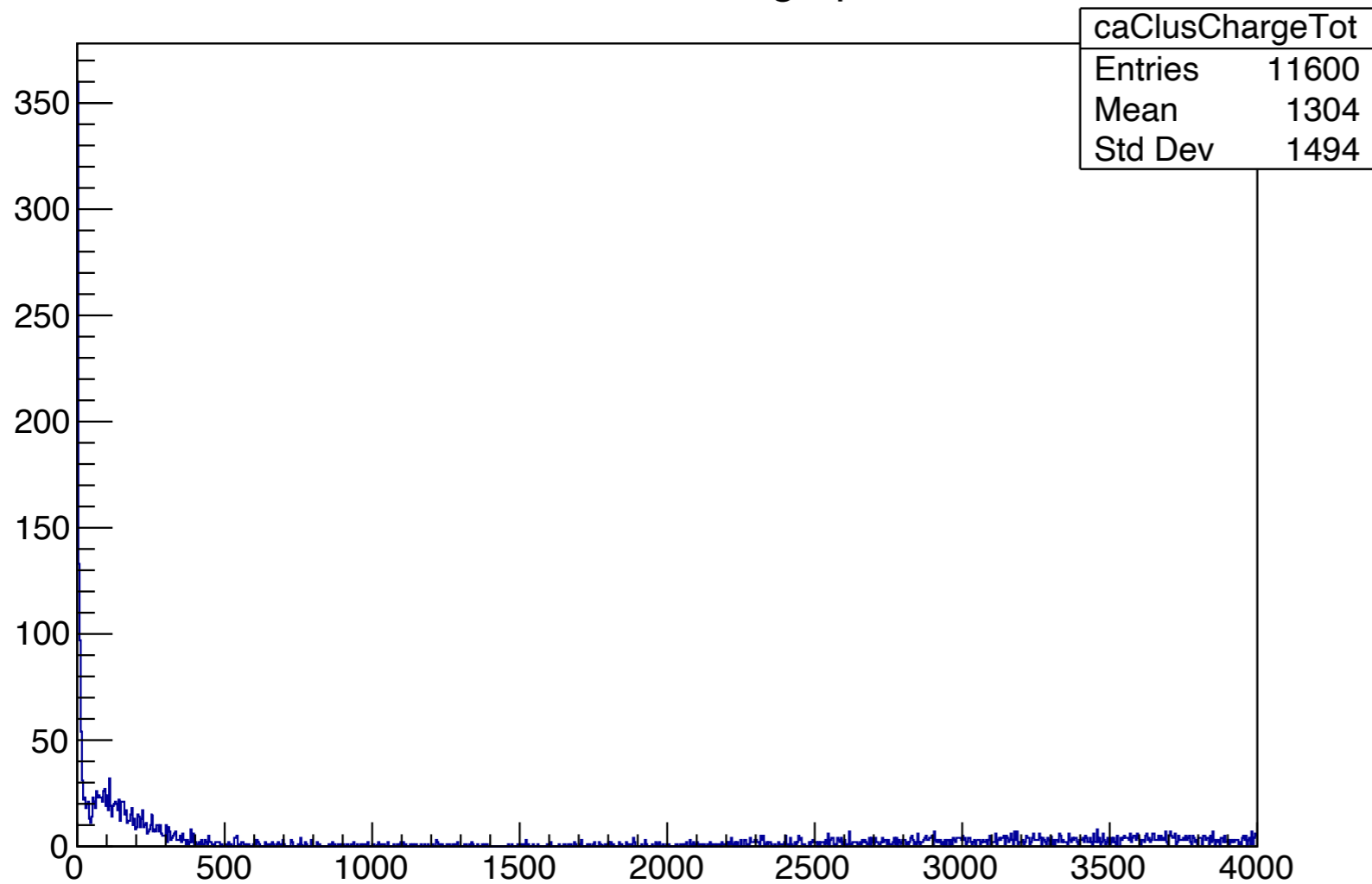


➔ Most clusters have no charge ?

