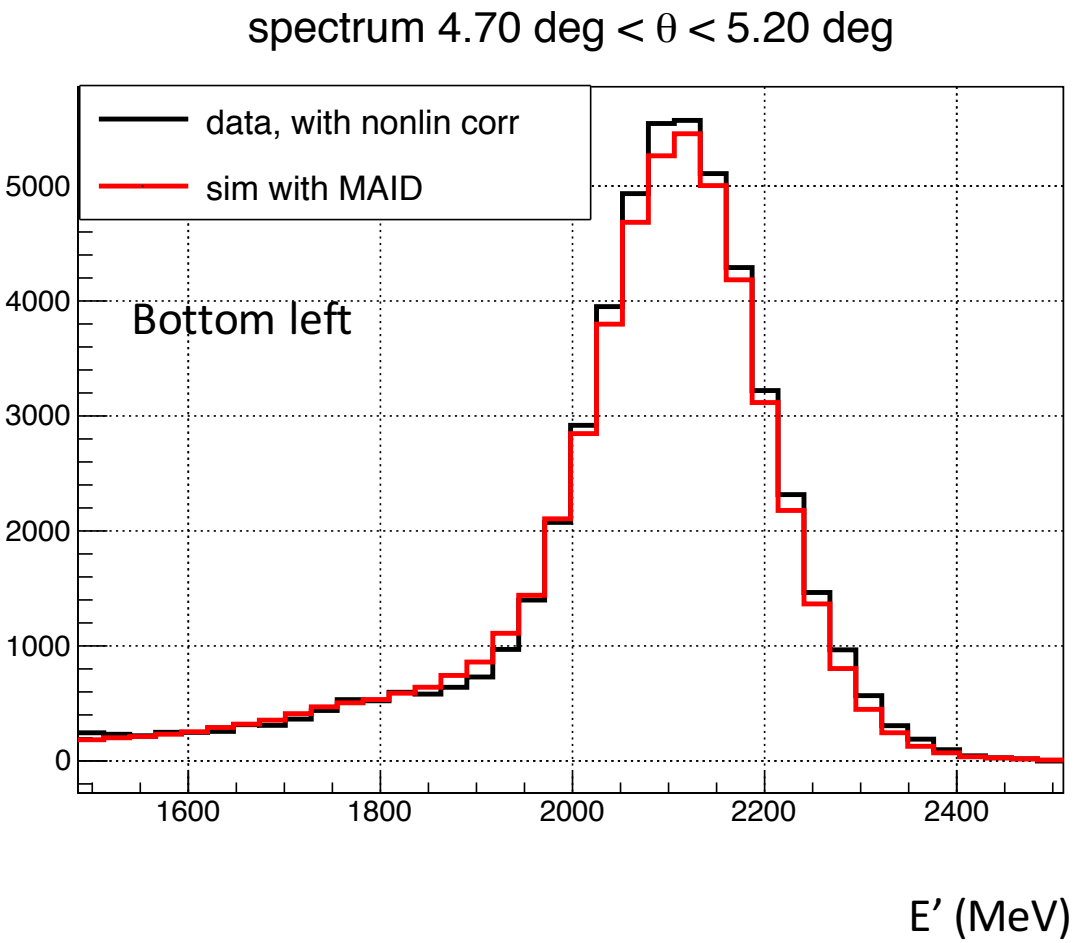
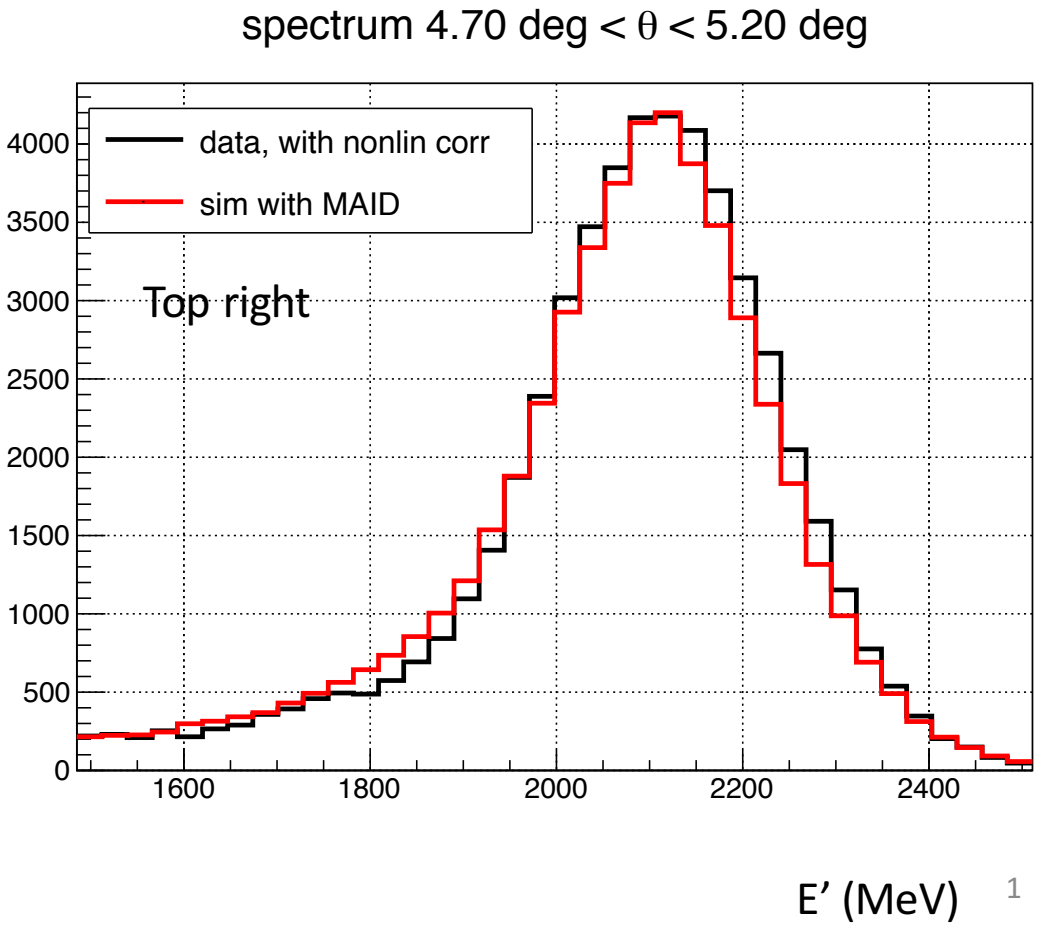
# Problem with LG simulation

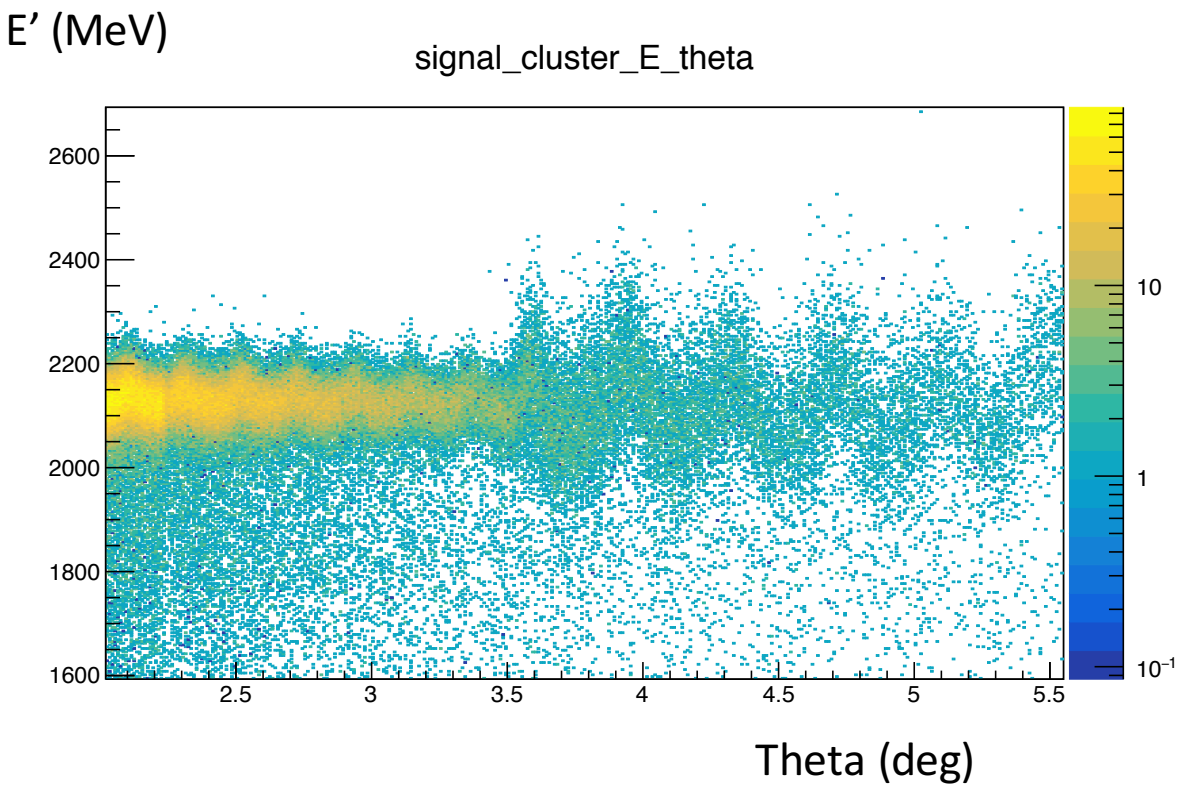
- In the simulation, the elastic tail is always larger than the that from the data
- Top right part of LG is more obvious than the bottom left
  - Probably because there is a  s-shape in the energy reconstruction
  - Cherenkov behavior of LG detector not properly simulated previously

