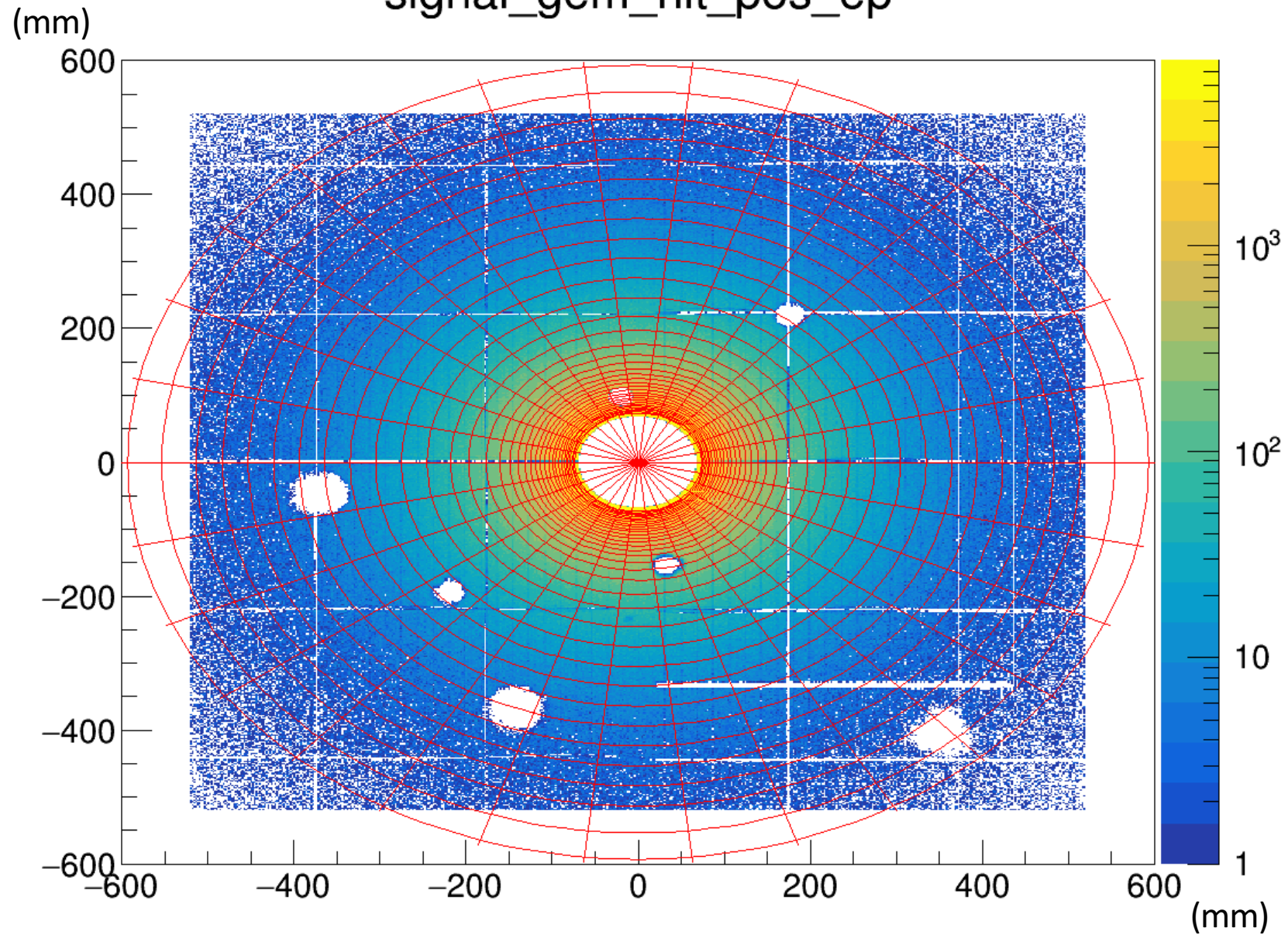


# Progress summary

- Finished 1GeV data re-calibration, s-shape correction and mc calibration for the Cherenkov simulation of LG
- Obtained new super ratio after these changes
- Increase theta angle coverage to 6 deg for both 1GeV and 2GeV
  
- Working on systematic studies (sensitivity of elasticity cut right now)
- Working on more detailed studies for the forward angle spectrum