# with target (ii)

MC data cluster charge (total):

Calorimeter - Total charge per cluster

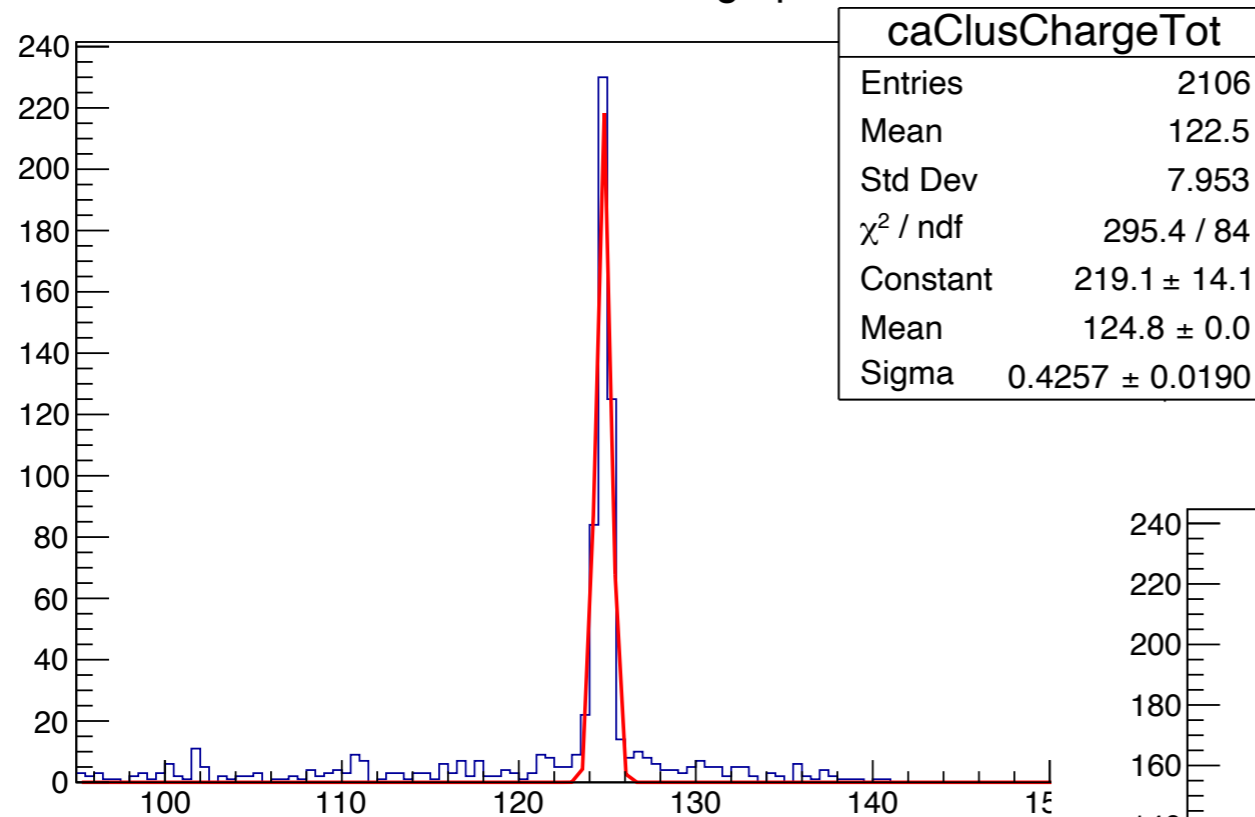


→ ??

