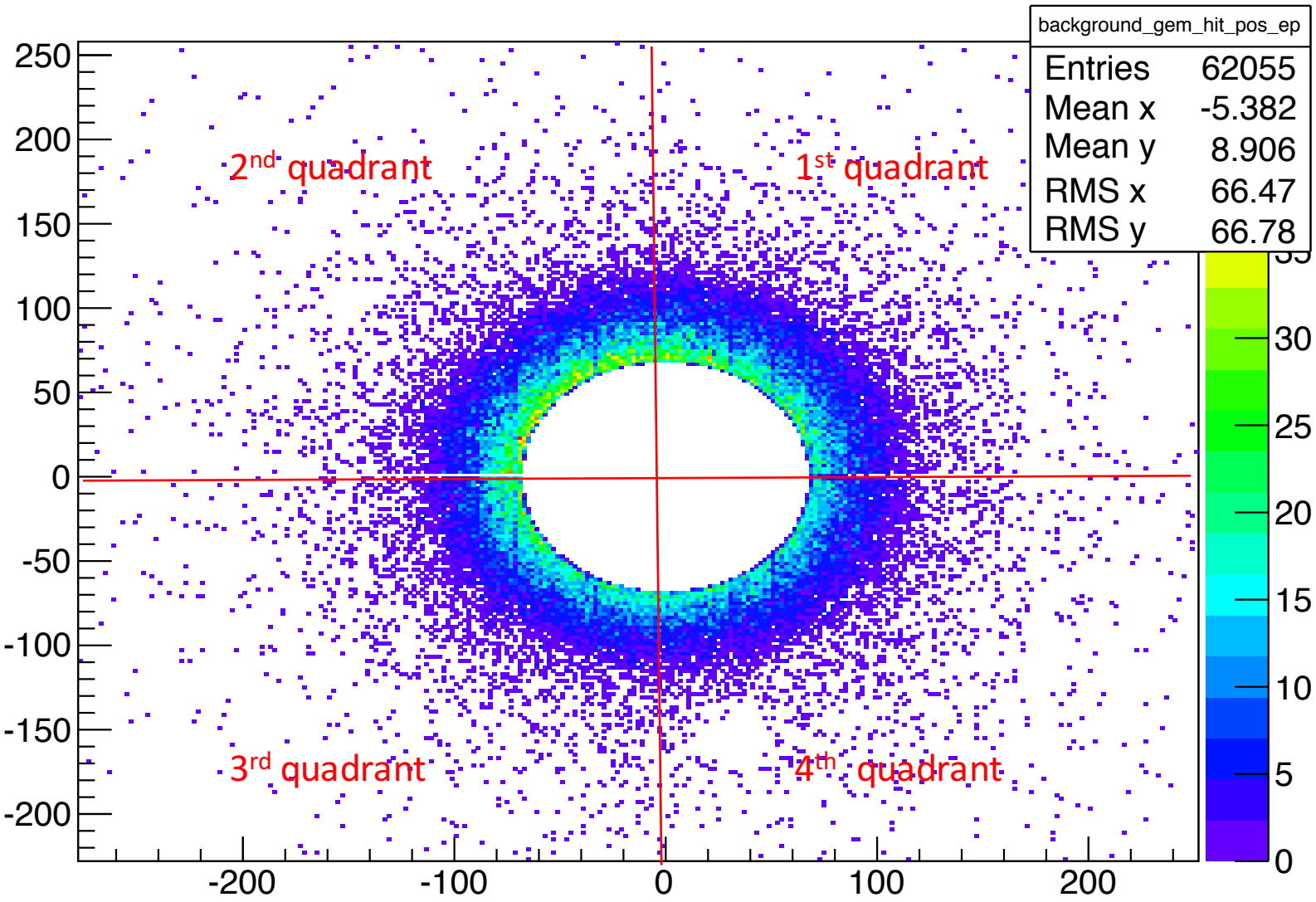
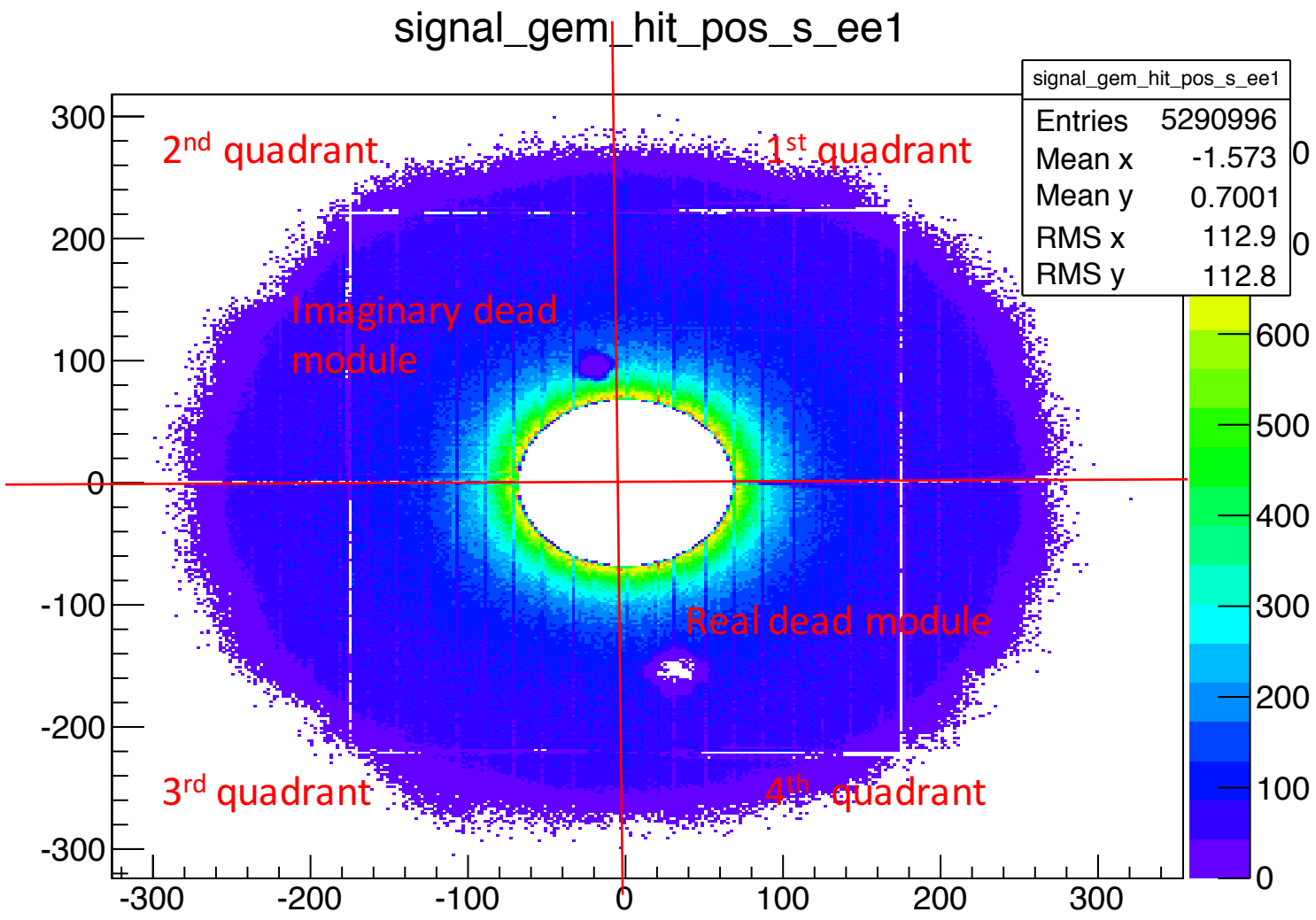