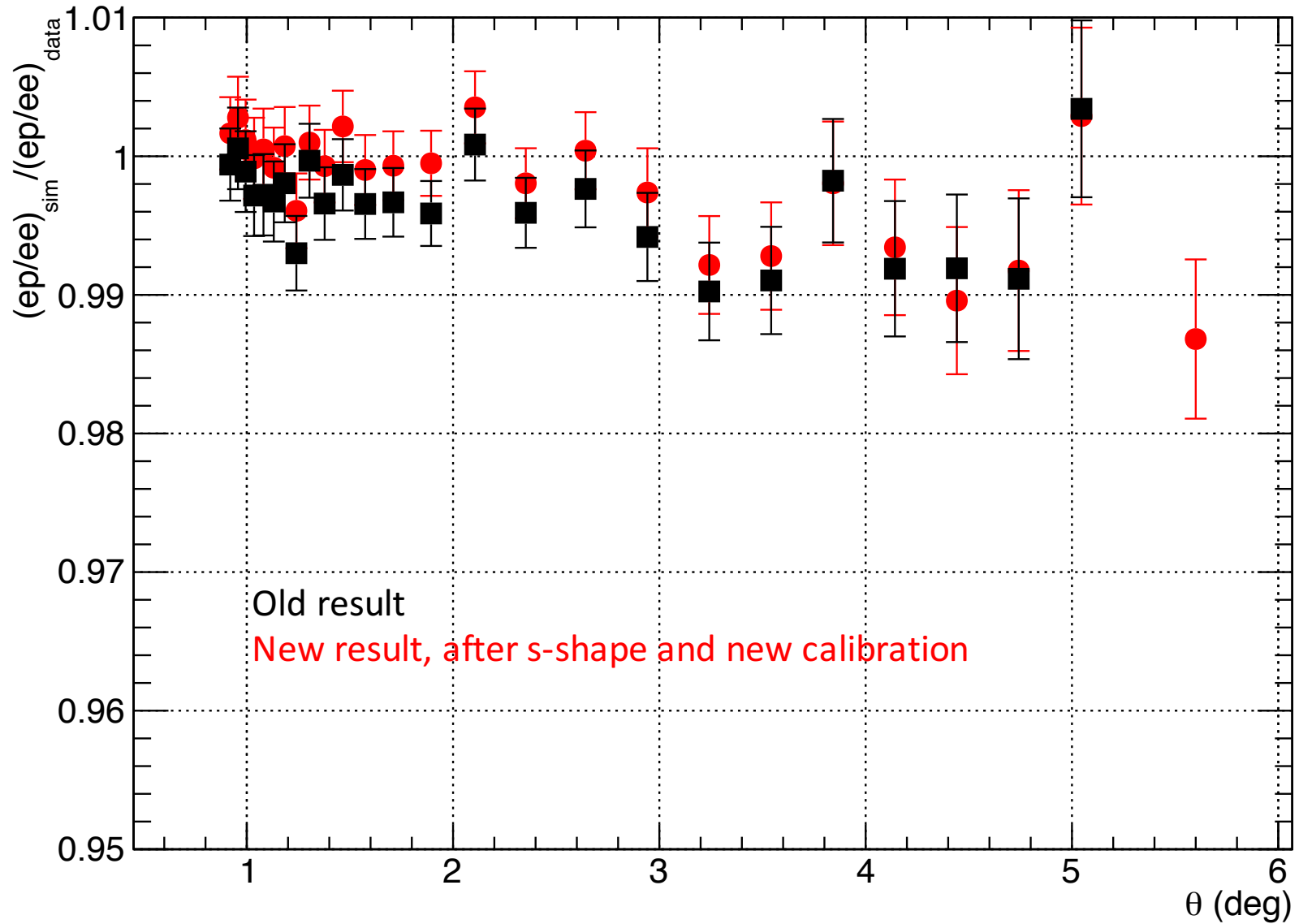
# Binning for 2GeV

signal\_gem\_hit\_pos\_ep



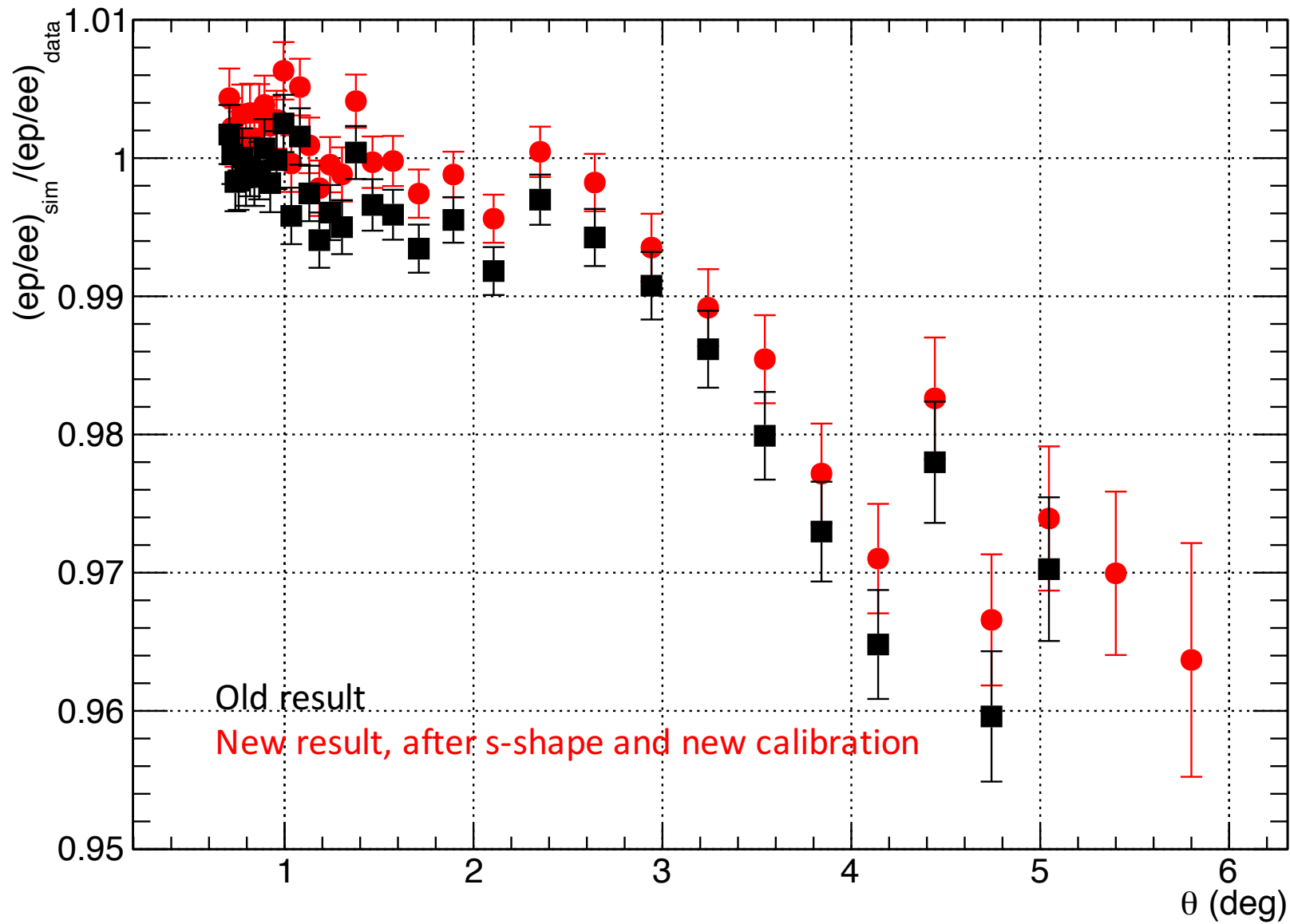
# Super-ratio 1GeV

## Graph



# Super-ratio 2GeV

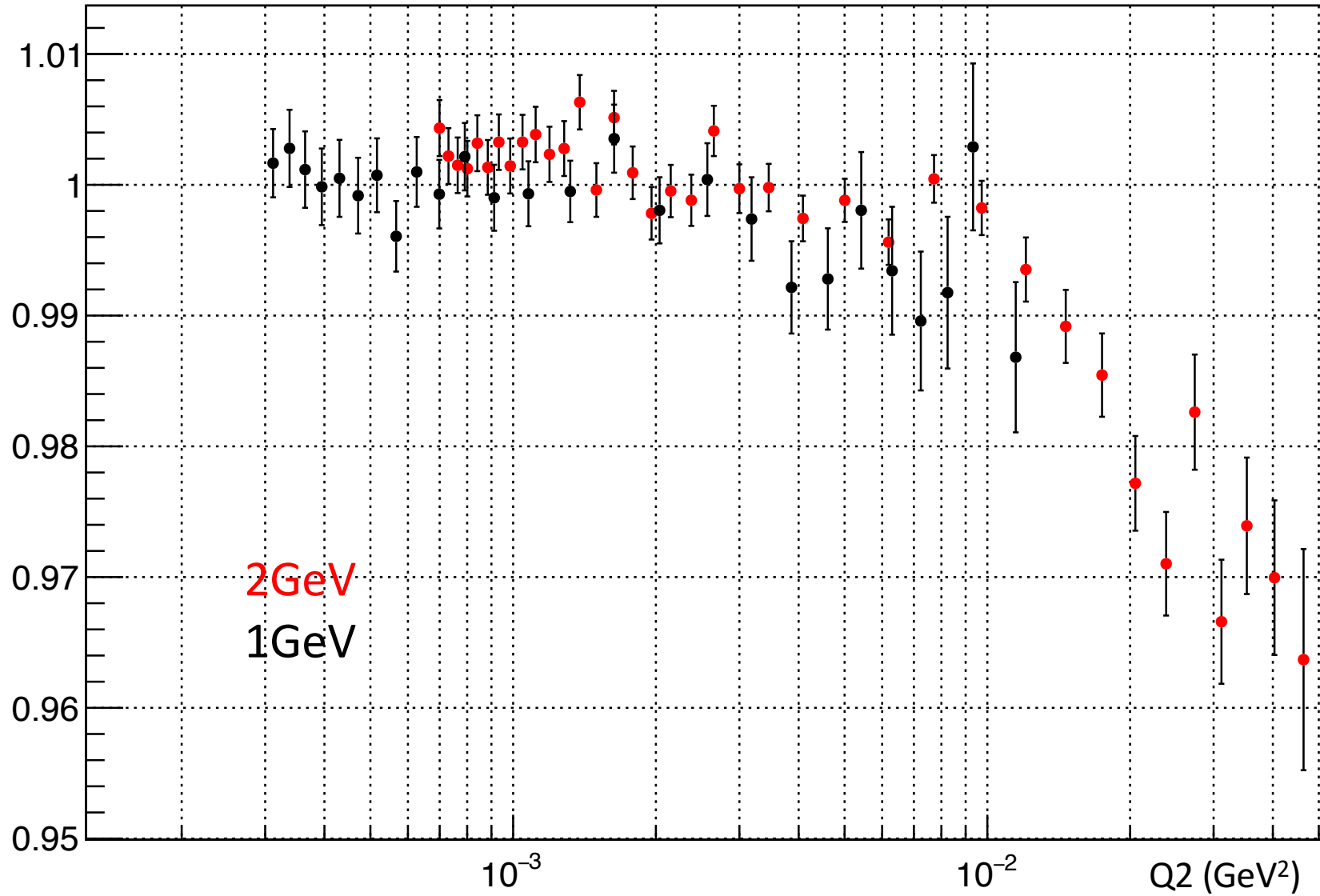
## Graph



# Super-ratio 2GeV

Graph

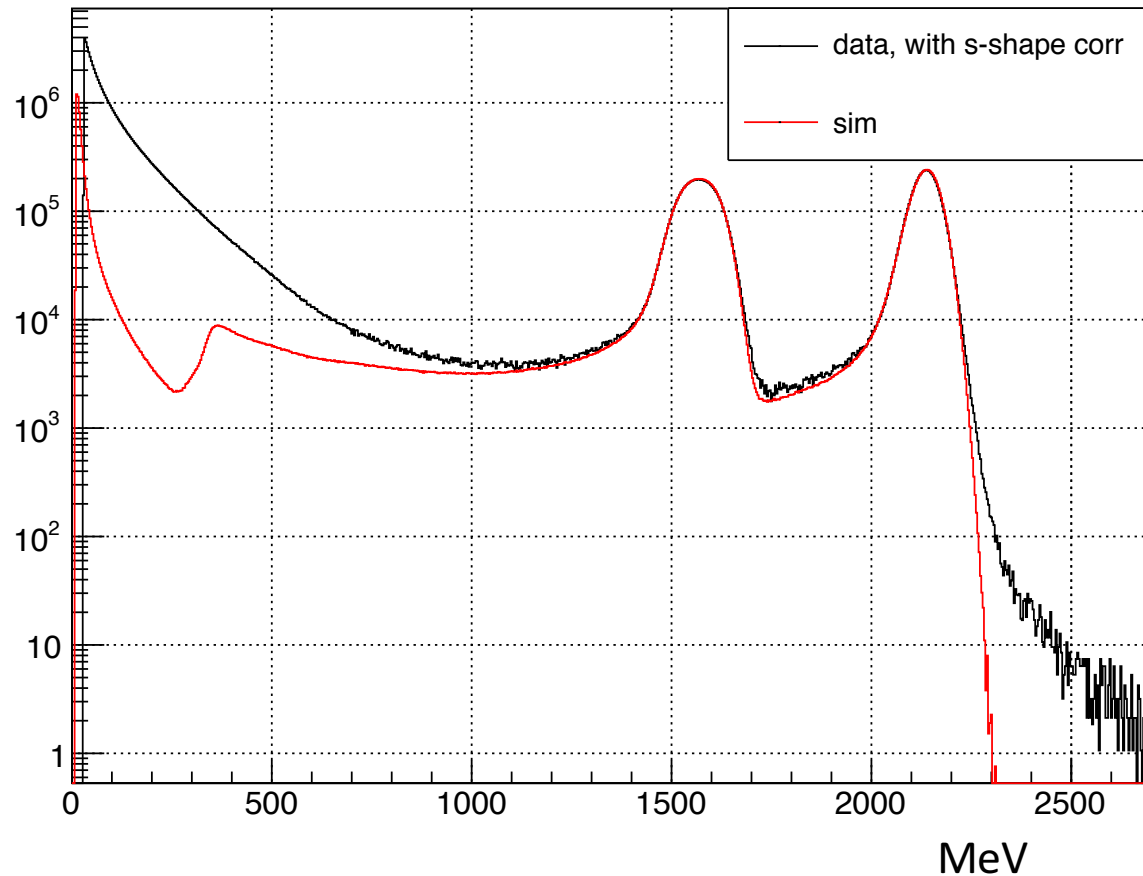
Super ratio



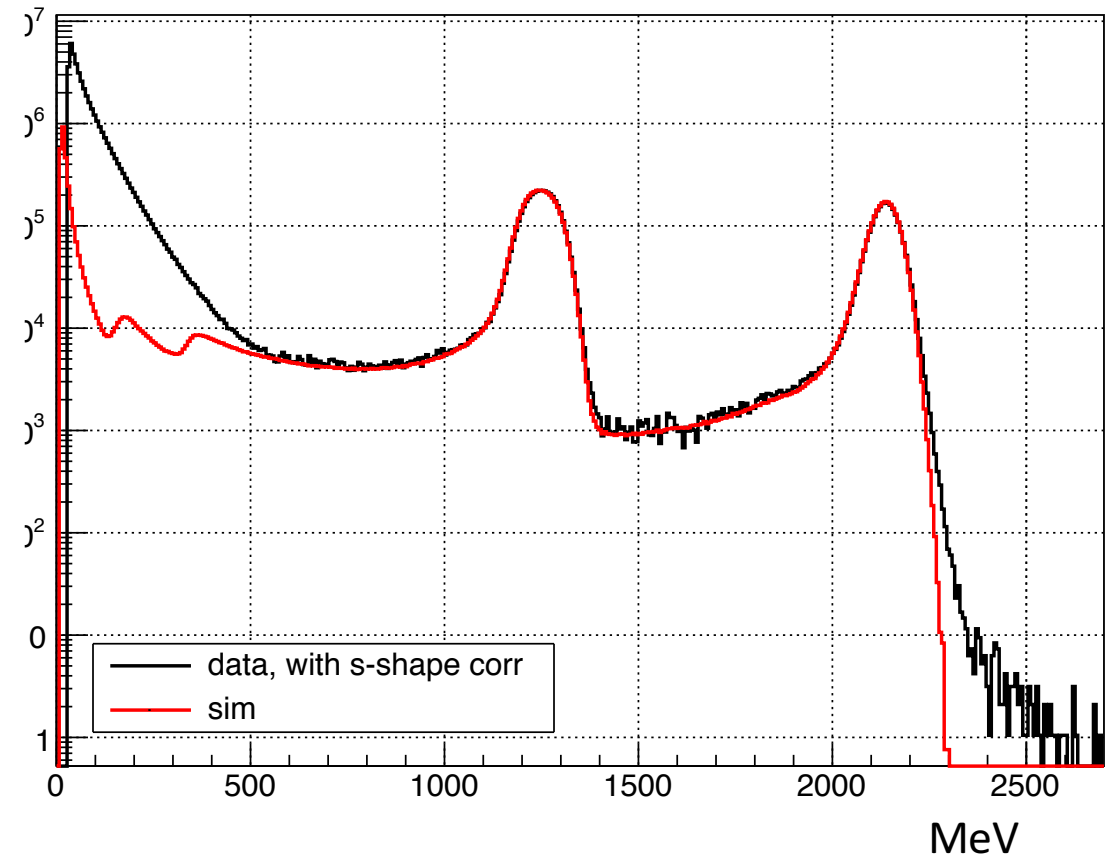
# Forward angle spectrum

- Potential issues with forward angle:
  - Possible background from low energy region
  - Energy Leakage