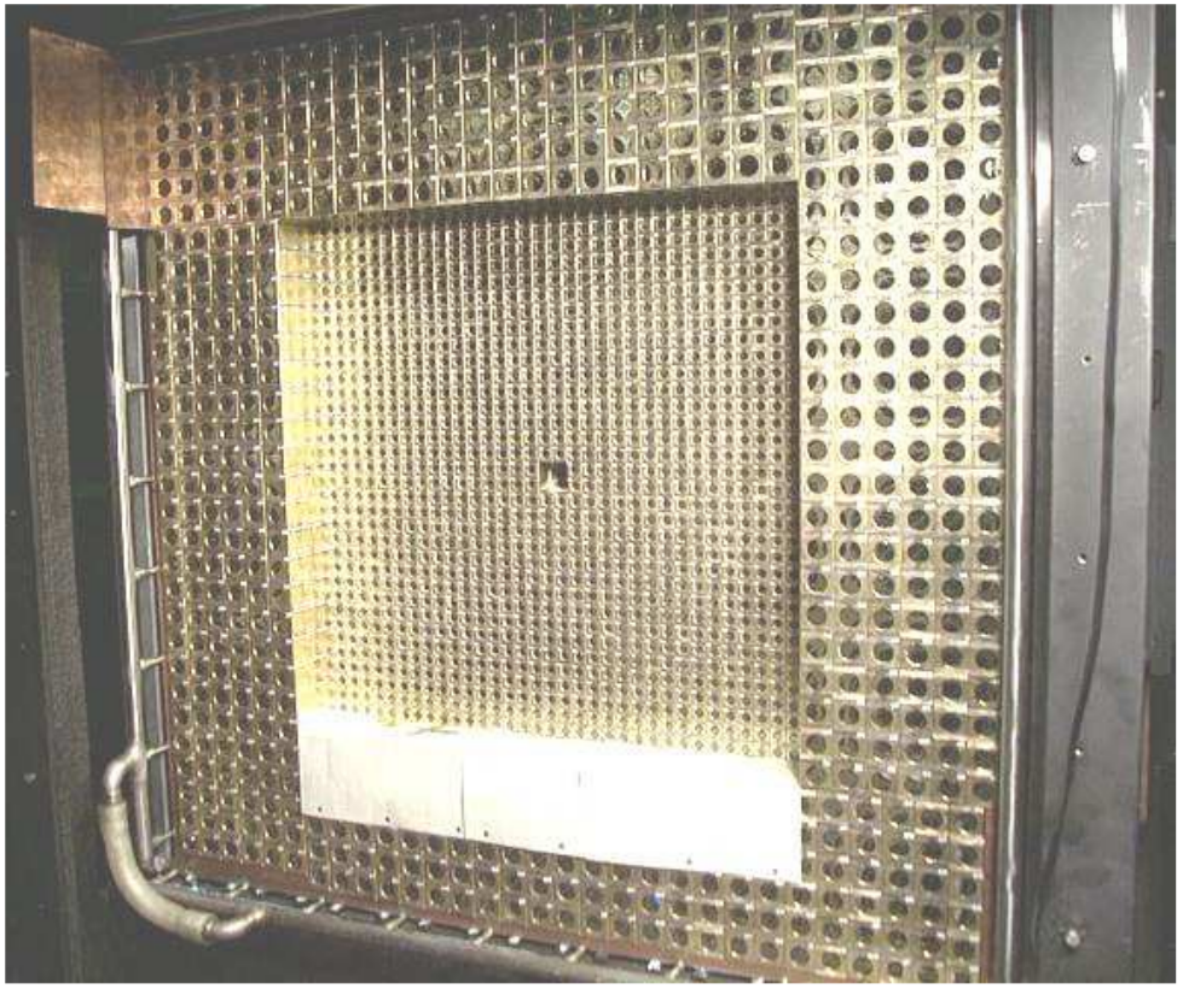


# S-Shape in reconstructed energy

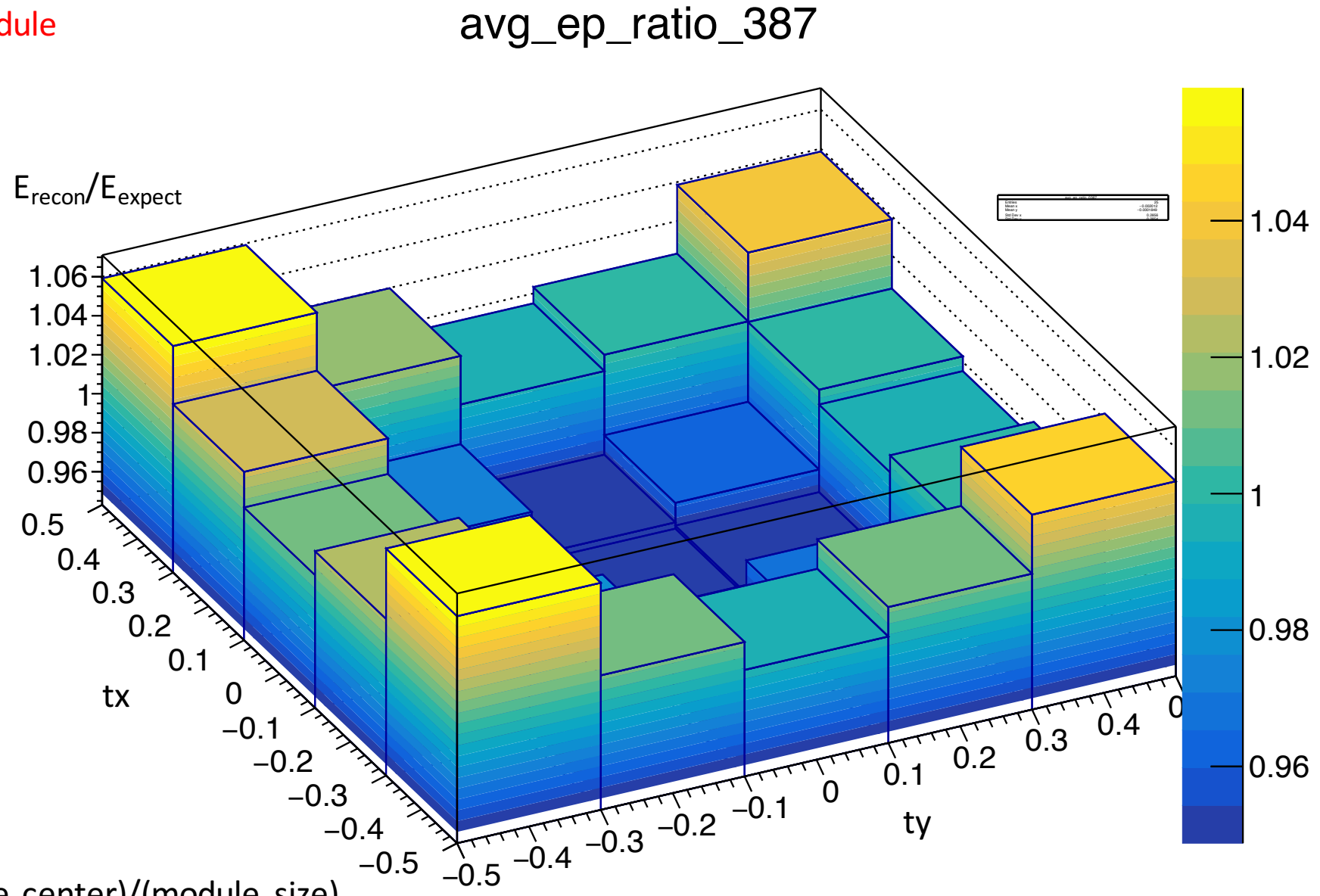
|HyCal x| < 40mm



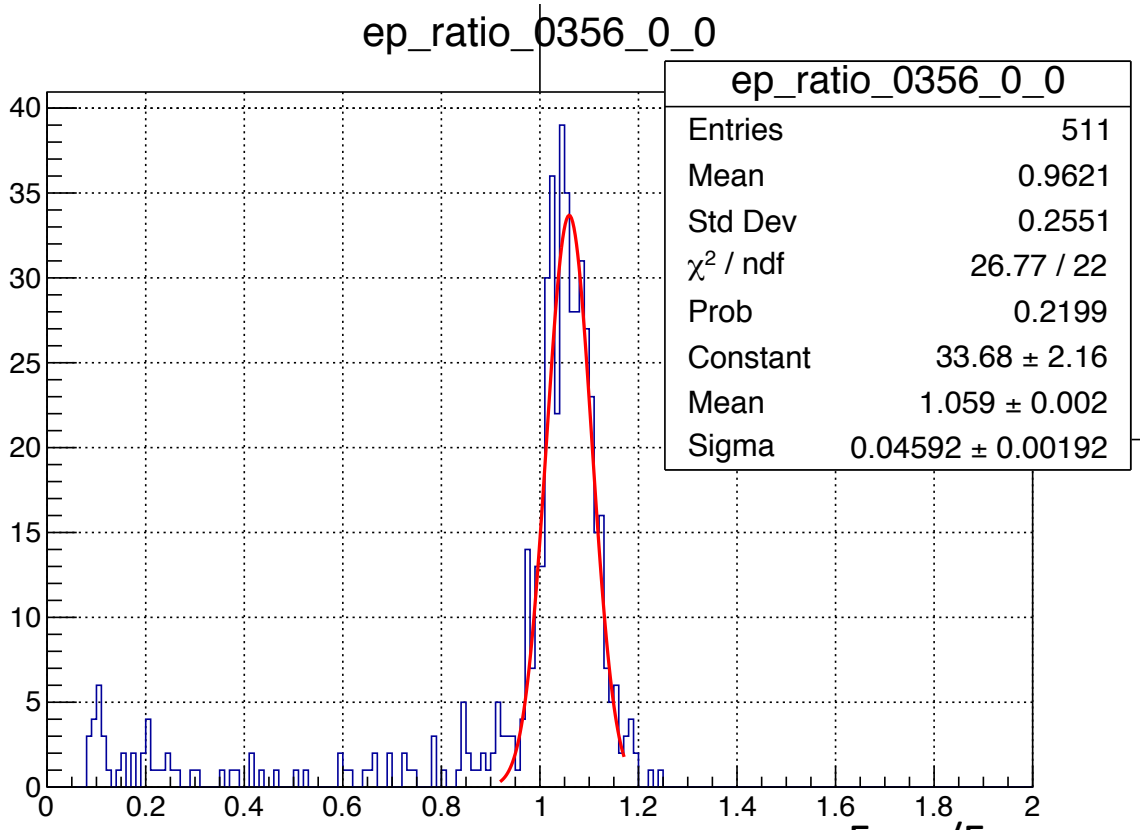
# S-Shape in reconstructed energy

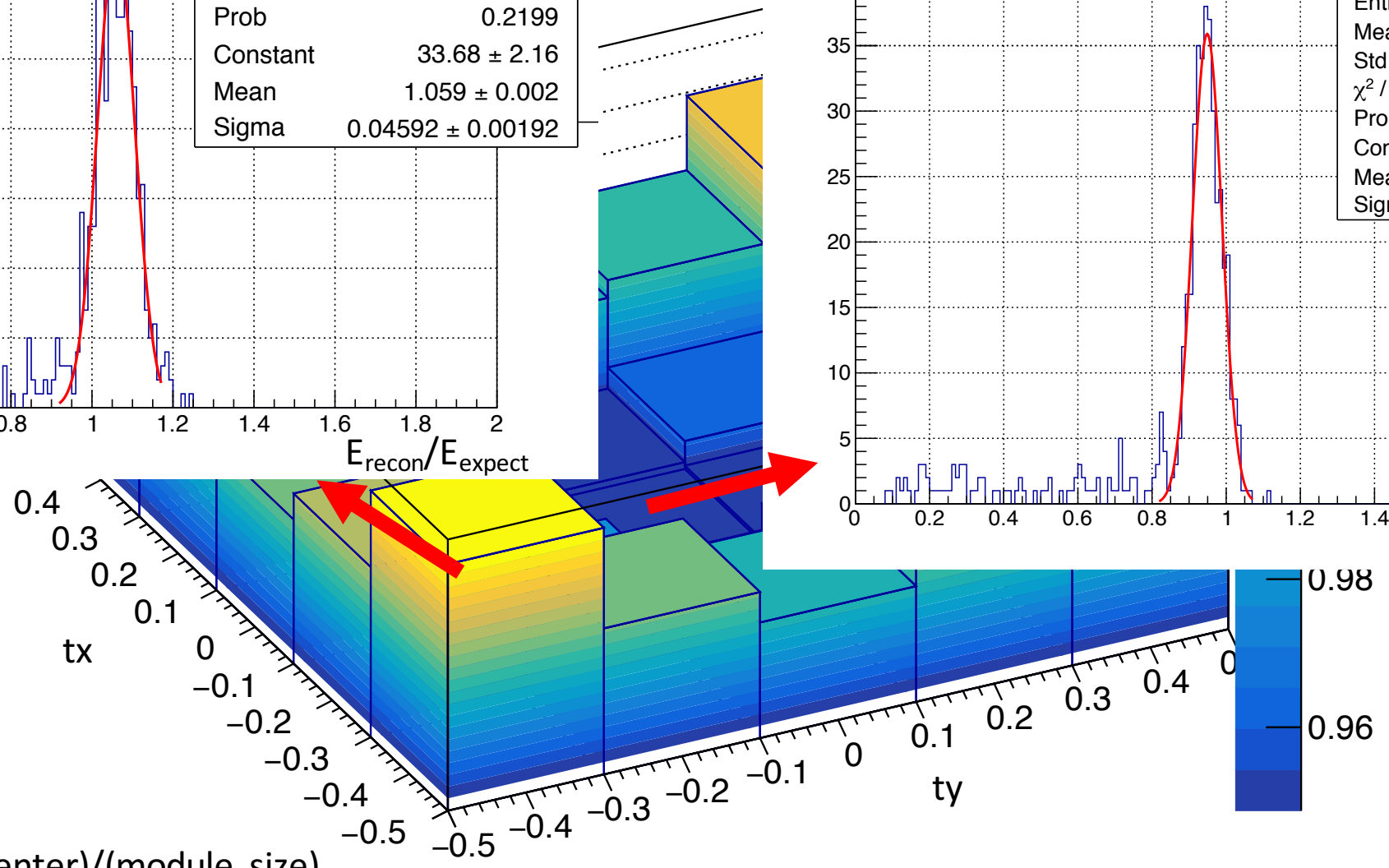
Example LG module




tx = (ReconX – module center)/(module size)