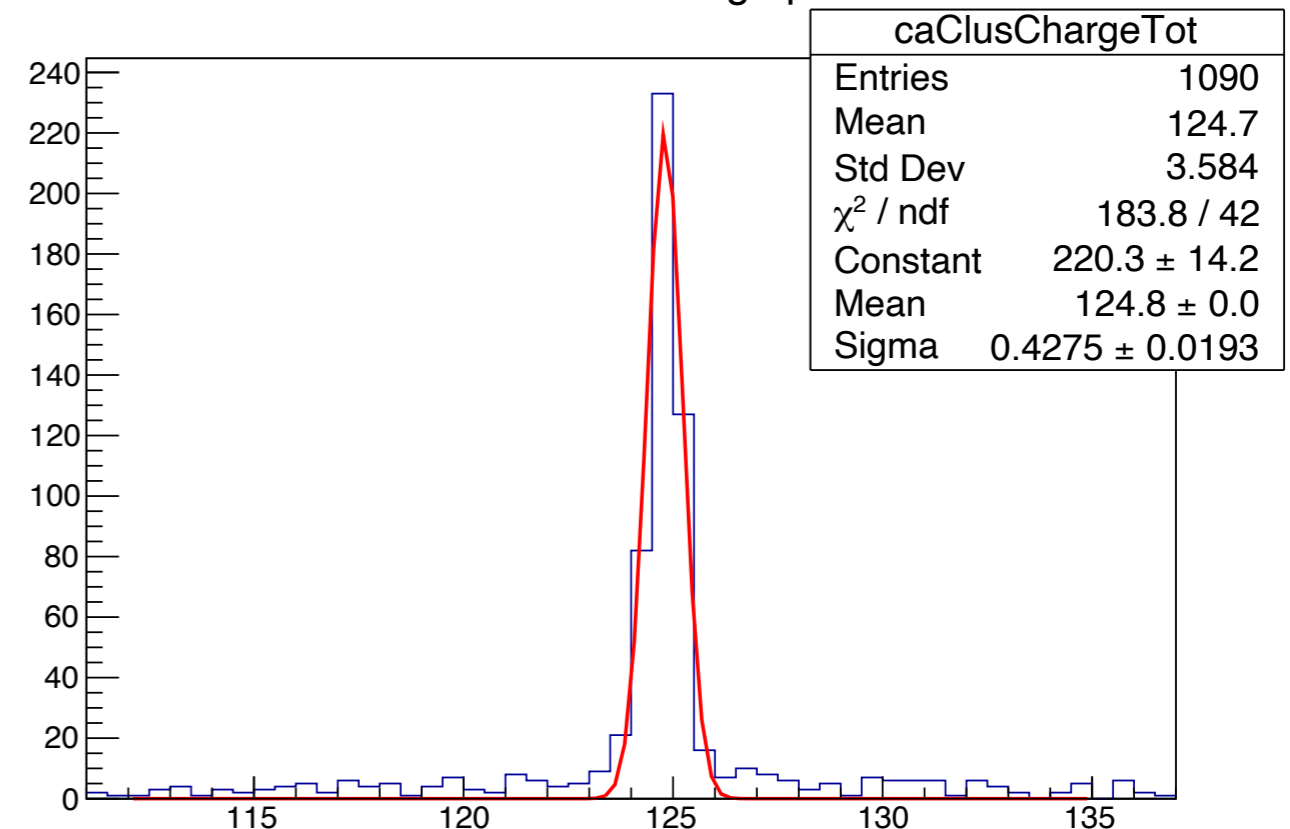
# with target (iii)

## Raw data cluster charge (change clustering):

Calorimeter - Total charge per cluster



Calorimeter - Total charge per cluster



➔ Same results (faster)

➔ Reject noise

# Conclusions

- ❑ VTX simulations tuned

- ➔ Still not perfect
- ➔ Good enough

- ❑ MSD-CAL simulations

- ➔ Response function missing or badly parametrised

- ❑ ST-BM-TW simulations

- ➔ Not shown, but seems ok, need maybe some fine tuning

- ➔ Experts should check the response function in MC with raw data

- ➔ Need also to implemented dead map for MC (not yet done for all detectors)

**Backup**