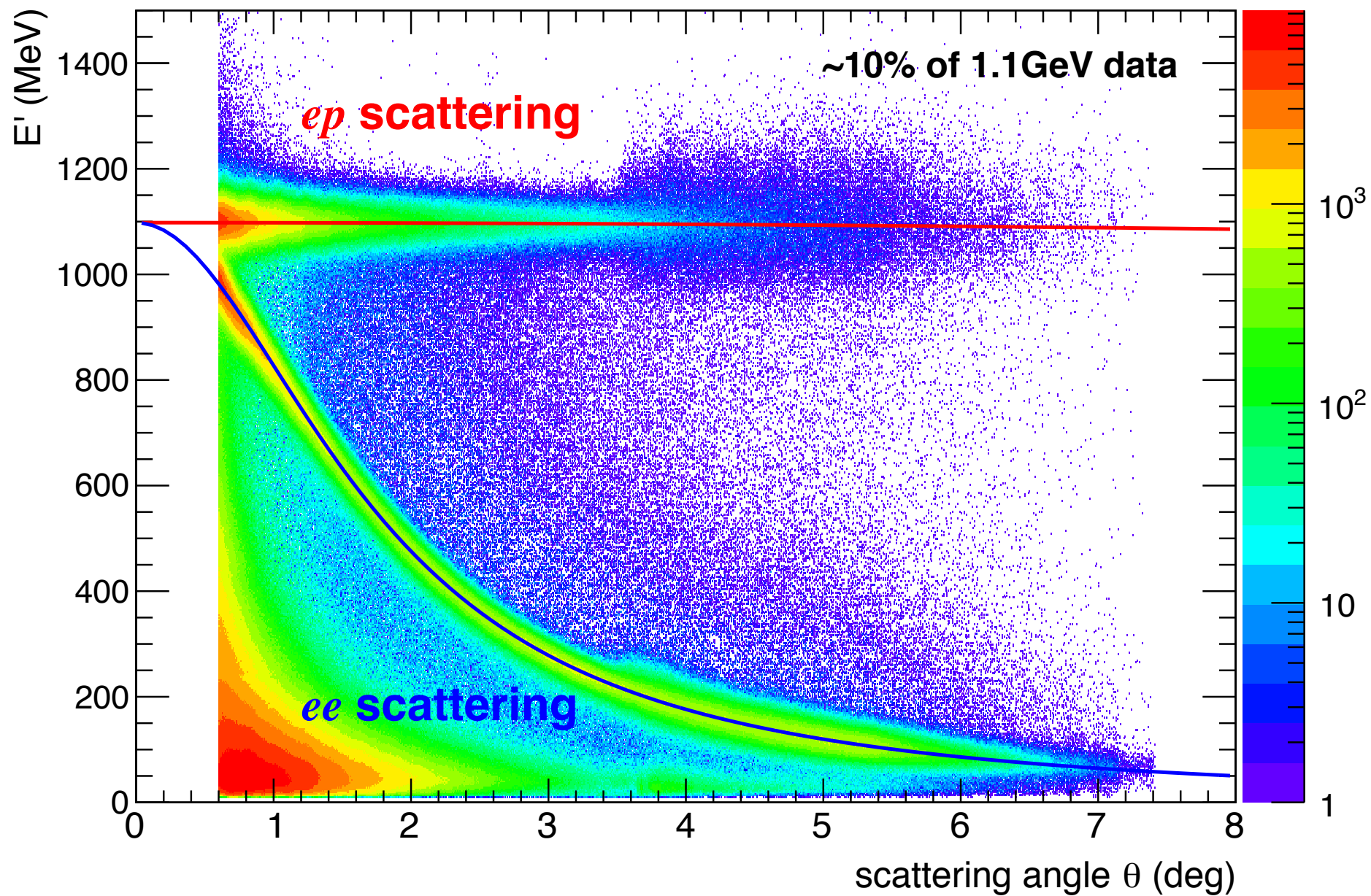
spectrum  $0.70 \text{ deg} < \theta < 0.80 \text{ deg}$