# nstructed energy



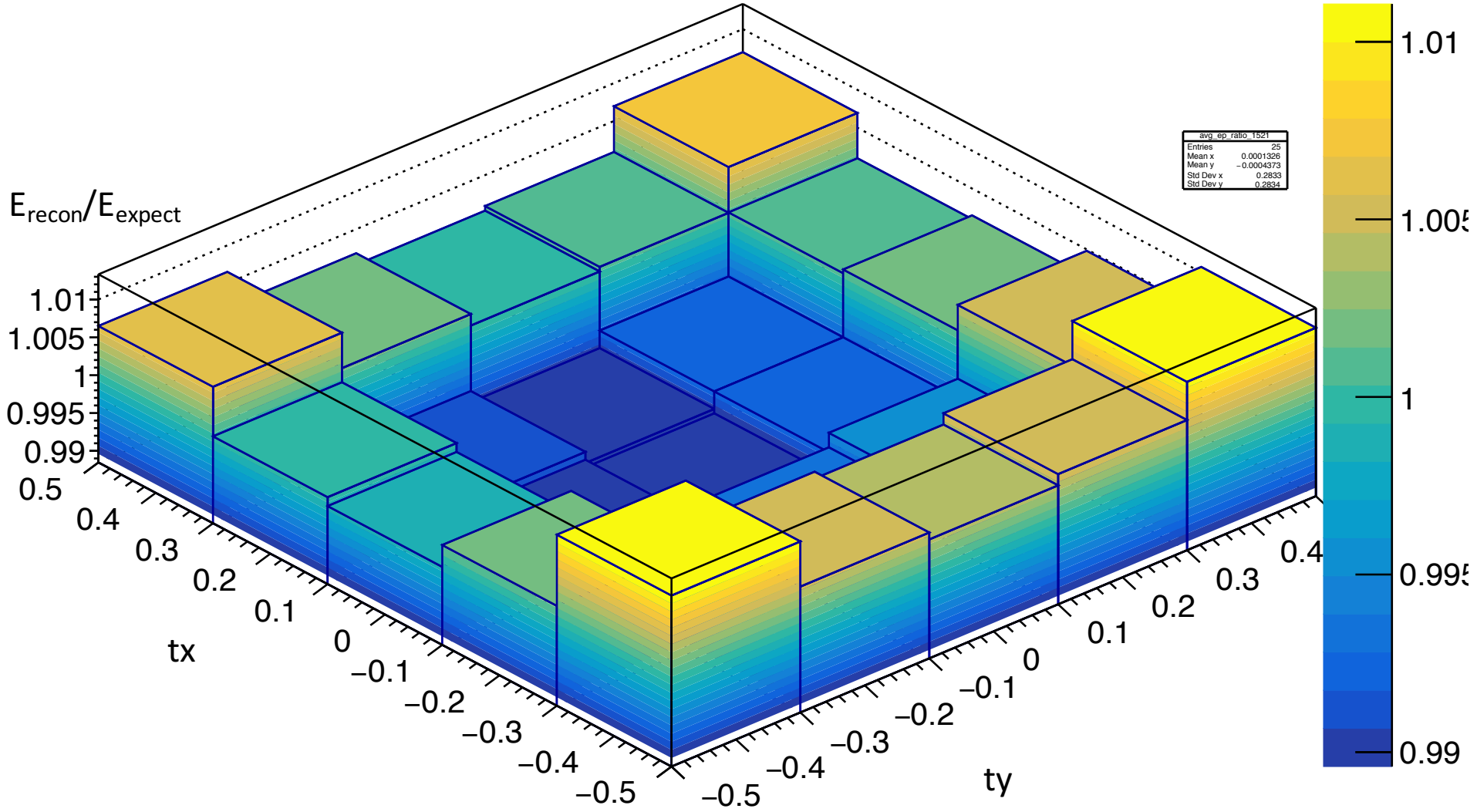




tx = (ReconX – module center)/(module size)

# S-Shape in reconstructed energy

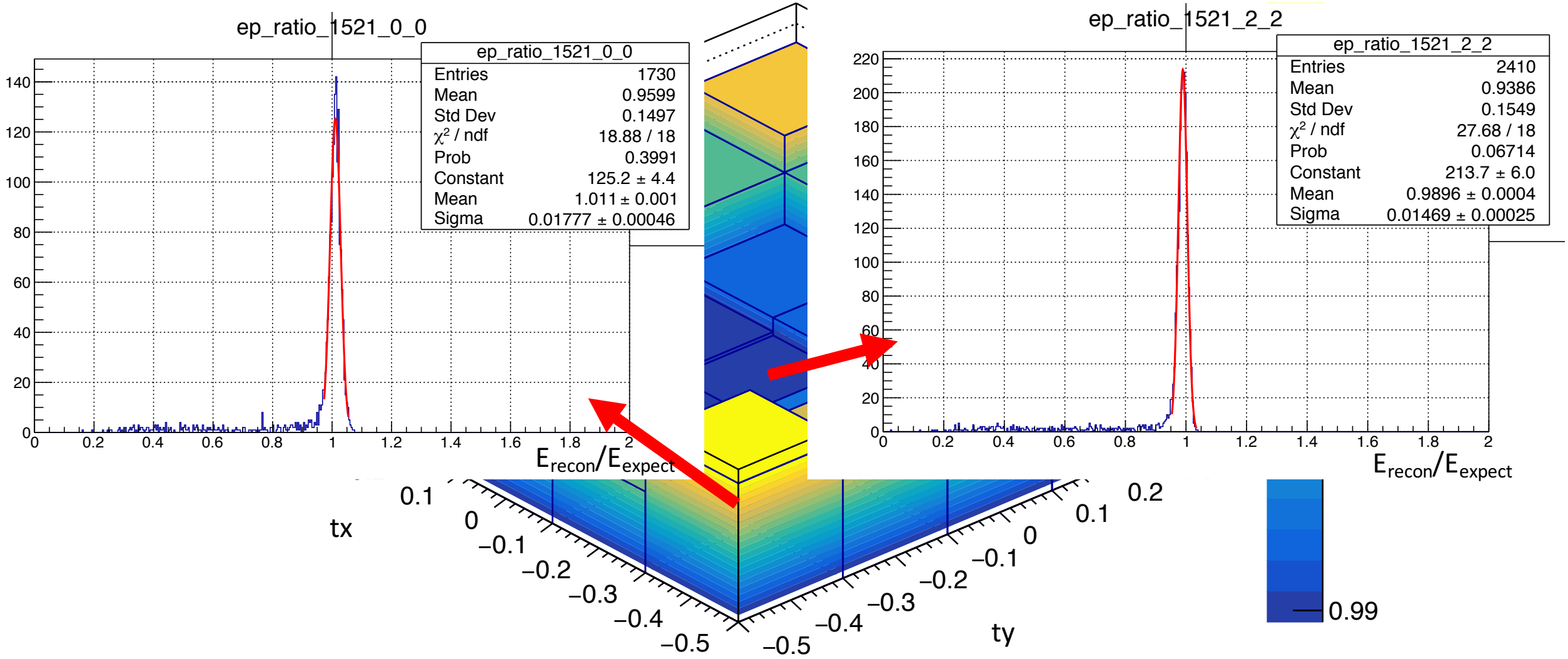
Example PWO module




tx = (ReconX – module center)/(module size)

# S-Shape in reconstructed energy

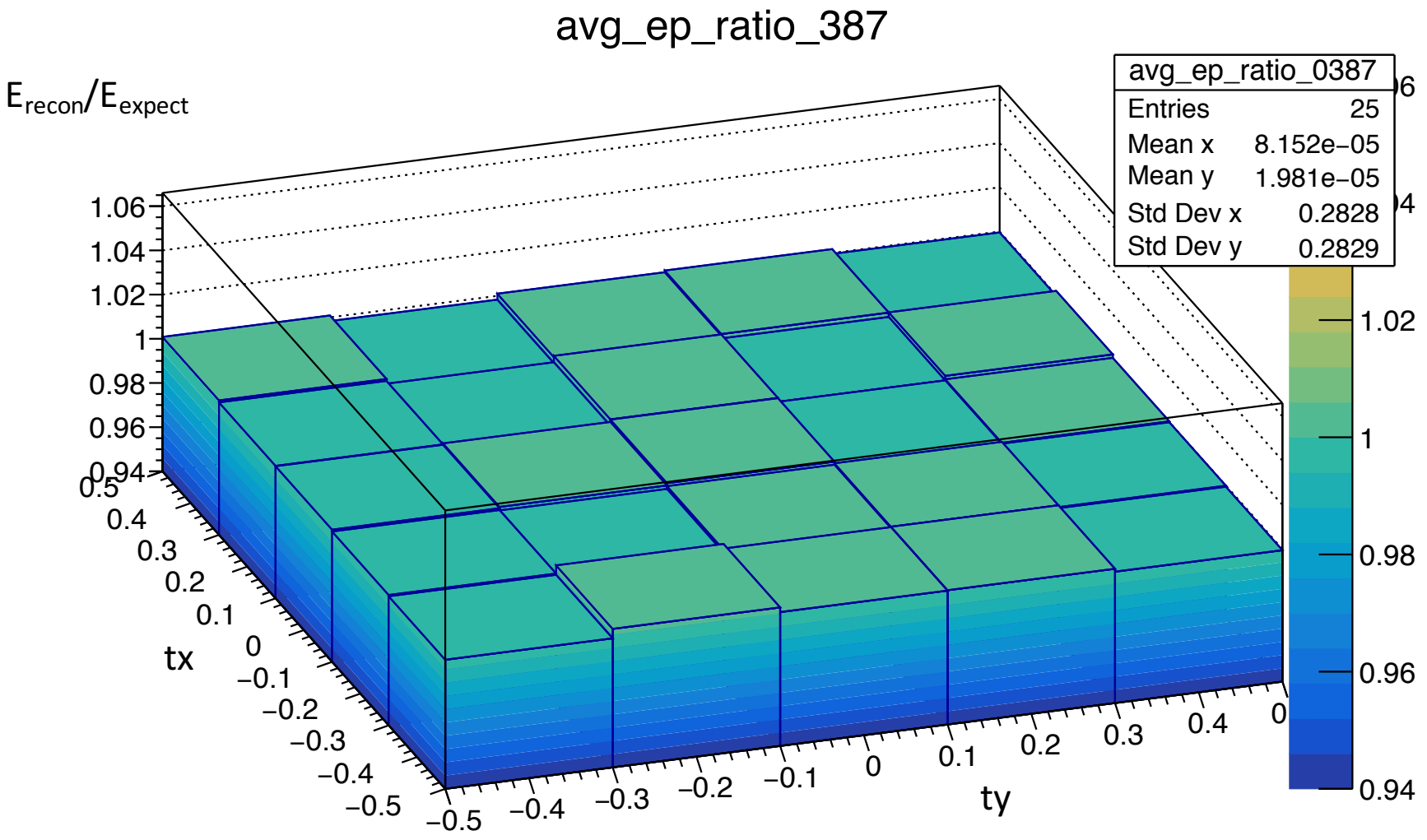
## avg_ep_ratio_1521




tx = (ReconX – module center)/(module size)

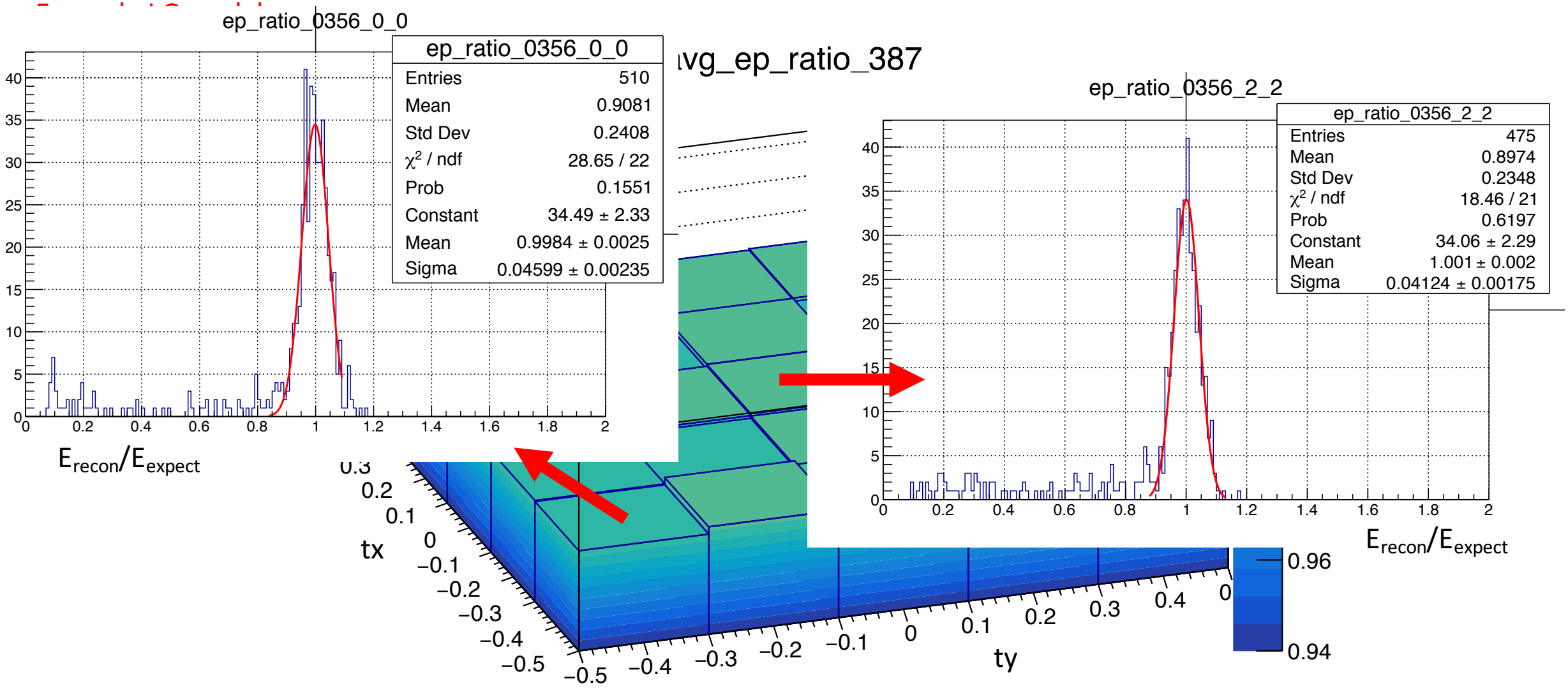
# S-Shape in reconstructed energy

Example LG module
After correction




tx = (ReconX – module center)/(module size)

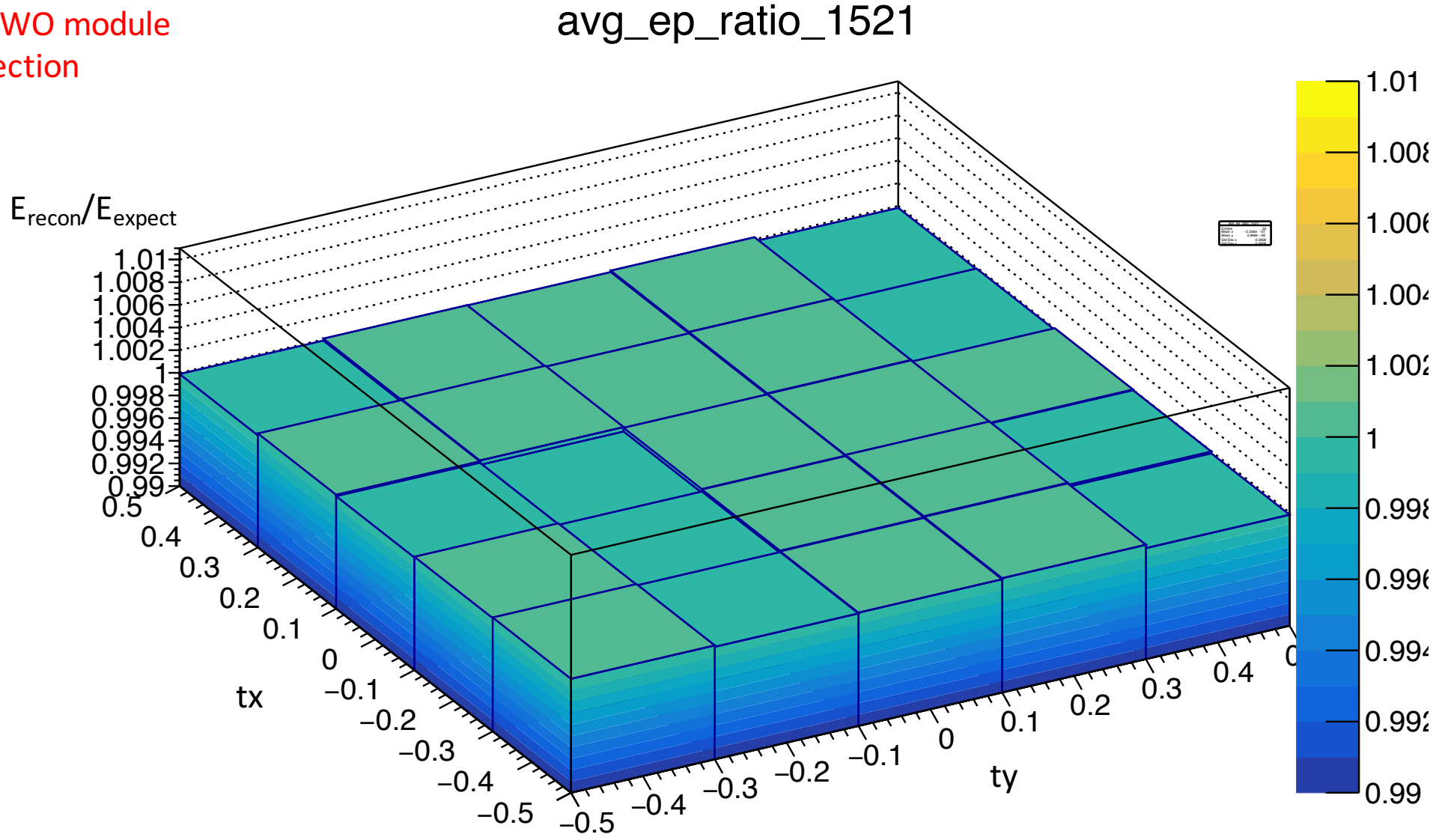
# S-Shape in reconstructed energy




tx = (ReconX – module center)/(module size)

# S-Shape in reconstructed energy

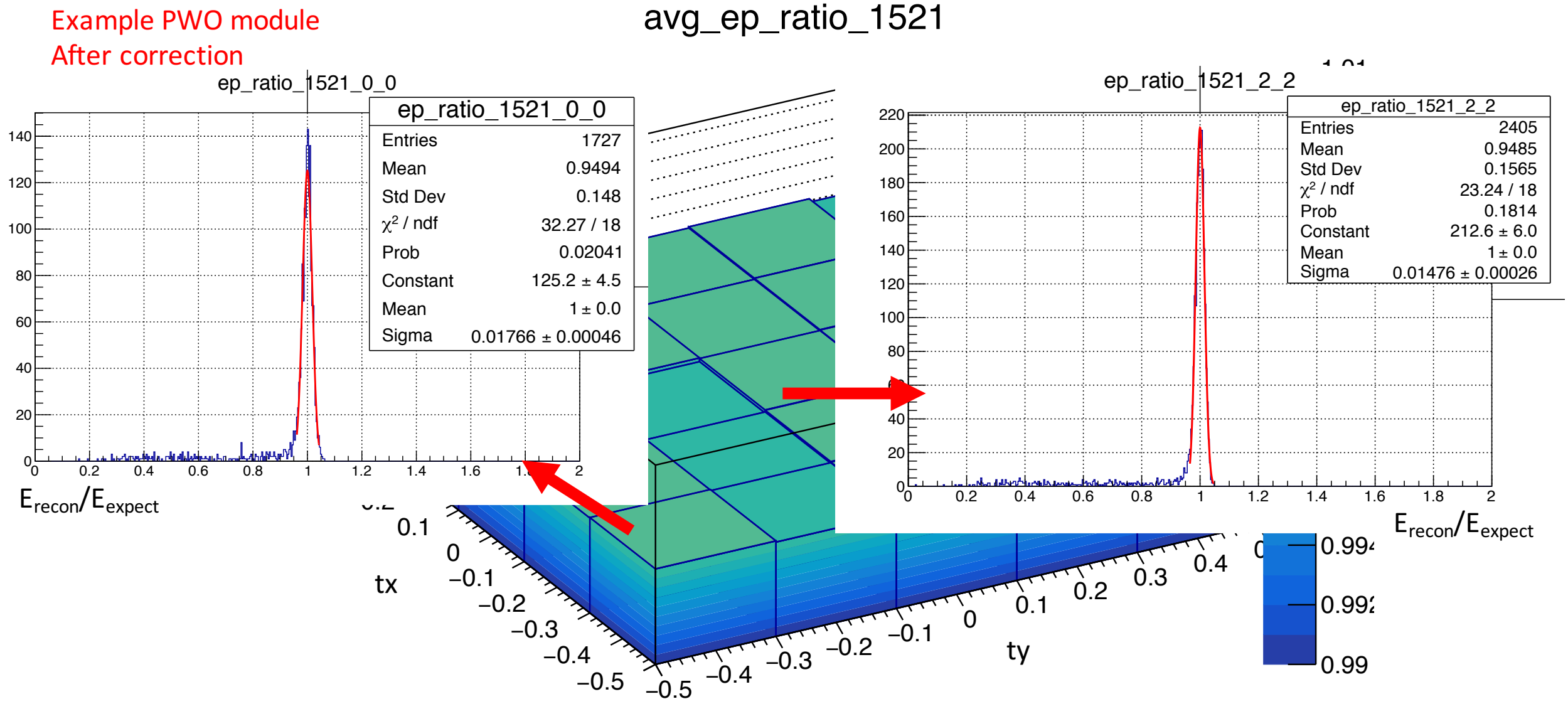
Example PWO module
After correction




tx = (ReconX – module center)/(module size)