spectrum  $1.00 \text{ deg} < \theta < 1.10 \text{ deg}$

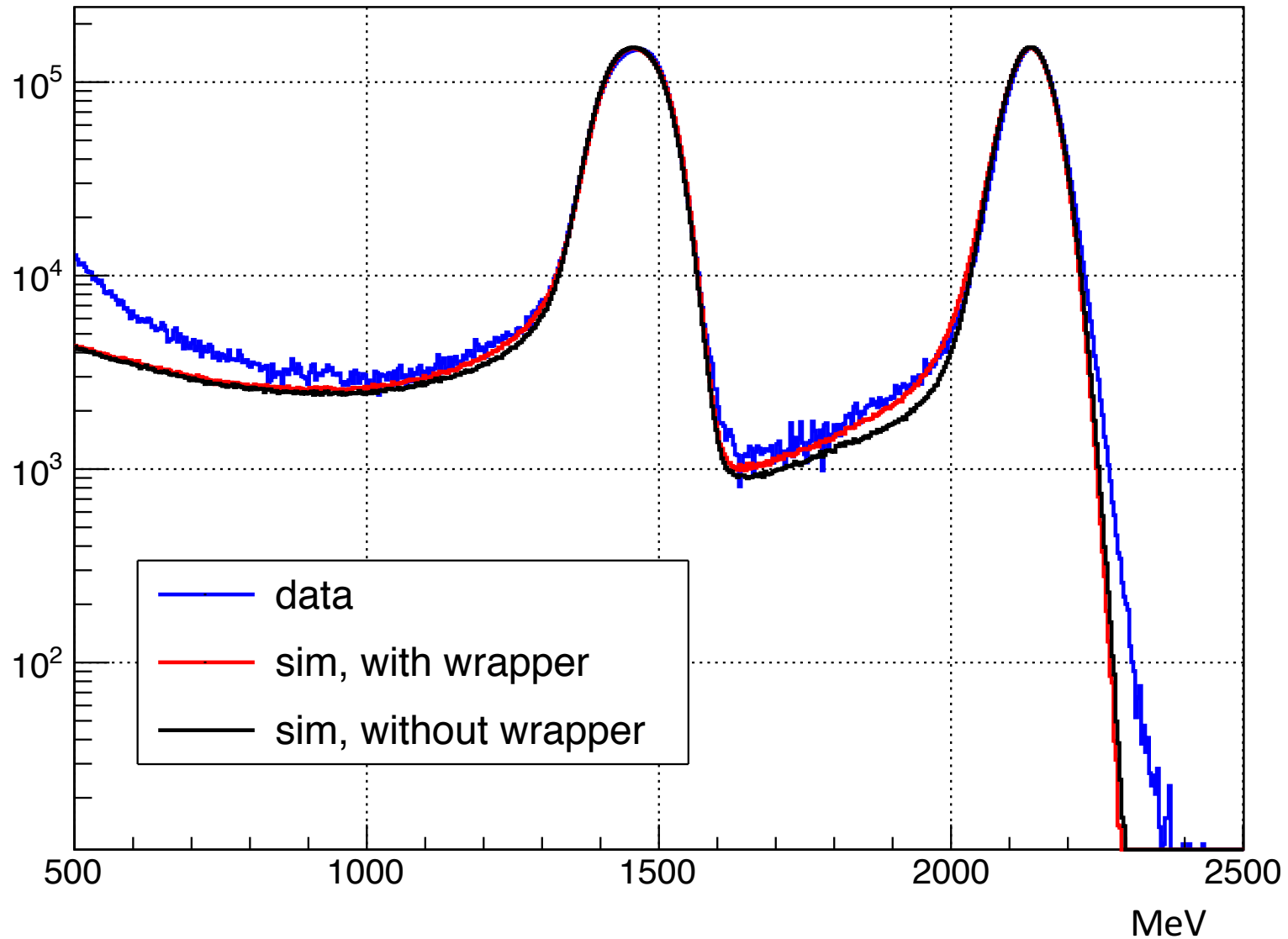


# Cluster energy $E'$ vs. scattering angle $\theta$



# Forward angle spectrum

spectrum  $0.80 \text{ deg} < \theta < 0.90 \text{ deg}$

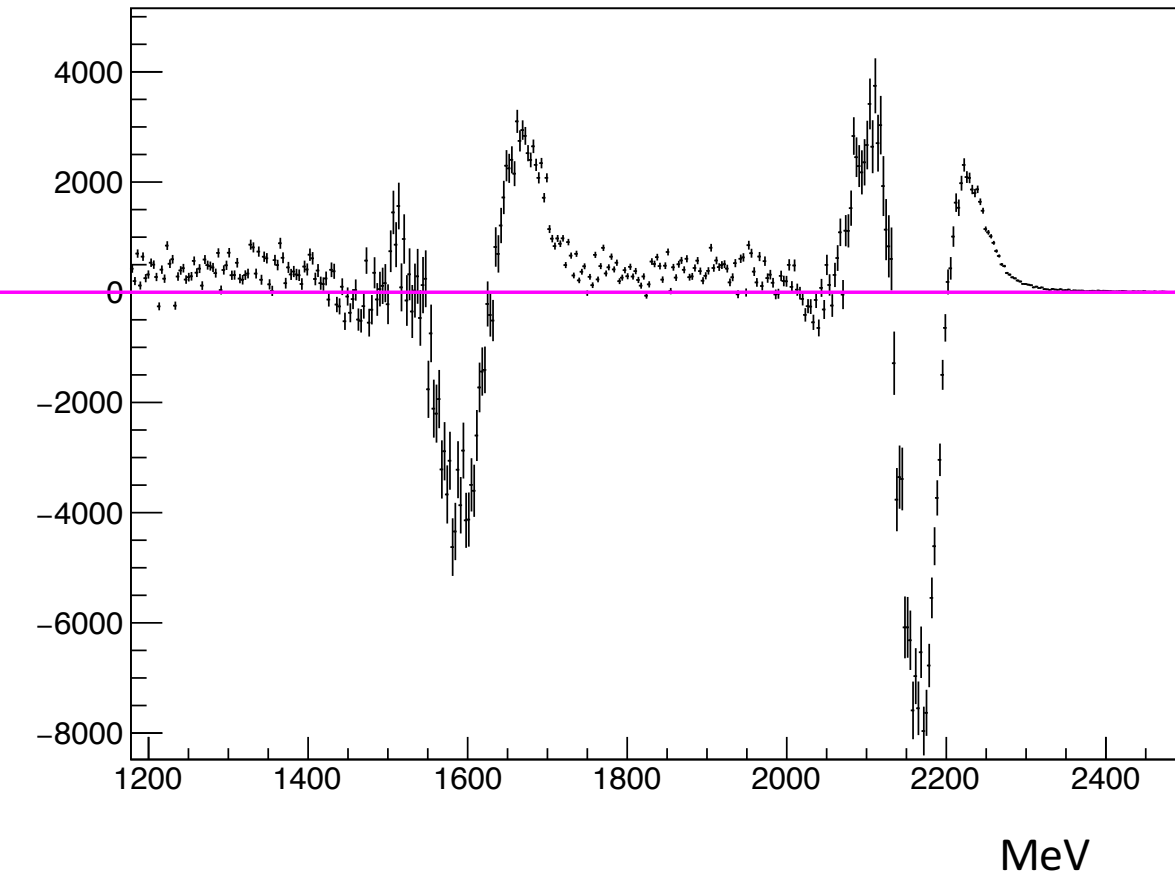




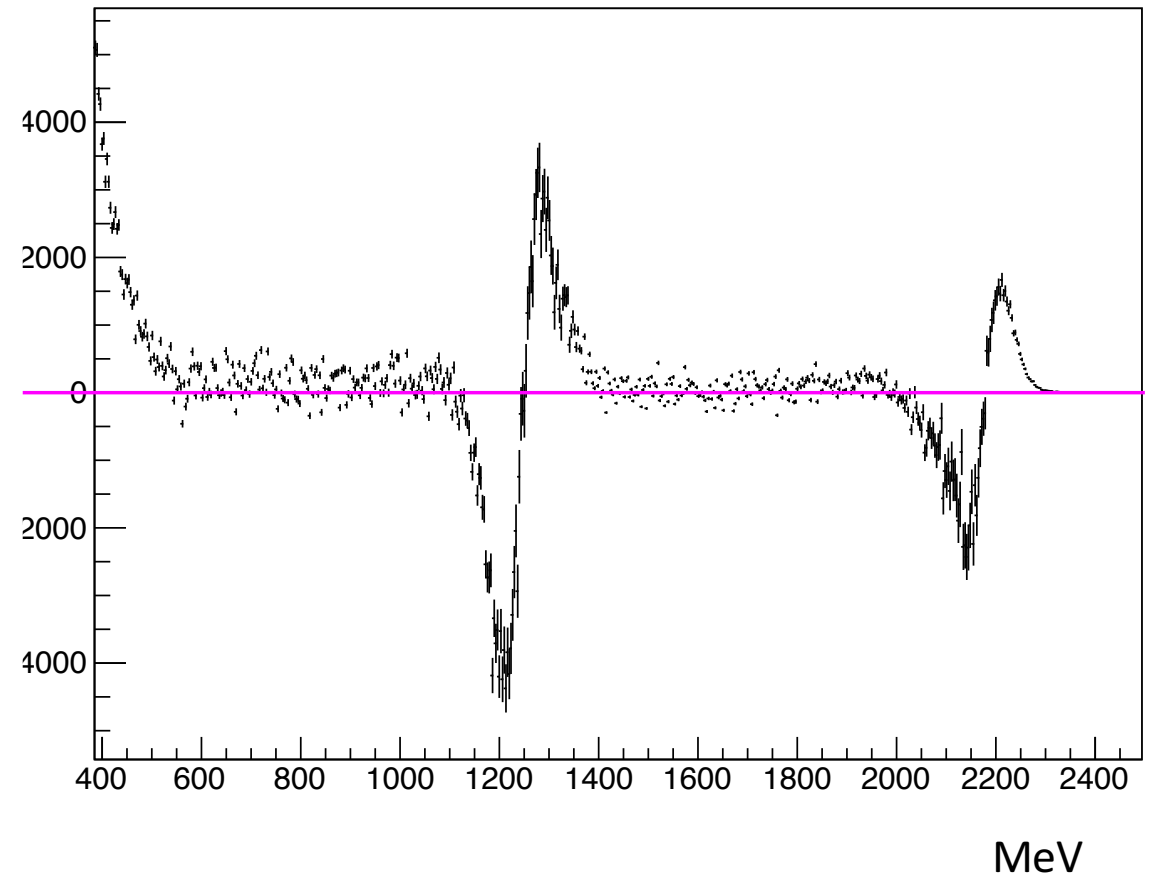
# Forward angle spectrum

Data spectrum minus simulation spectrum, after scaling both to the same ee yield

spectrum  $0.70 \text{ deg} < \theta < 0.80 \text{ deg}$



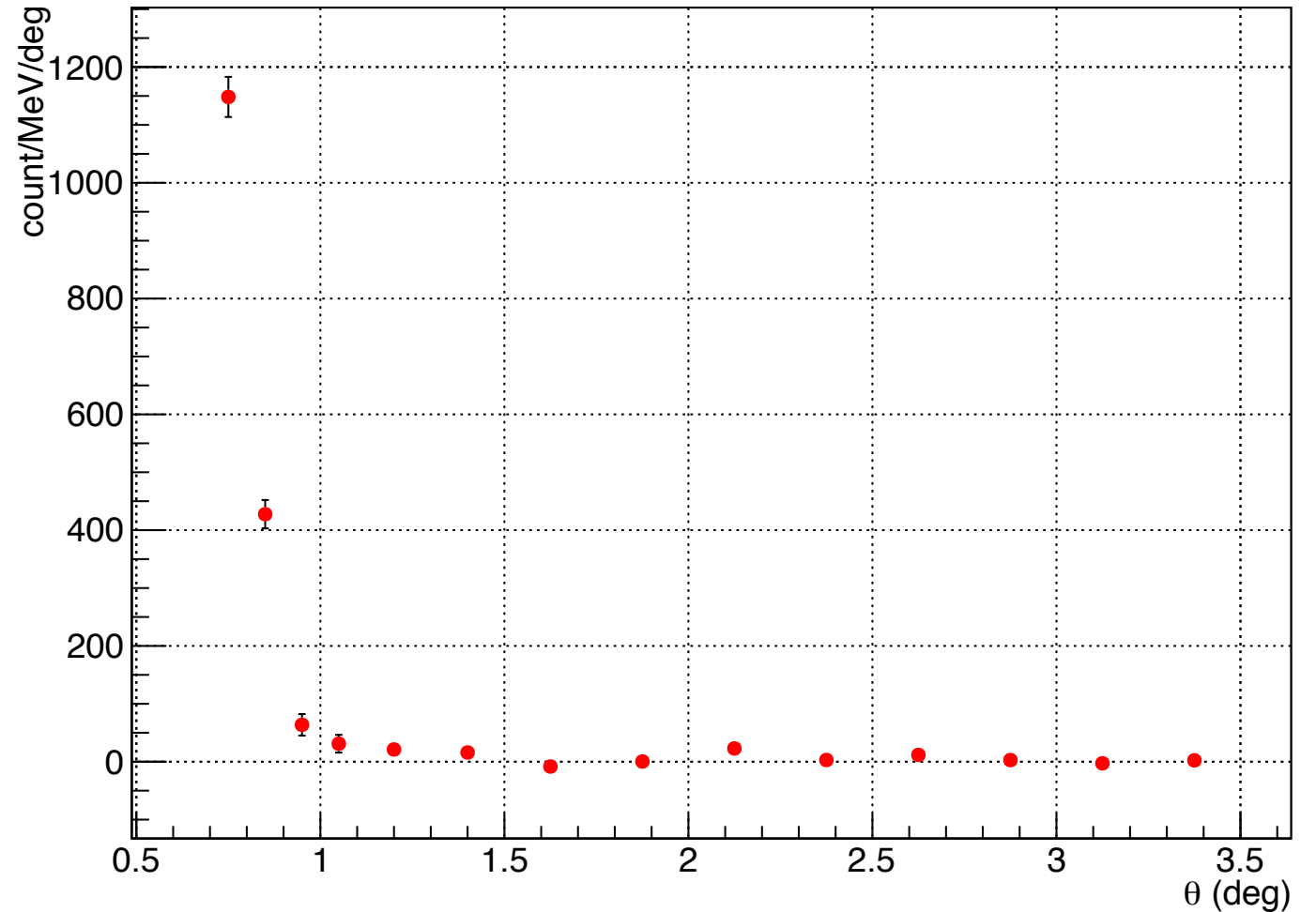
spectrum  $1.00 \text{ deg} < \theta < 1.10 \text{ deg}$



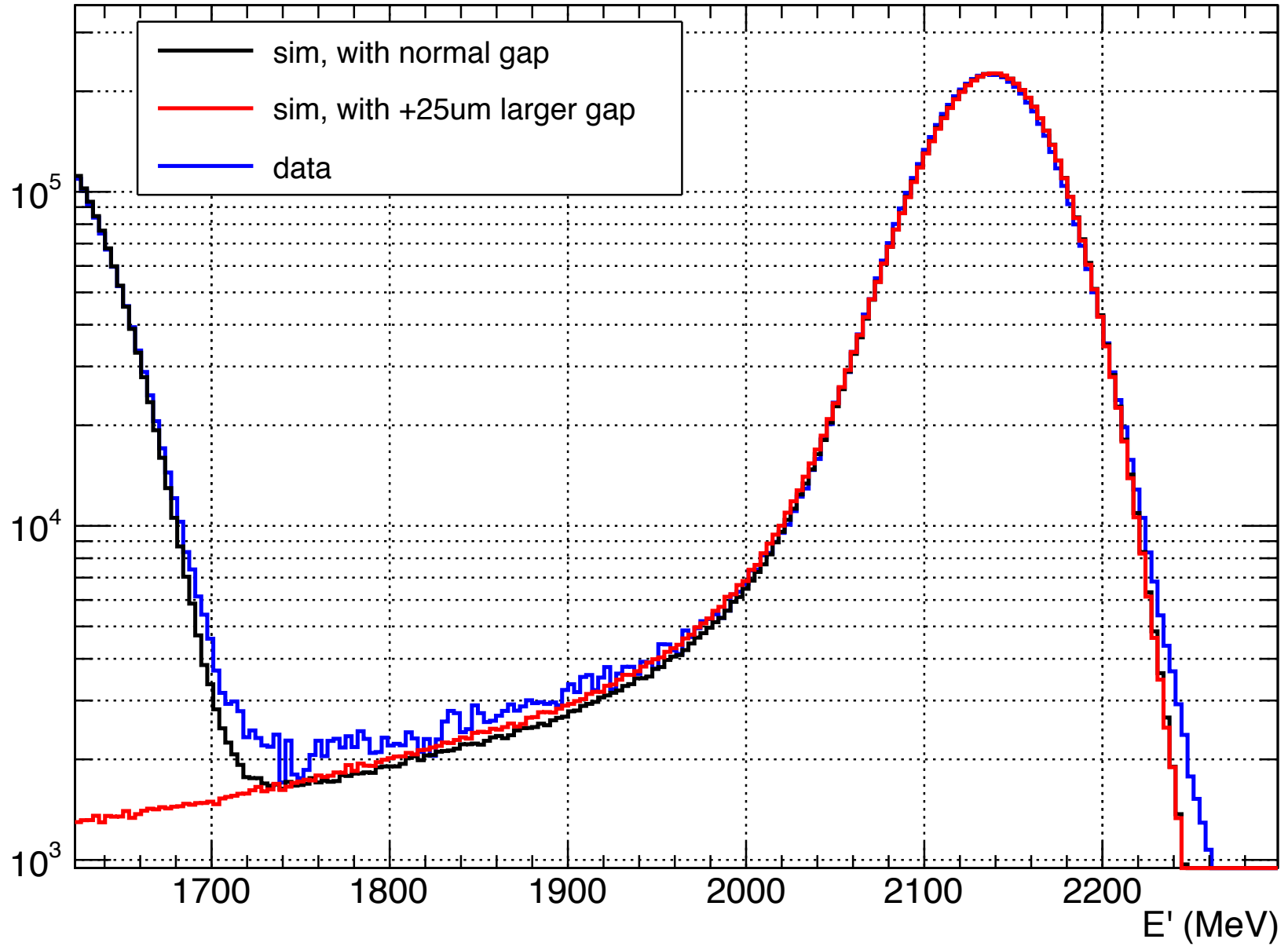
# Base line after subtraction

- The base line quickly converge to 0 after 1deg
- If we assume that it is due to background, and the same base line goes under the ep peak, then after subtraction, the forward angle points are shifted by at most 0.5%
- If it is due to leakage, then the entire slope of the super-ratio will be smaller
- In any case, should be a  $\sim < 0.5\%$  effect