# S-Shape in reconstructed energy

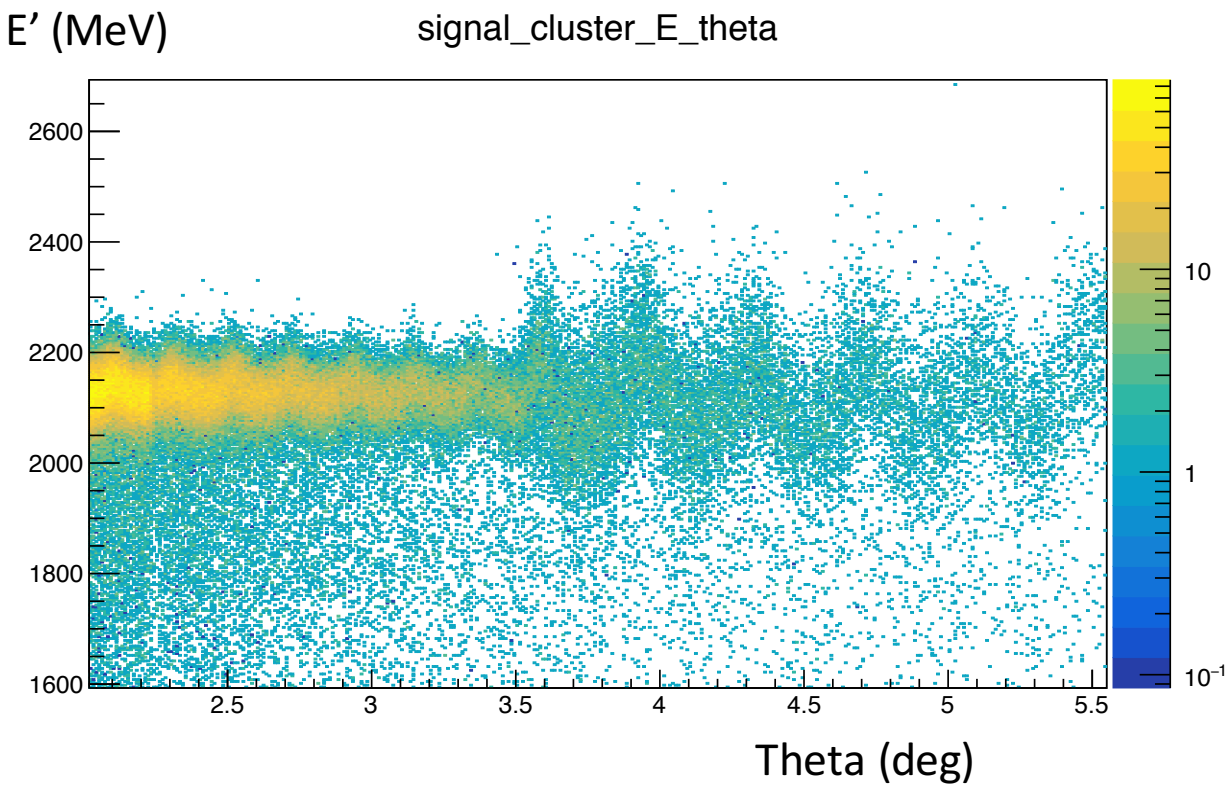
Example PWO module
After correction



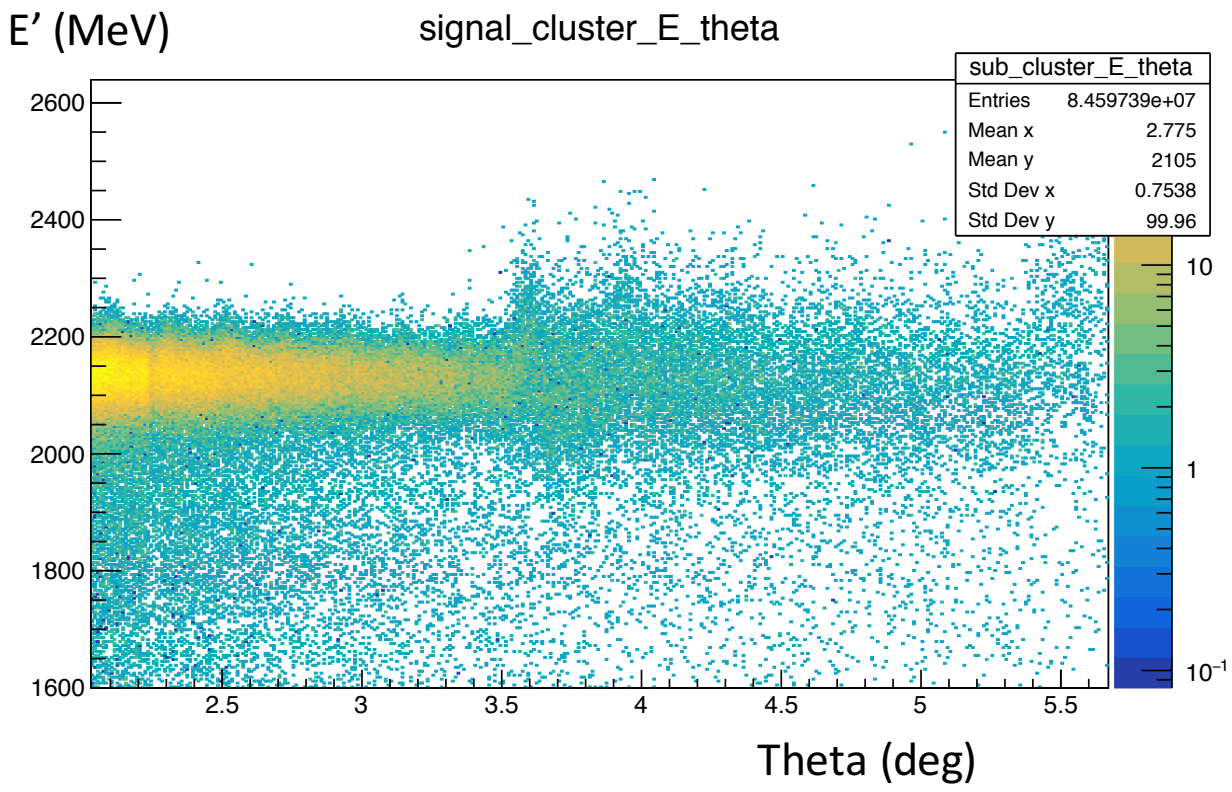

tx = (ReconX – module center)/(module size)

# S-Shape in reconstructed energy

|HyCal x| < 40mm

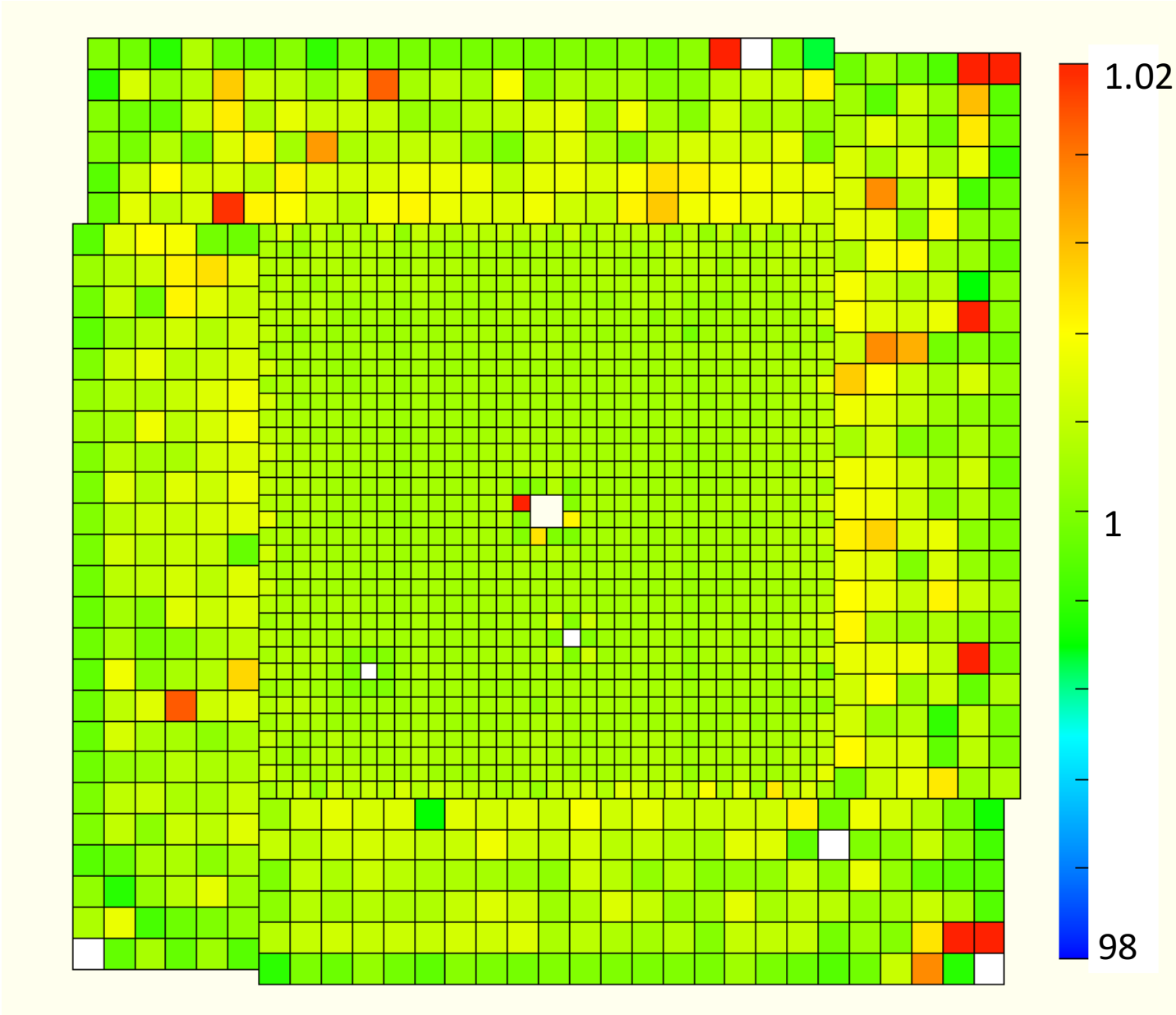



|HyCal x| < 40mm



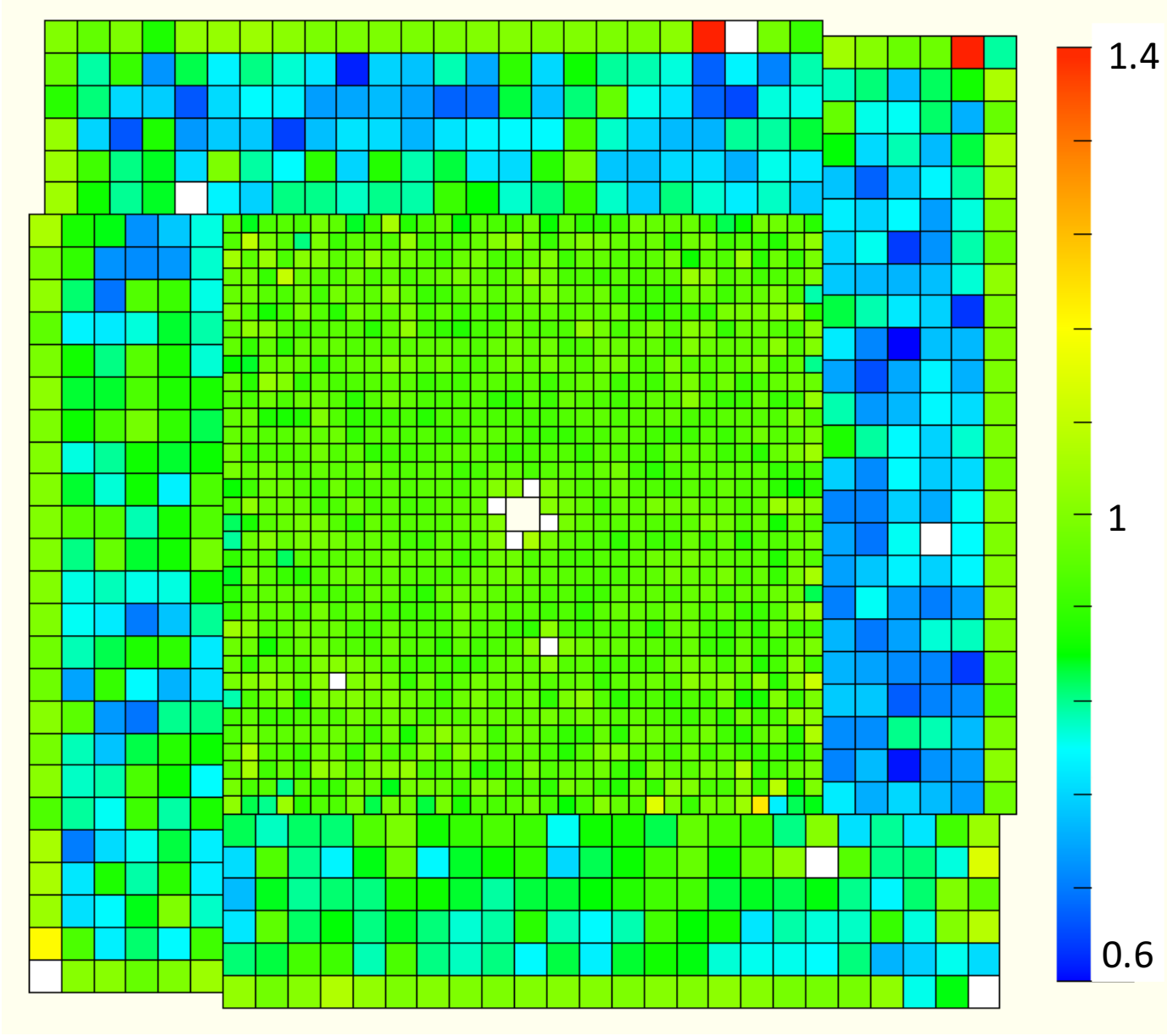
# S-Shape in reconstructed energy

($E_{recon}/E_{expect}$ after correction ) /
($E_{recon}/E_{expect}$ before correction )



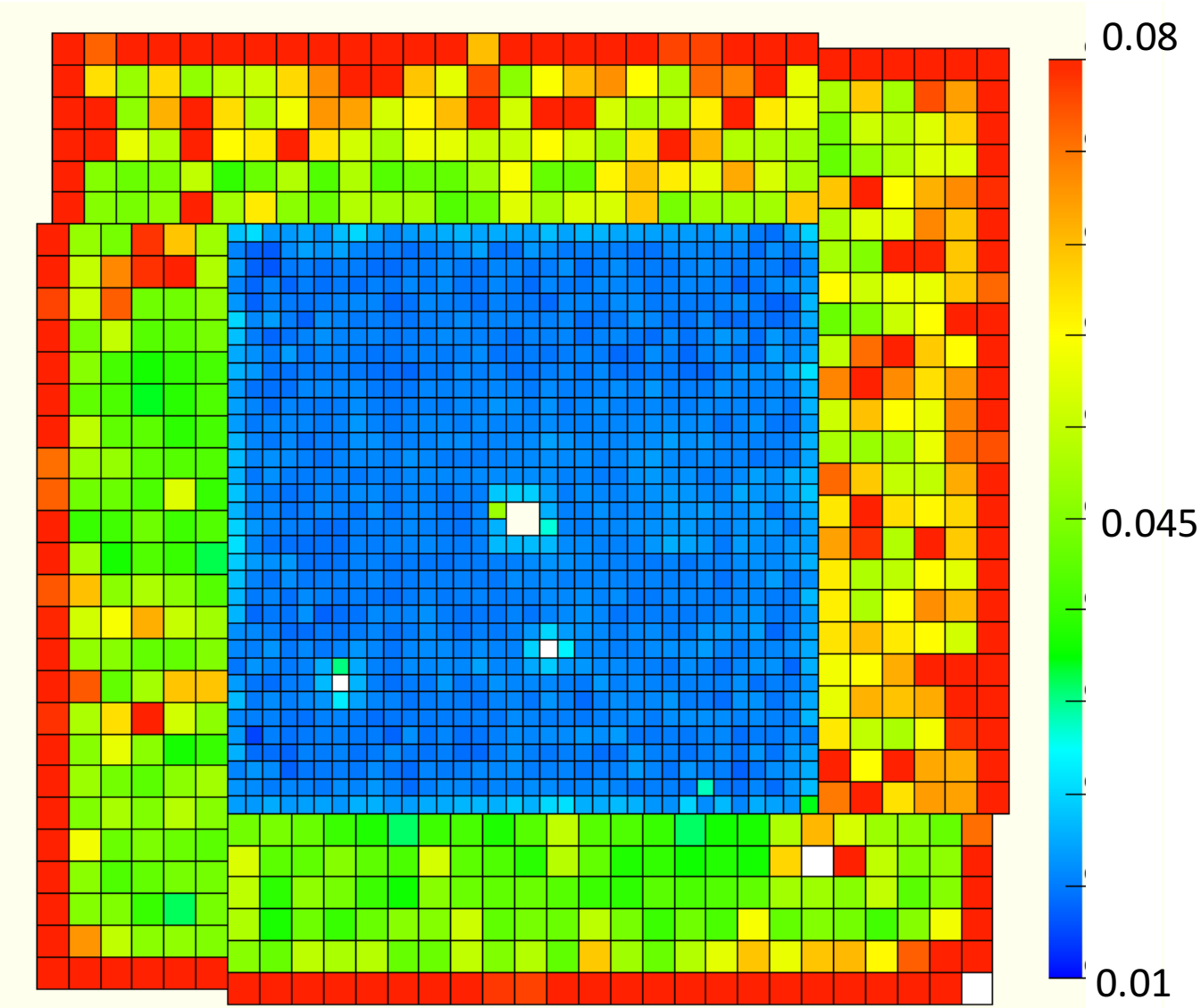
# S-Shape in reconstructed energy

(ep resolution after correction ) /
(ep resolution before correction )

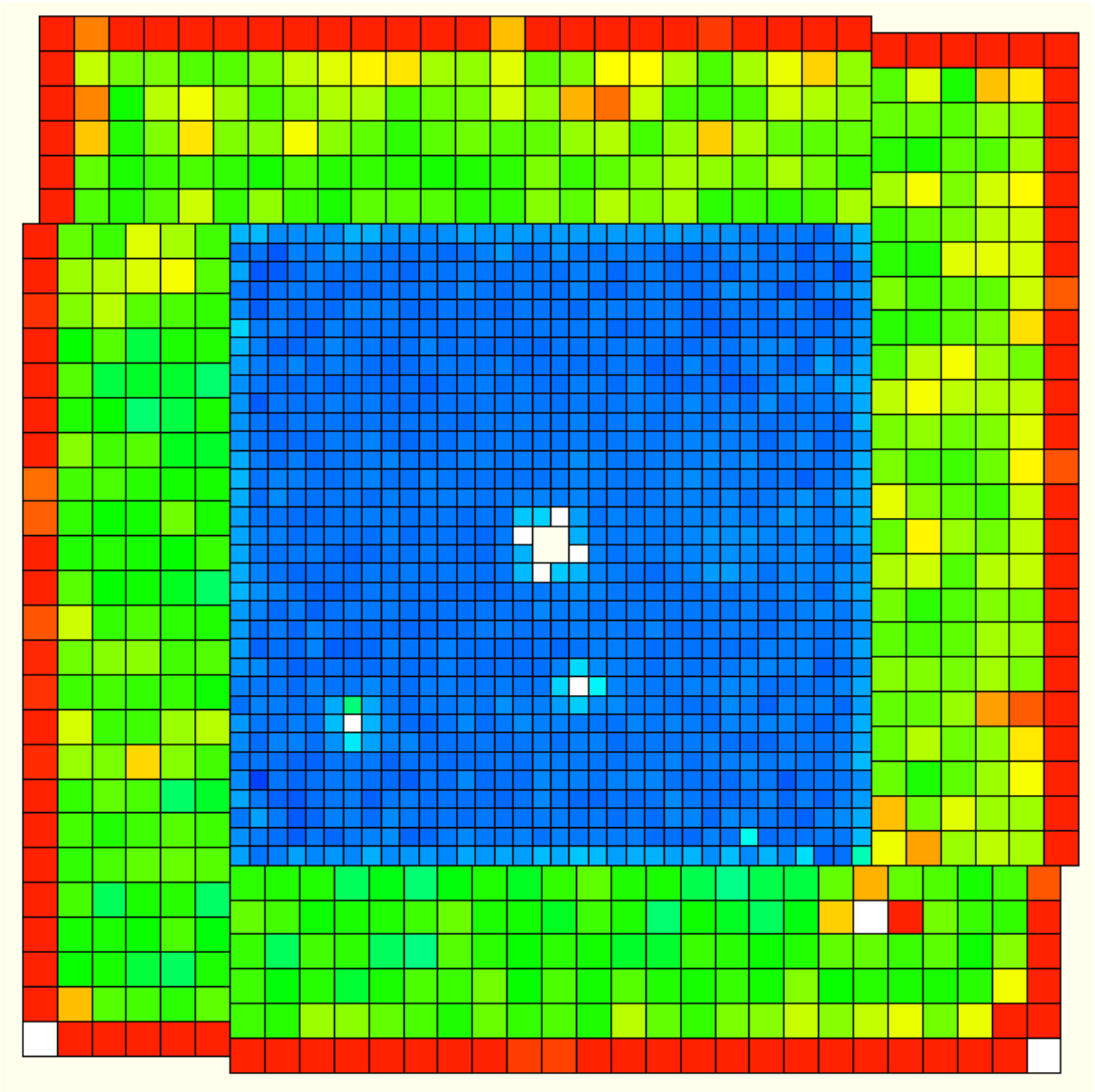


# S-Shape in reconstructed energy

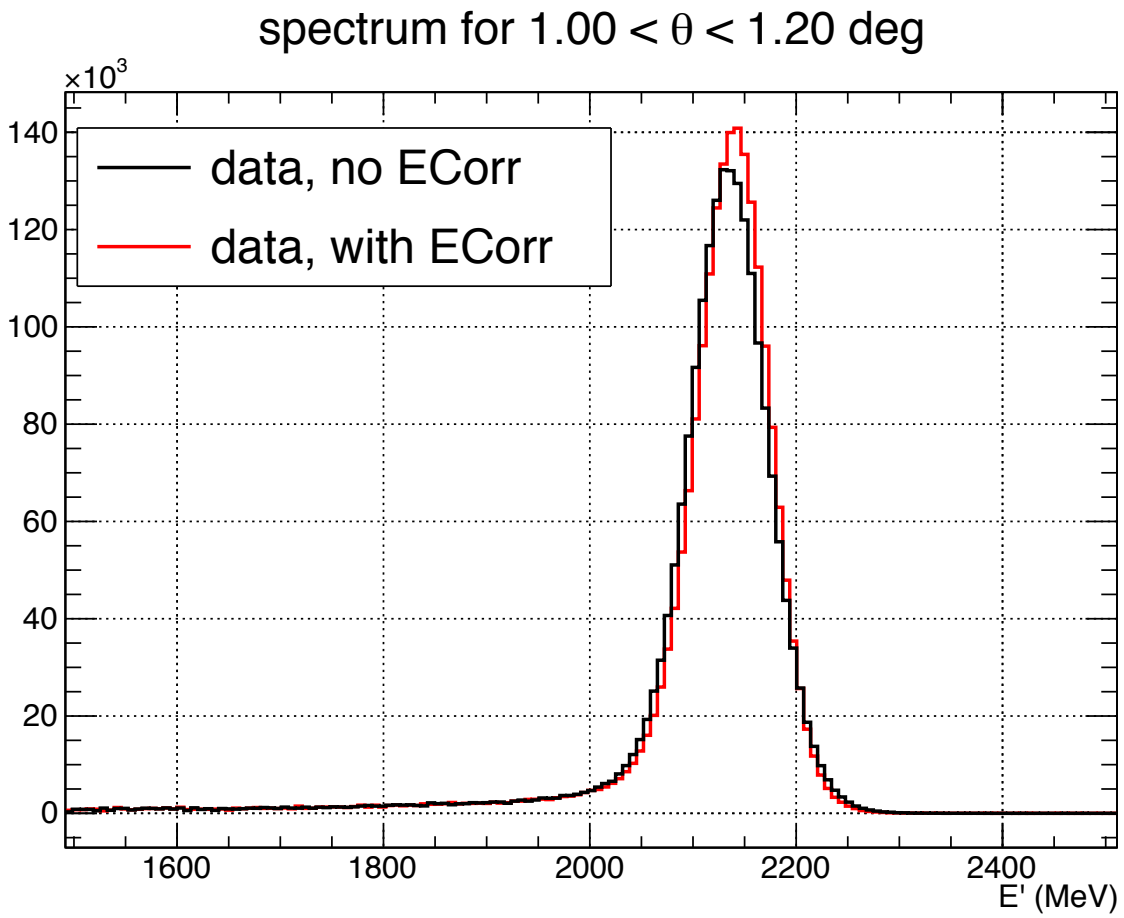
Energy resolution for ep (before correction)

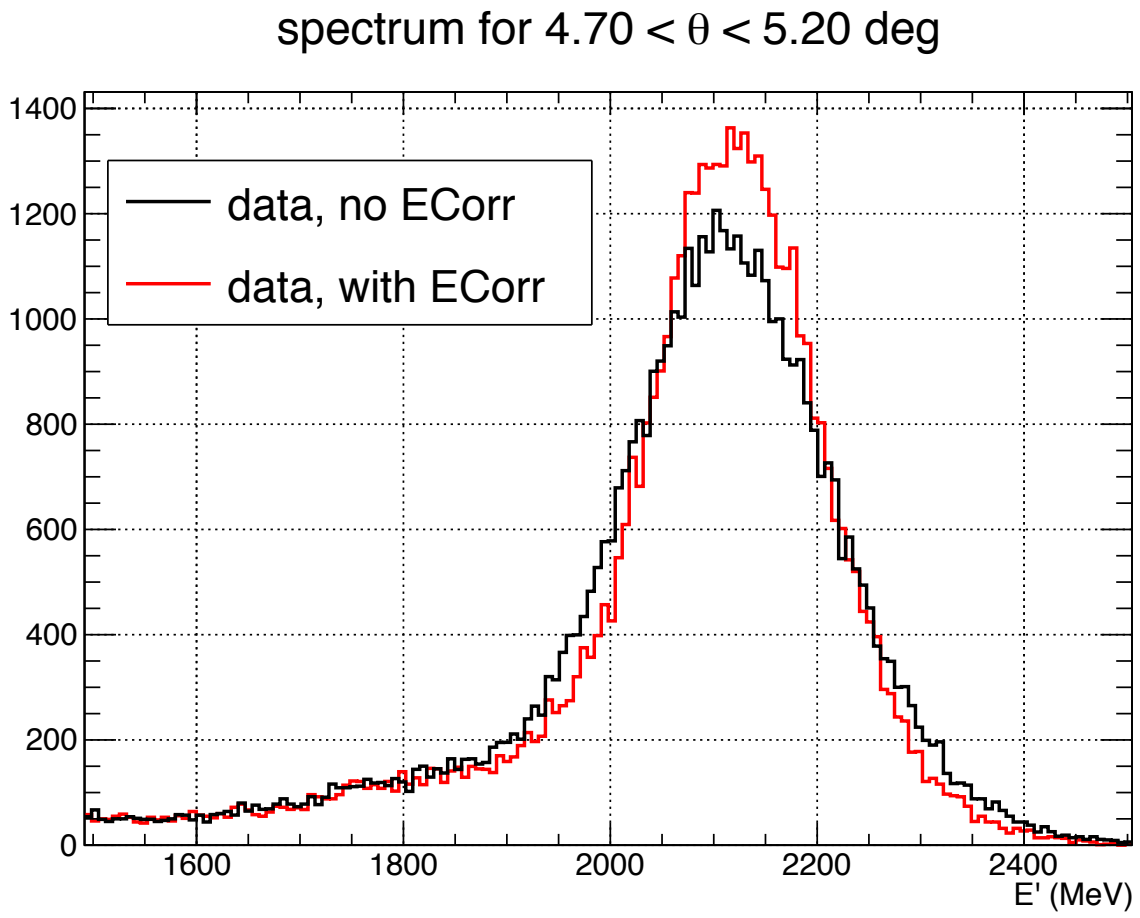



Energy resolution for ep (after correction)