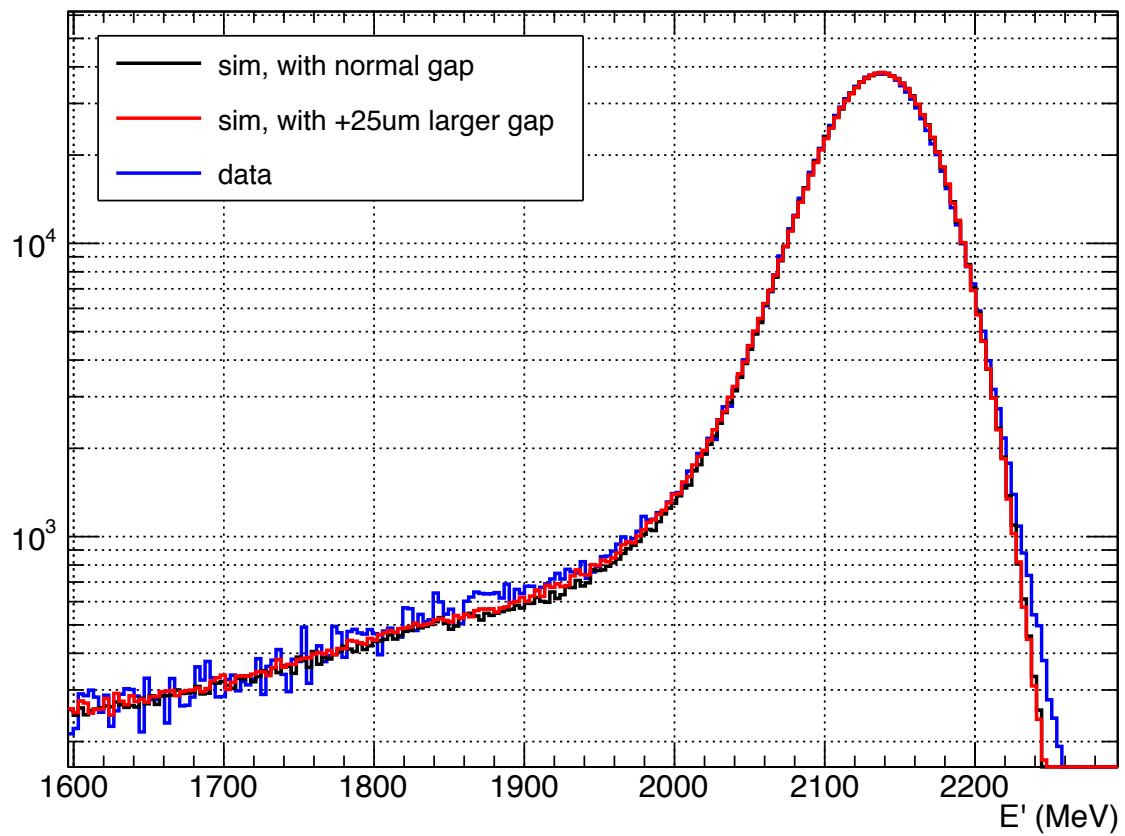
Graph



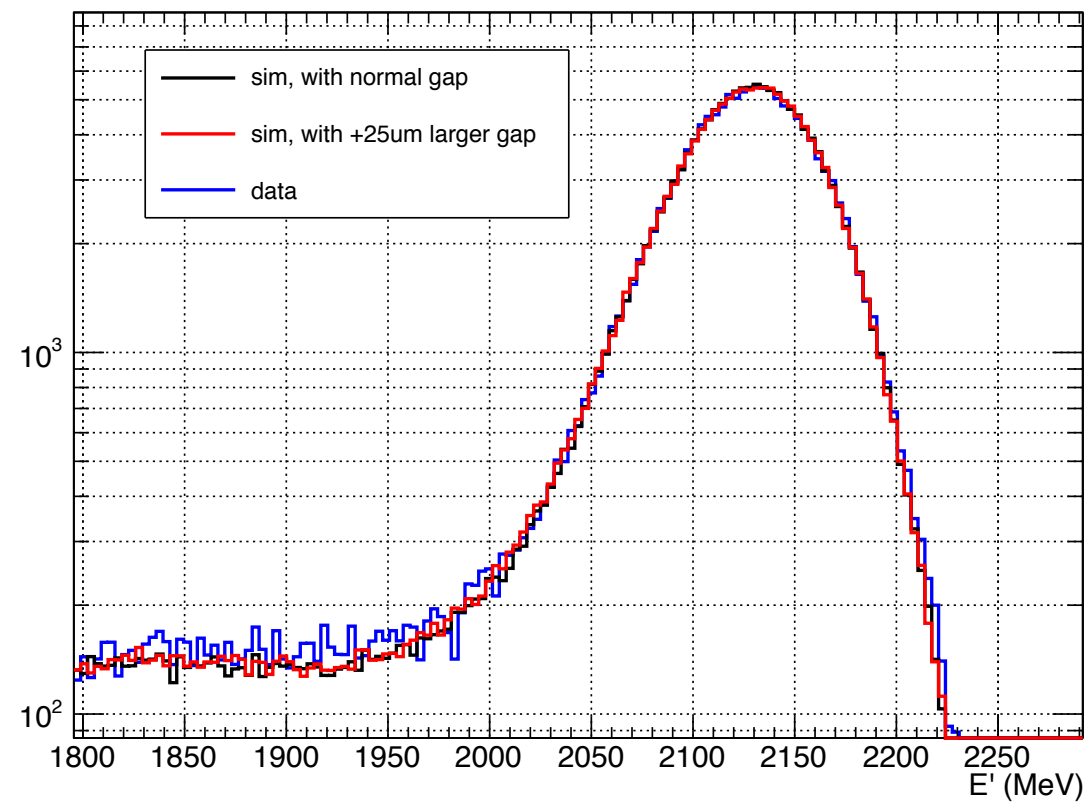
spectrum for  $0.70 < \theta < 0.80$  deg



spectrum for  $1.30 < \theta < 1.40$  deg



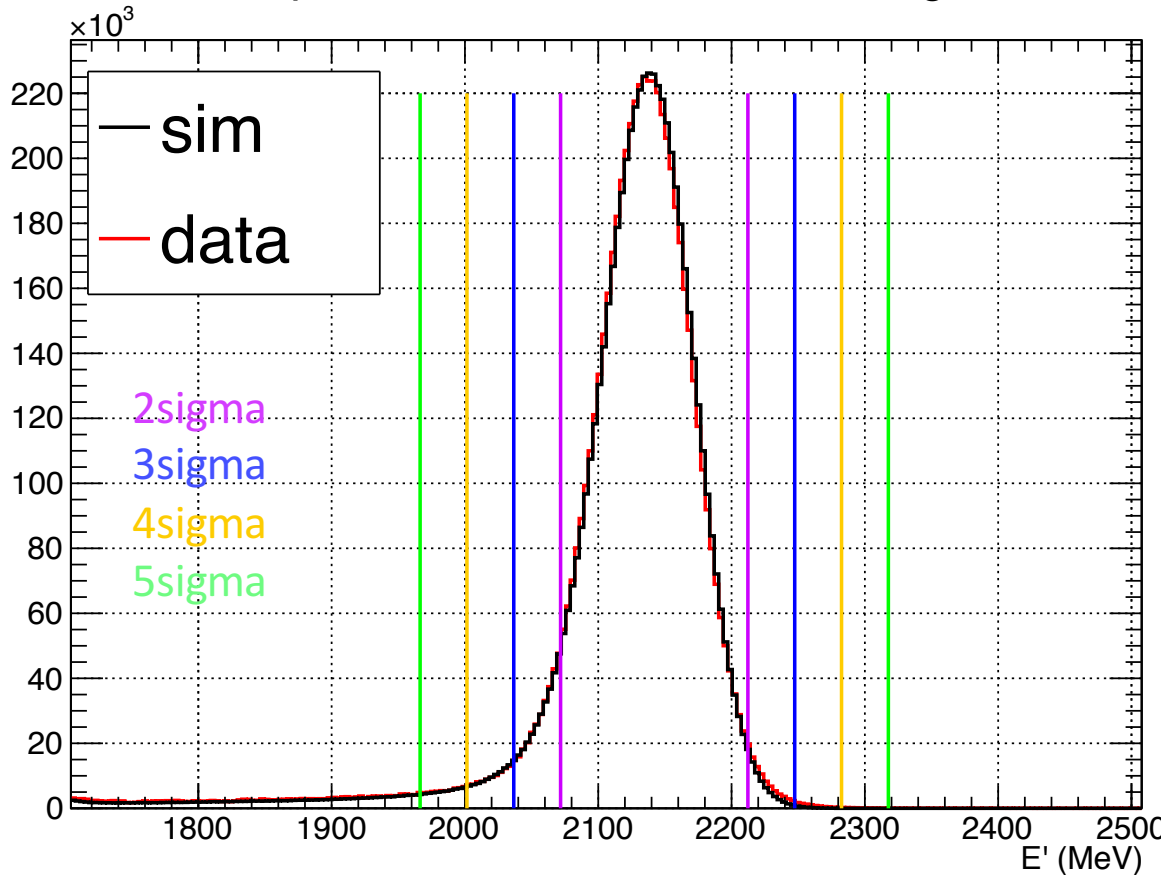
spectrum for  $3.00 < \theta < 3.20$  deg