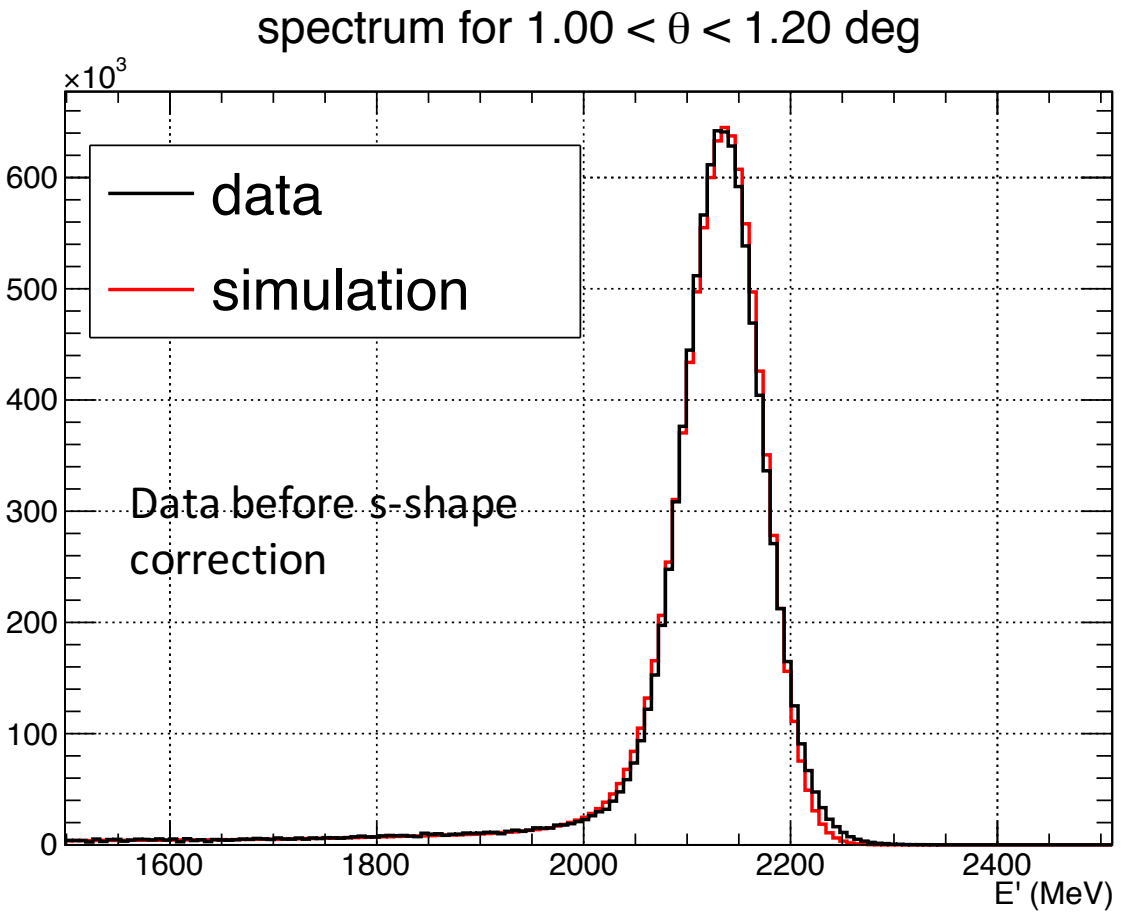
# S-Shape in reconstructed energy

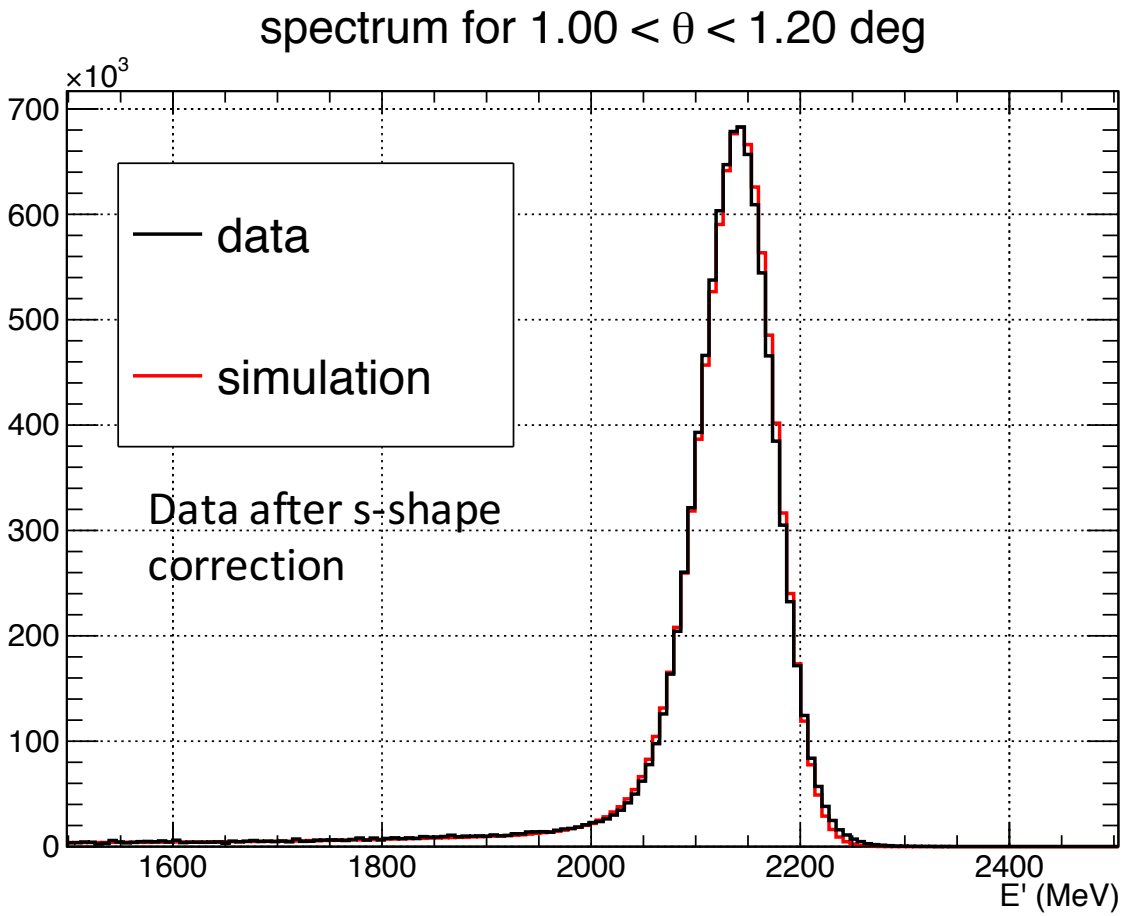



Now the s-shape may change the shape of the energy spectrum, can our simulation model describe the the data spectrum after s-shape correction better?