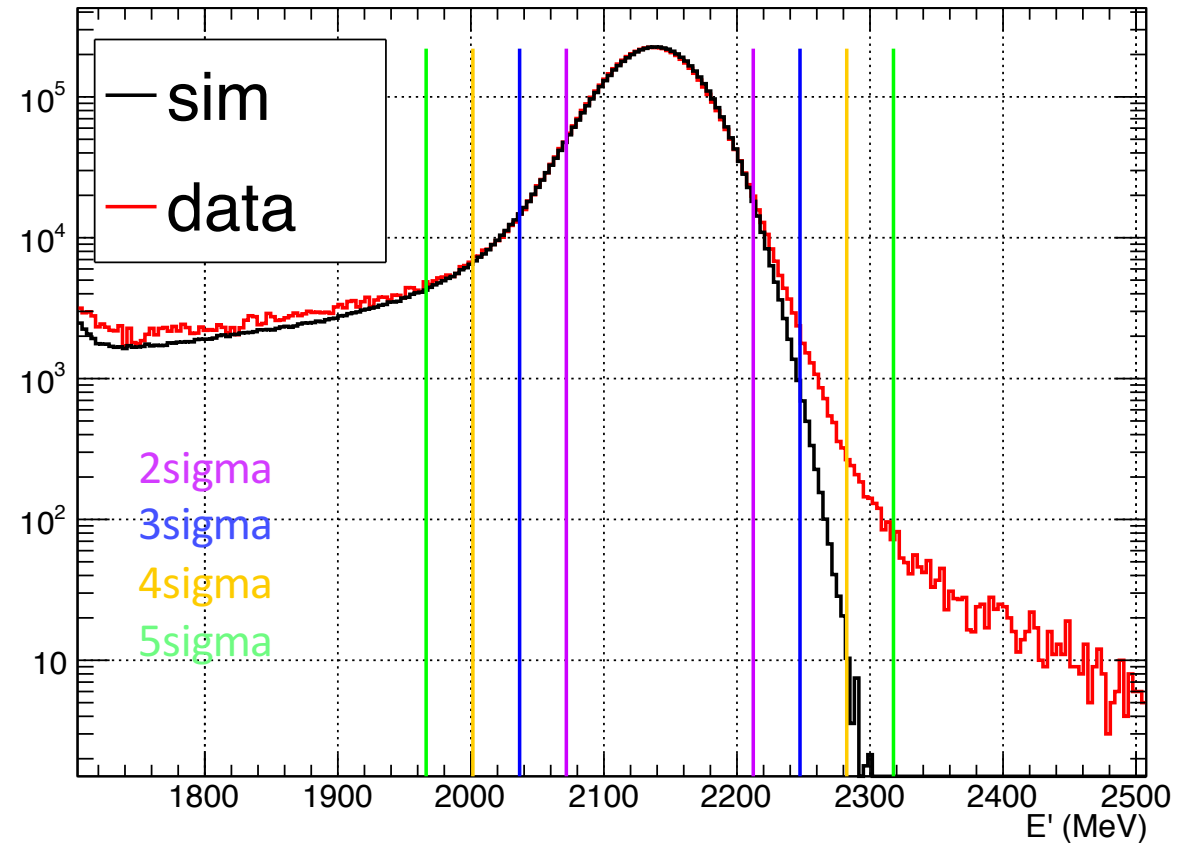
# Sensitivity of ep energy cut

PWO resolution  $\sim 35$  MeV

spectrum for  $0.70 < \theta < 0.80$  deg



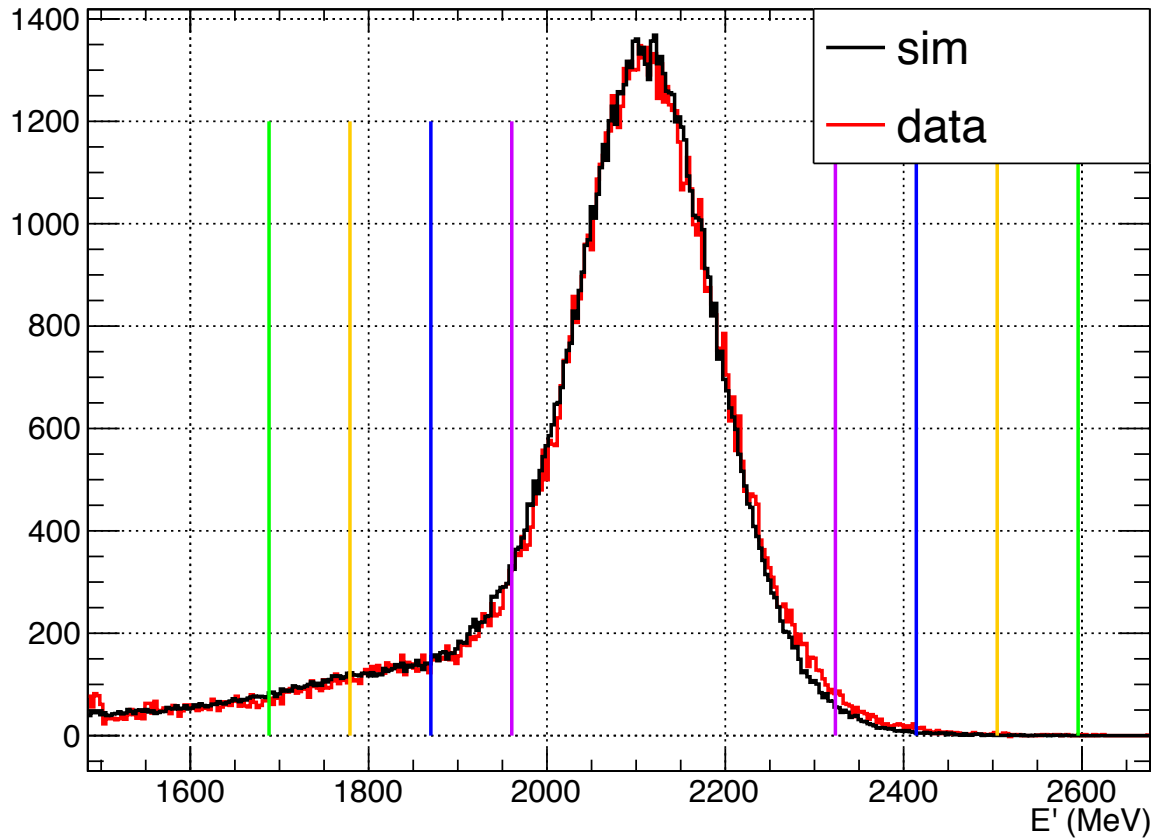
spectrum for  $0.70 < \theta < 0.80$  deg



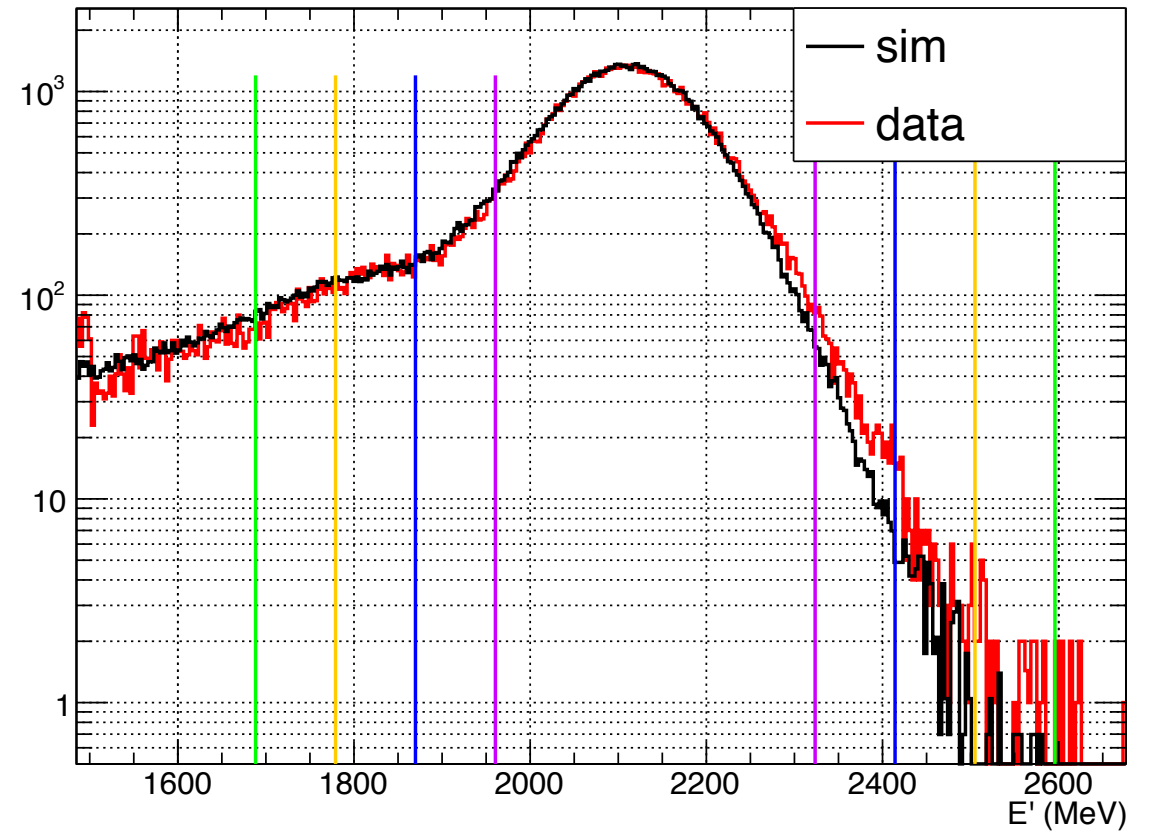
# Sensitivity of ep energy cut

PWO resolution  $\sim 90$  MeV

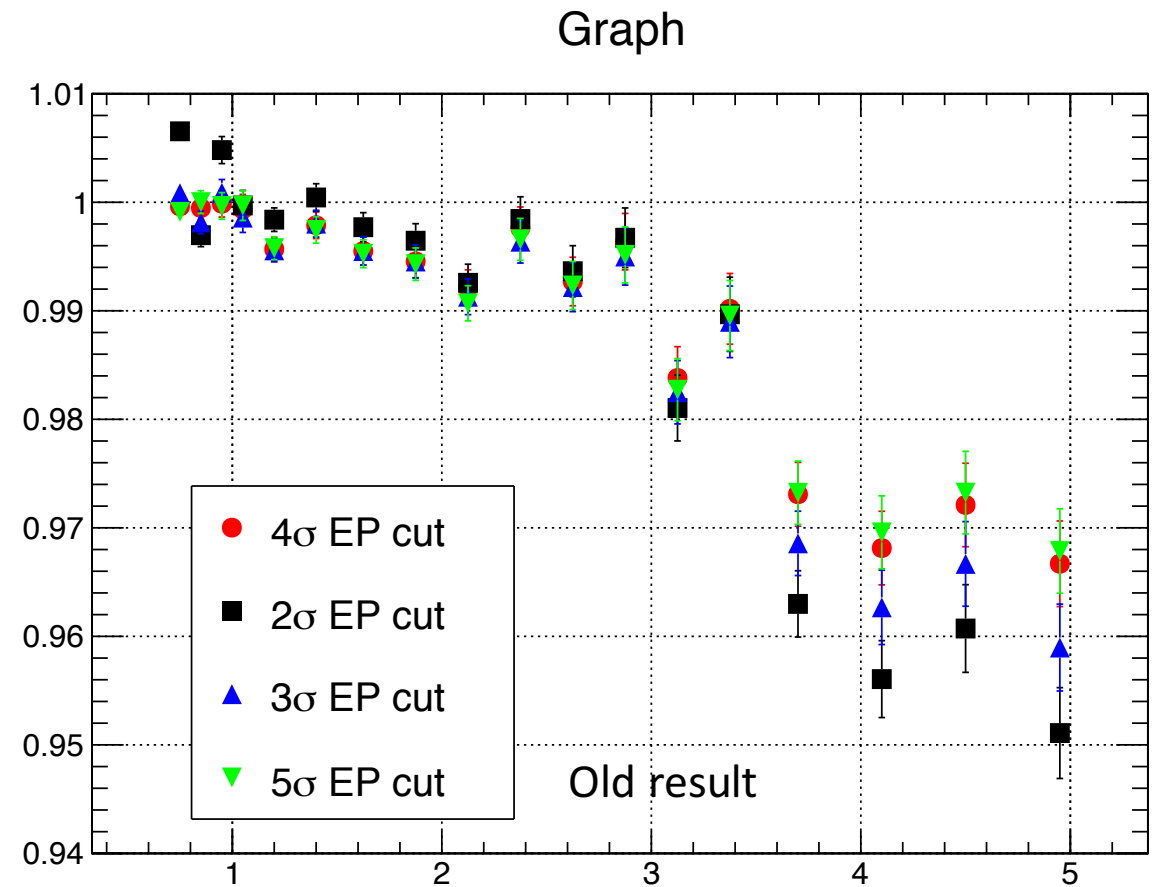
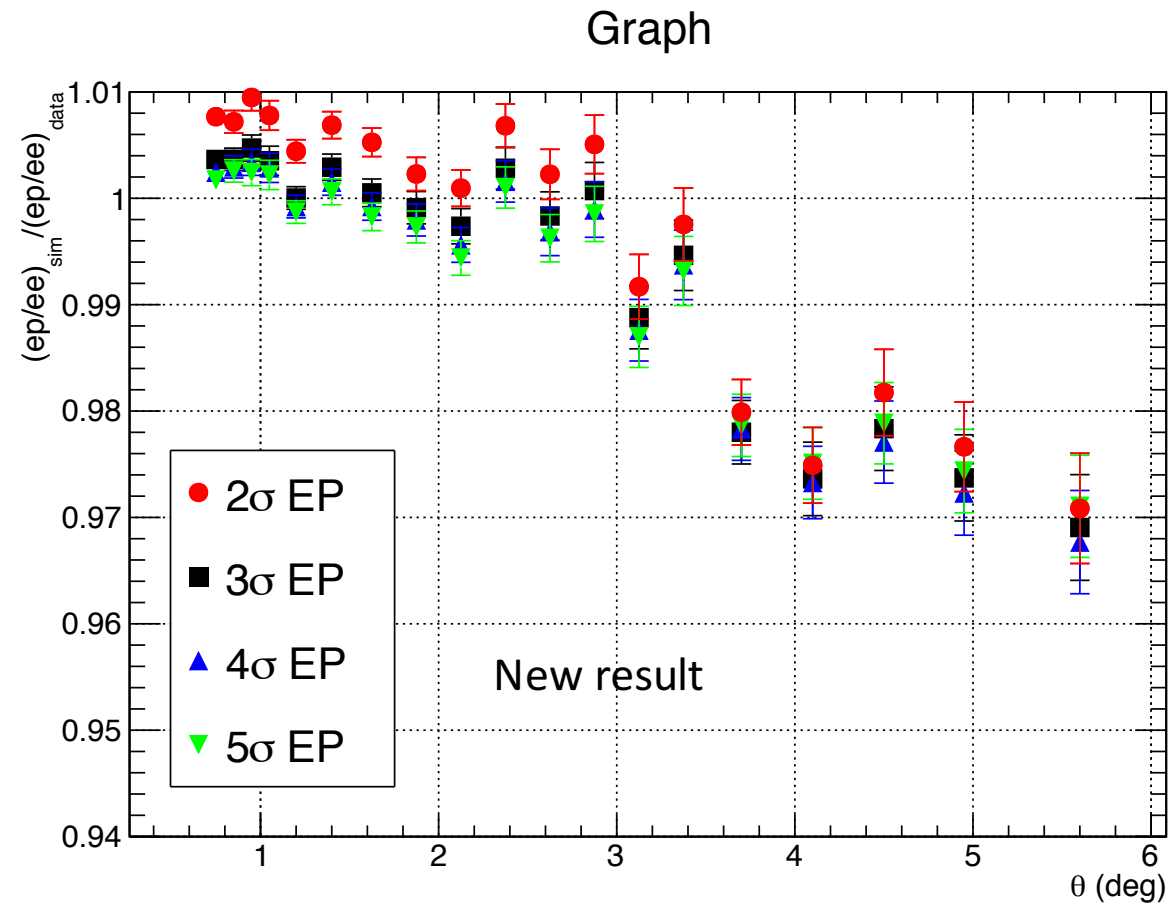
spectrum for  $4.70 < \theta < 5.20$  deg



spectrum for  $4.70 < \theta < 5.20$  deg



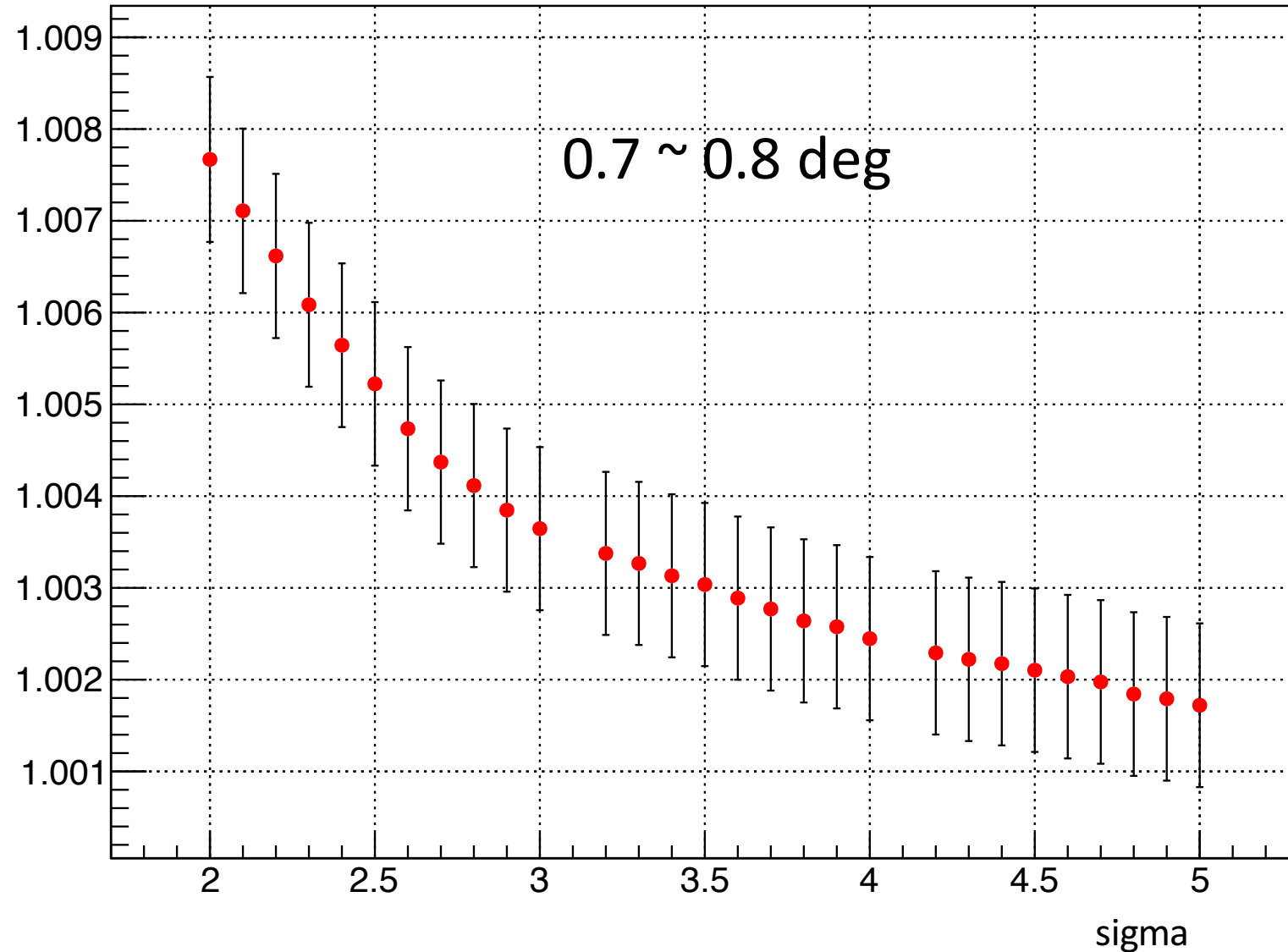
# Sensitivity of ep energy cut



# Sensitivity of ep energy cut

Graph

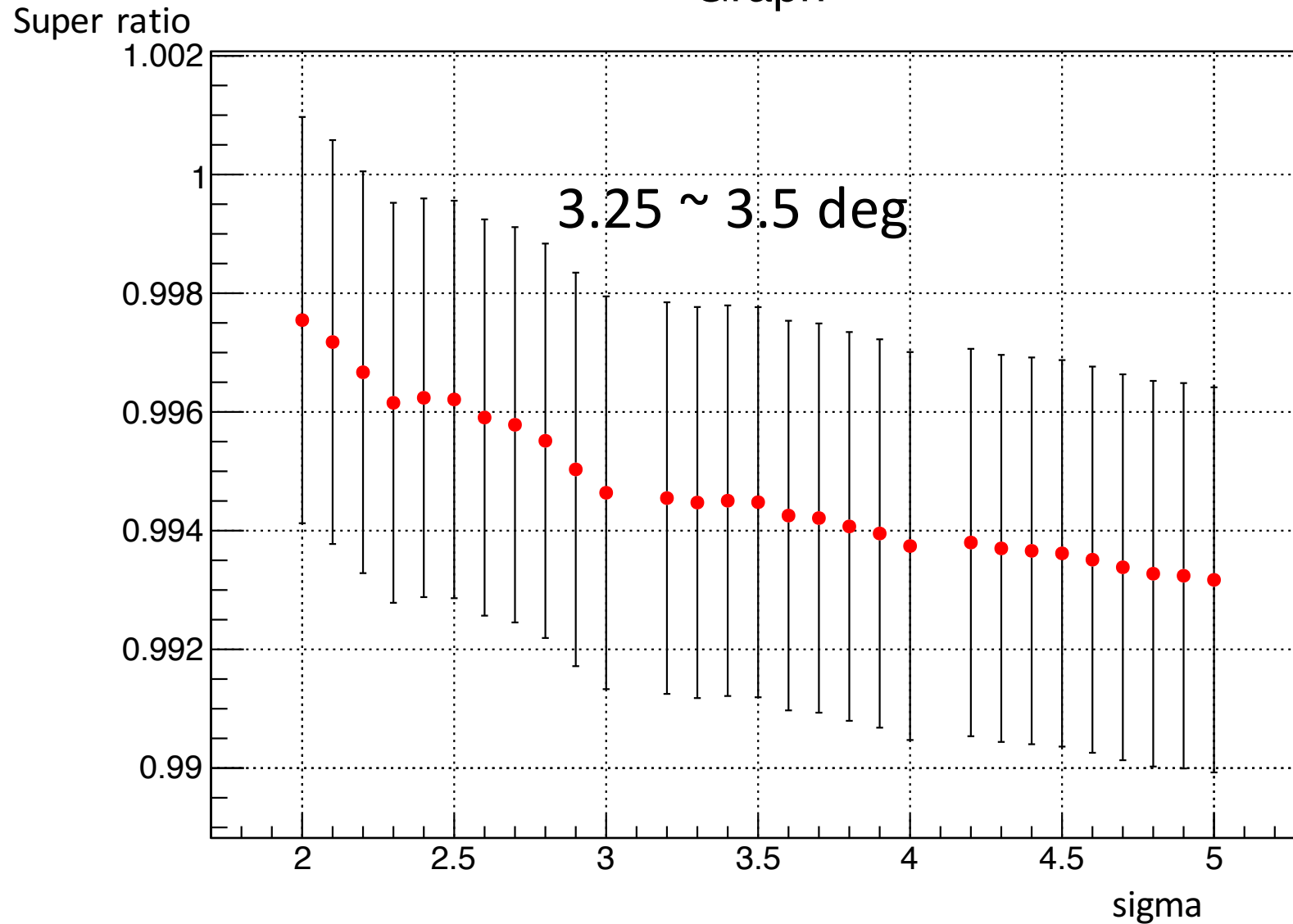
Super ratio





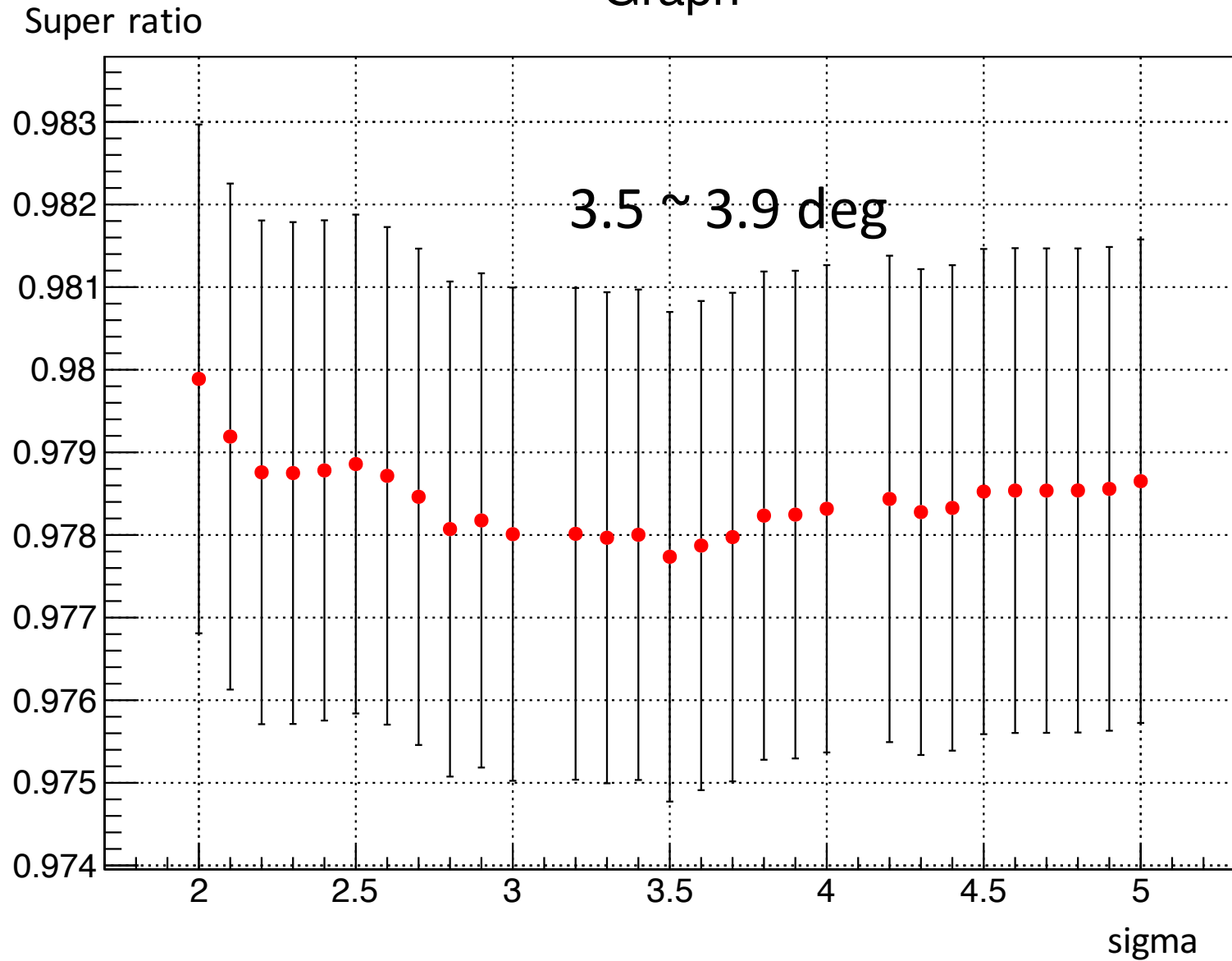
# Sensitivity of ep energy cut

## Graph



# Sensitivity of ep energy cut

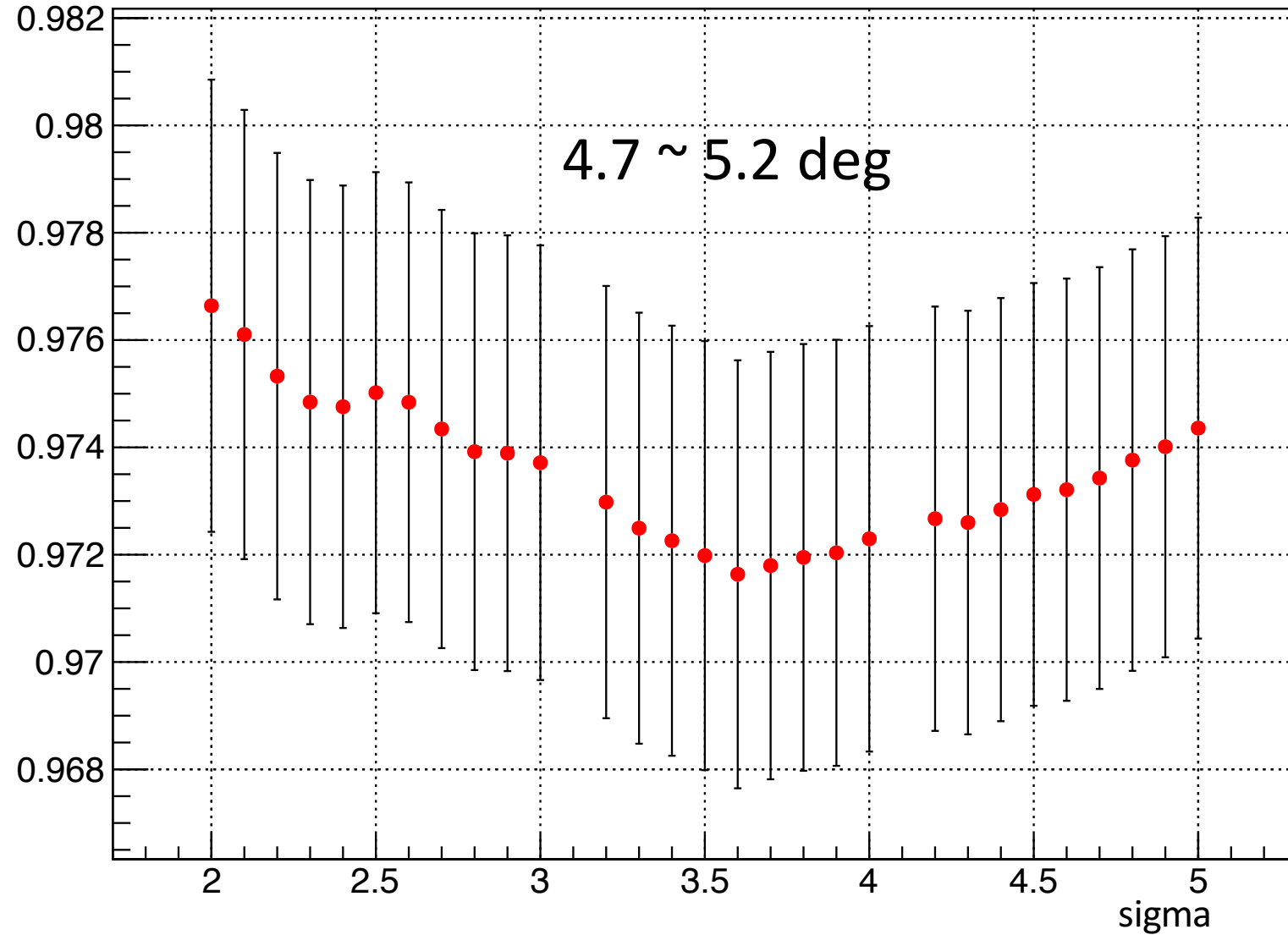
## Graph



# Sensitivity of ep energy cut

Graph