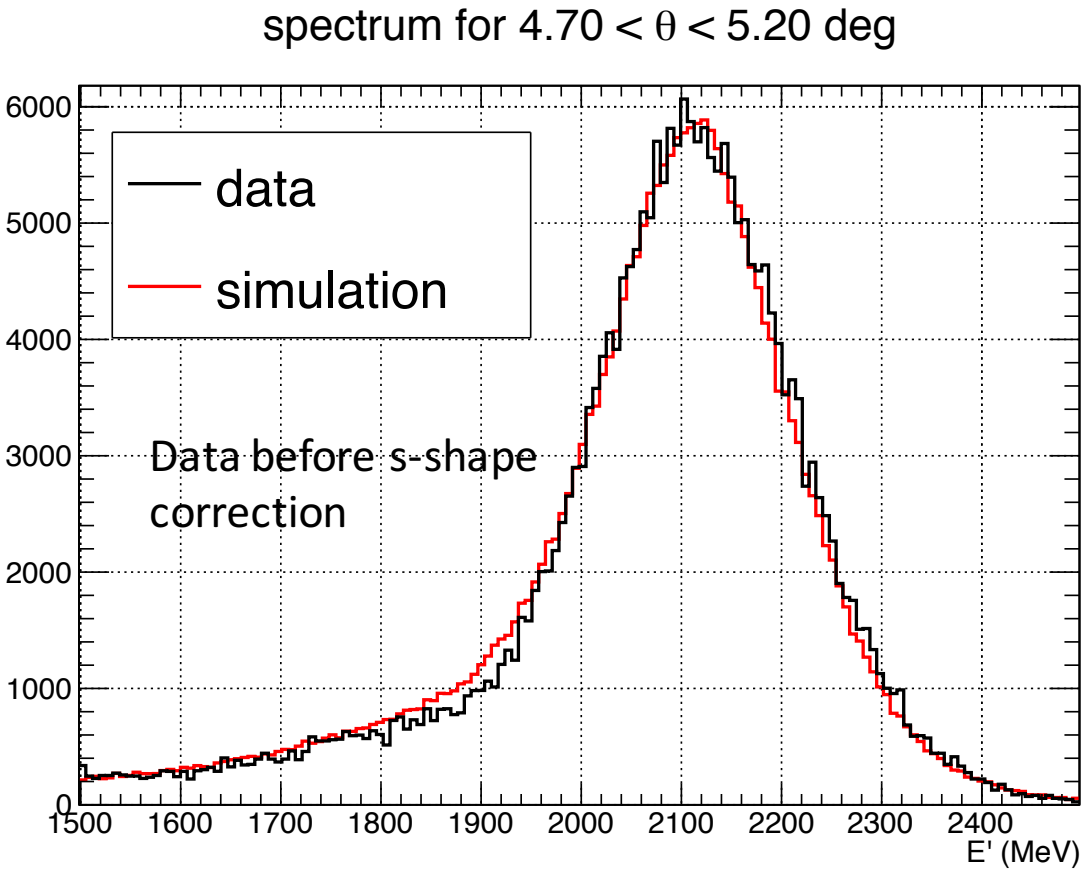
# S-Shape in reconstructed energy

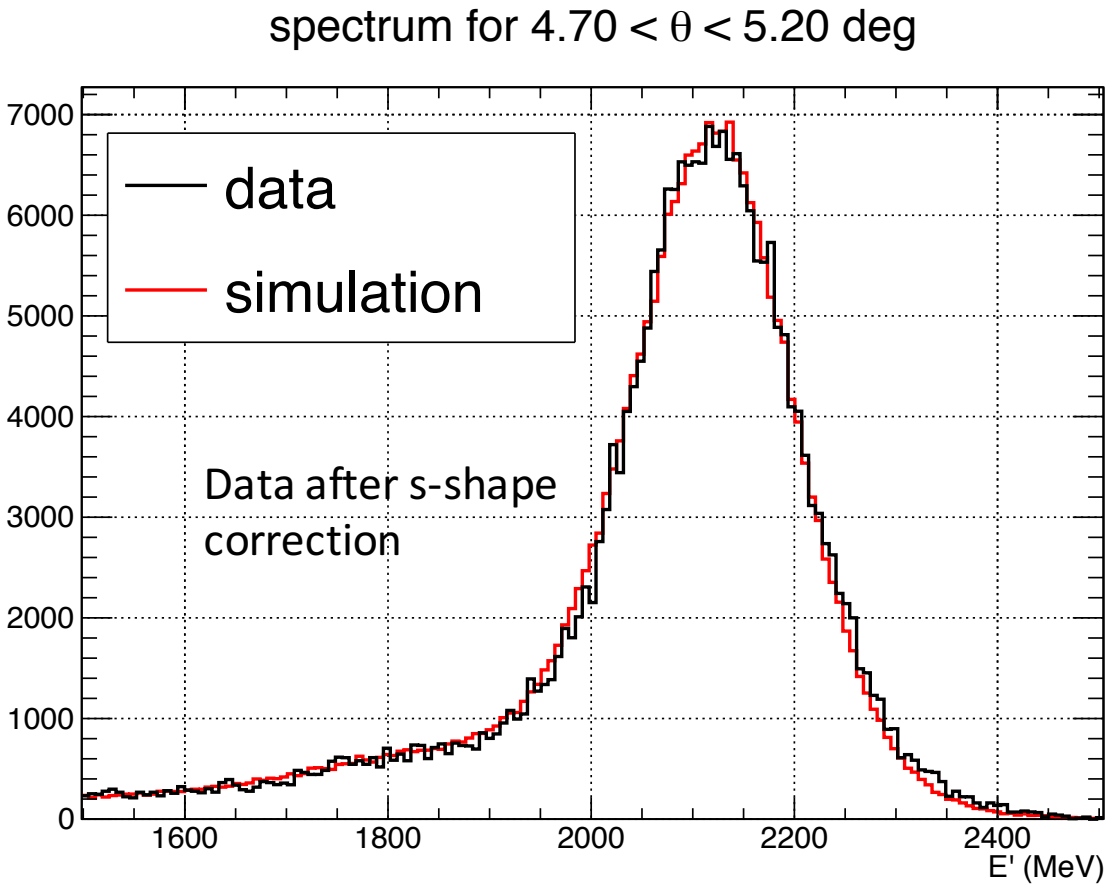


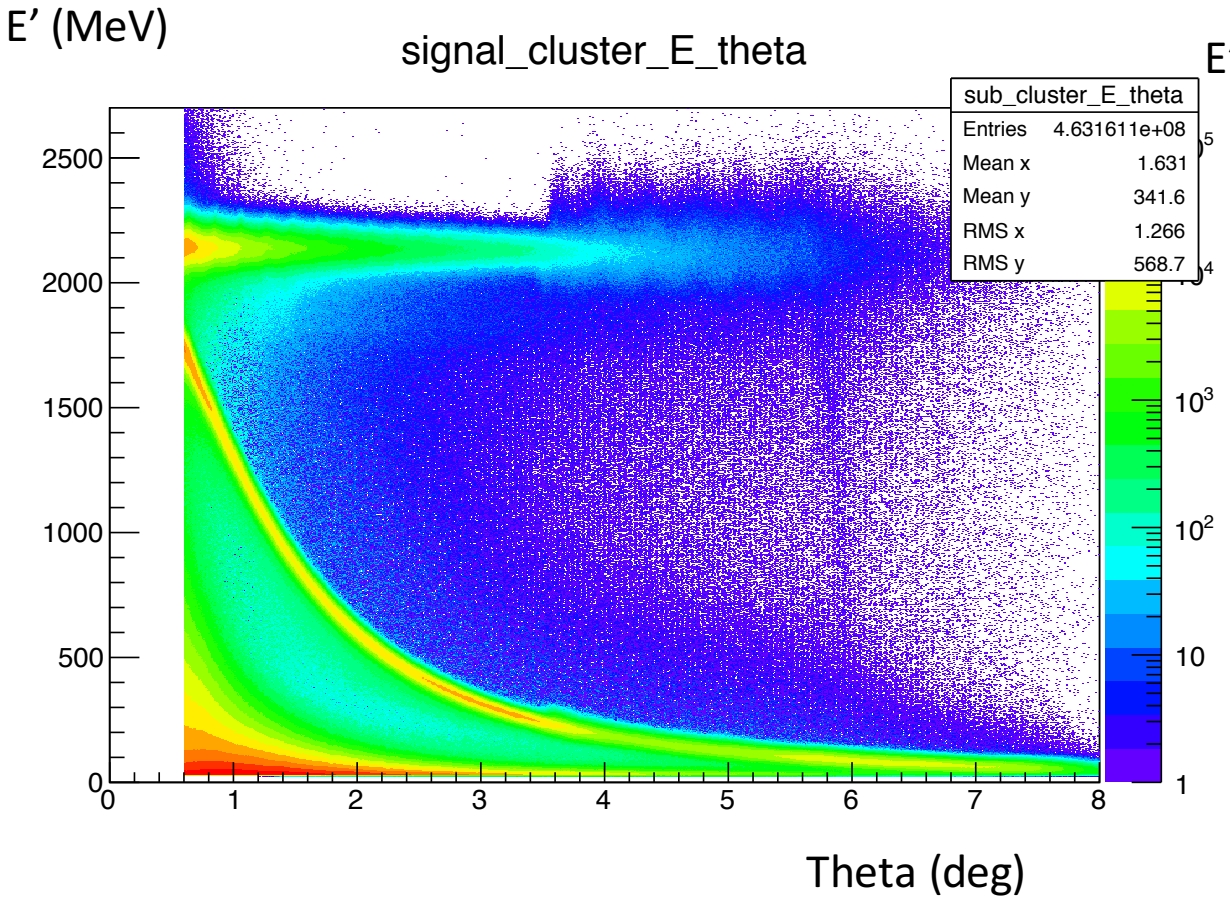
# S-Shape in reconstructed energy

Data and simulation are normalized to have the same total counts between E’ = 1600MeV and E’ = 2500 MeV

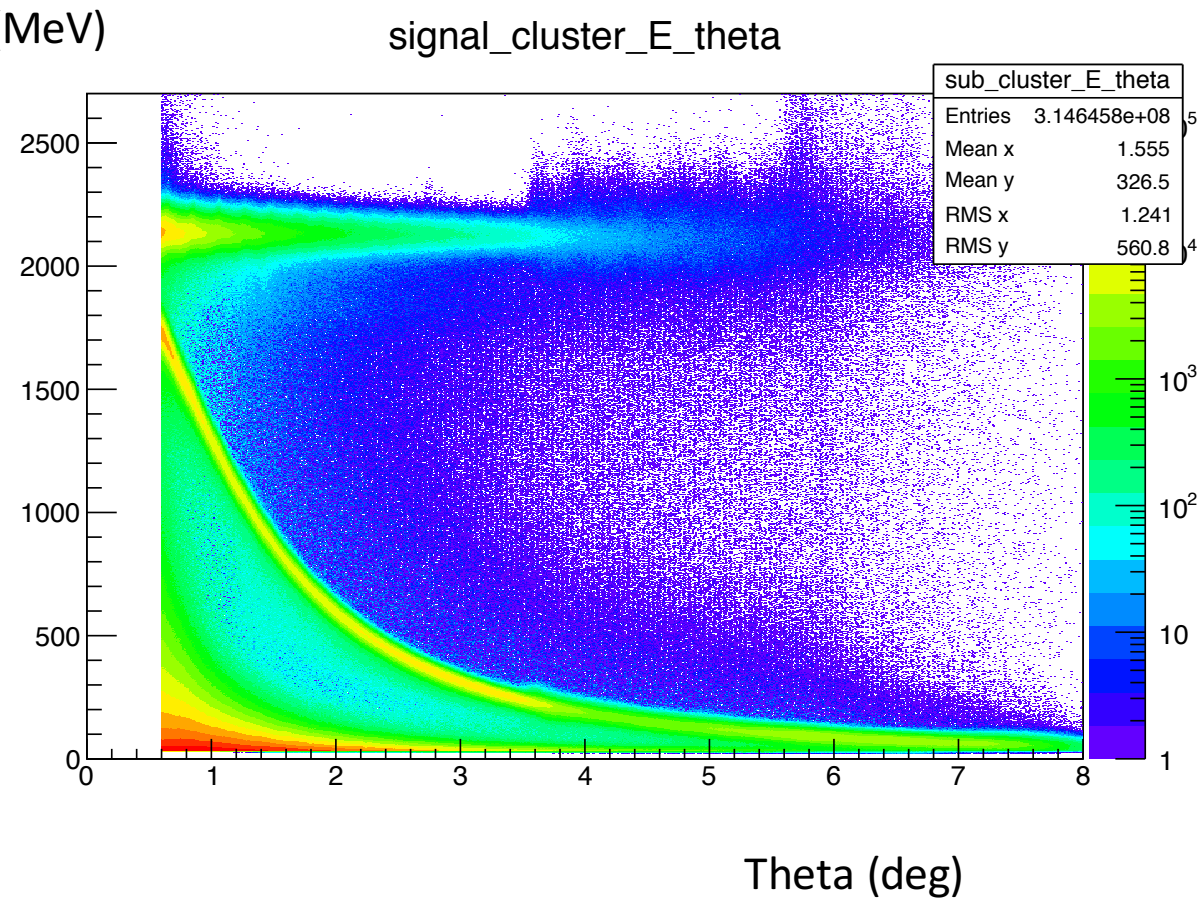


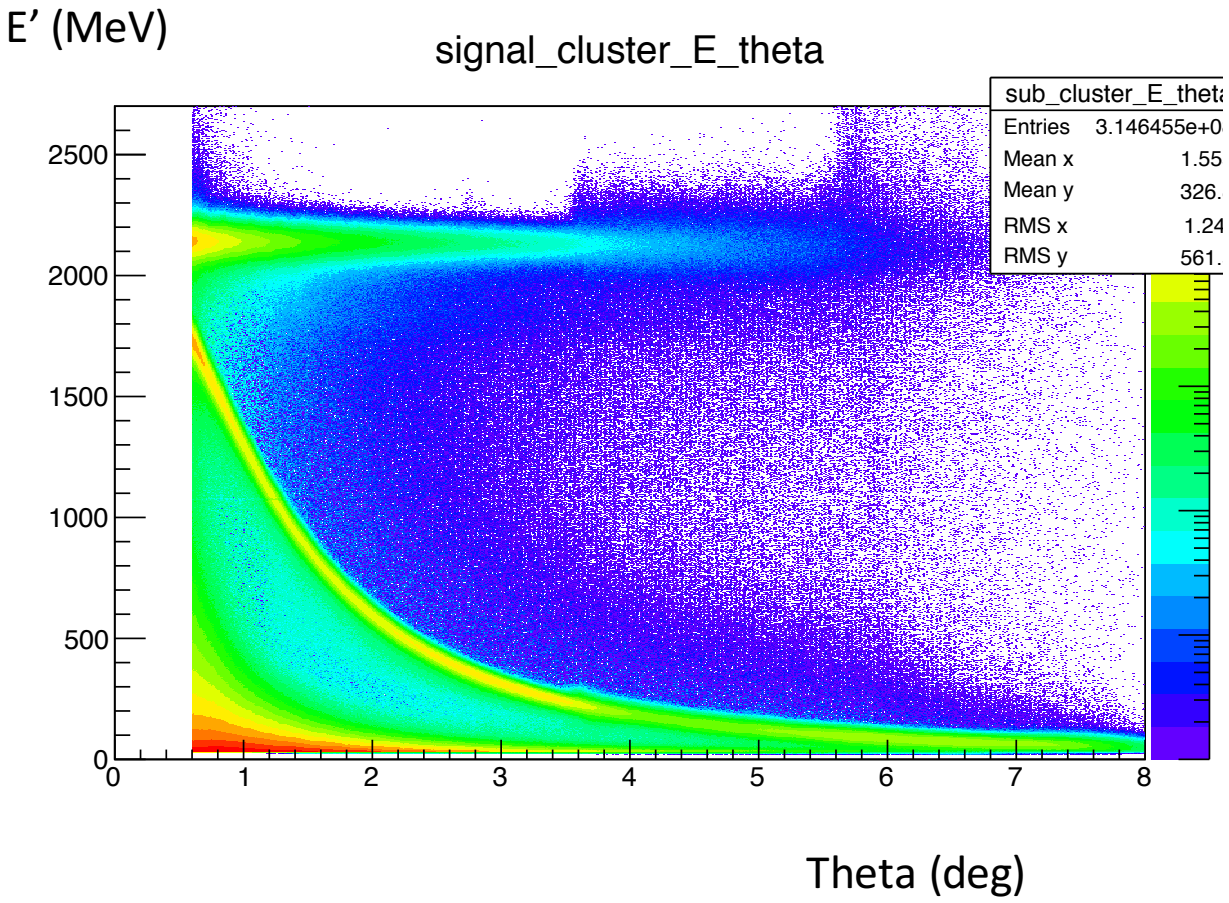
5 x 5, no s-shape correction




Prad island, no s-shape correction



Prad island , with s-shape correction




Prad island, no s-shape correction