Super ratio



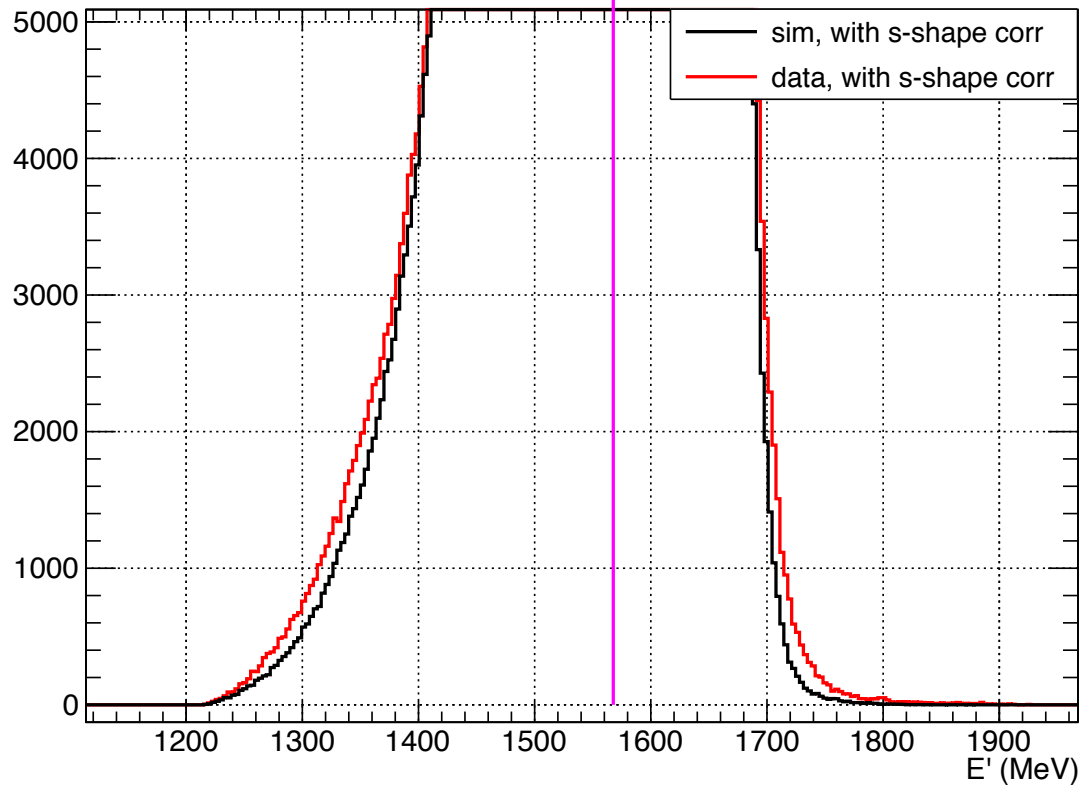


# Double arm Moller spectrum

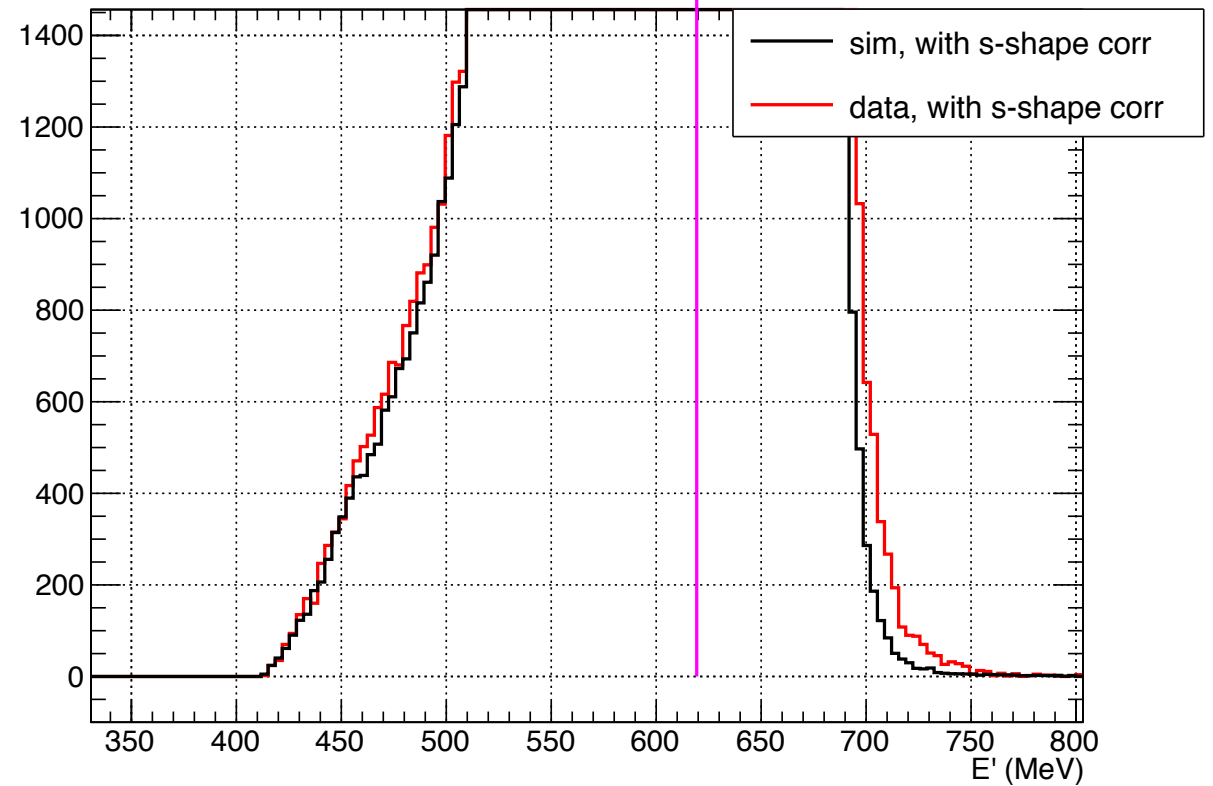
Magenta lines indicates the peak position

Distributions scaled by total integral of the histogram

spectrum for  $0.70 < \theta < 0.80$  deg



spectrum for  $1.90 < \theta < 2.00$  deg



# Integral of the low energy background from 100MeV to 300 MeV

## Graph