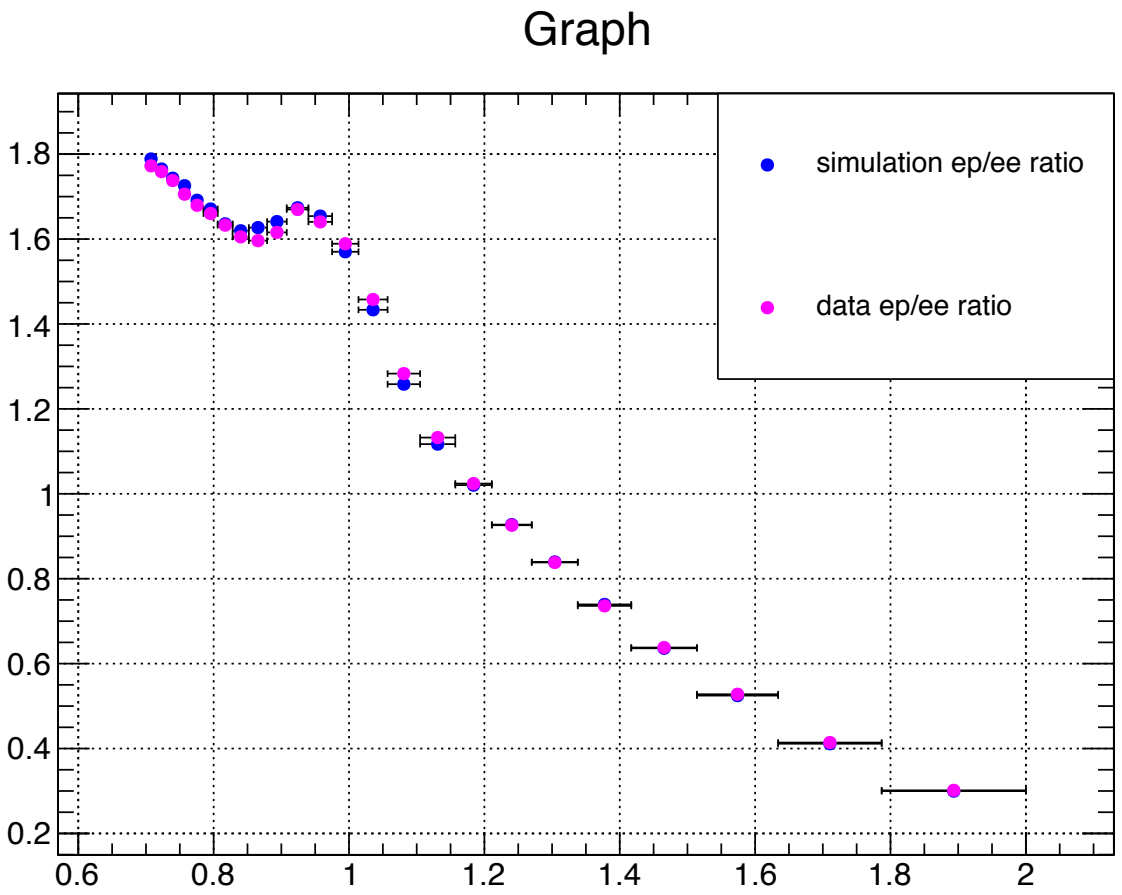
ep background distribution

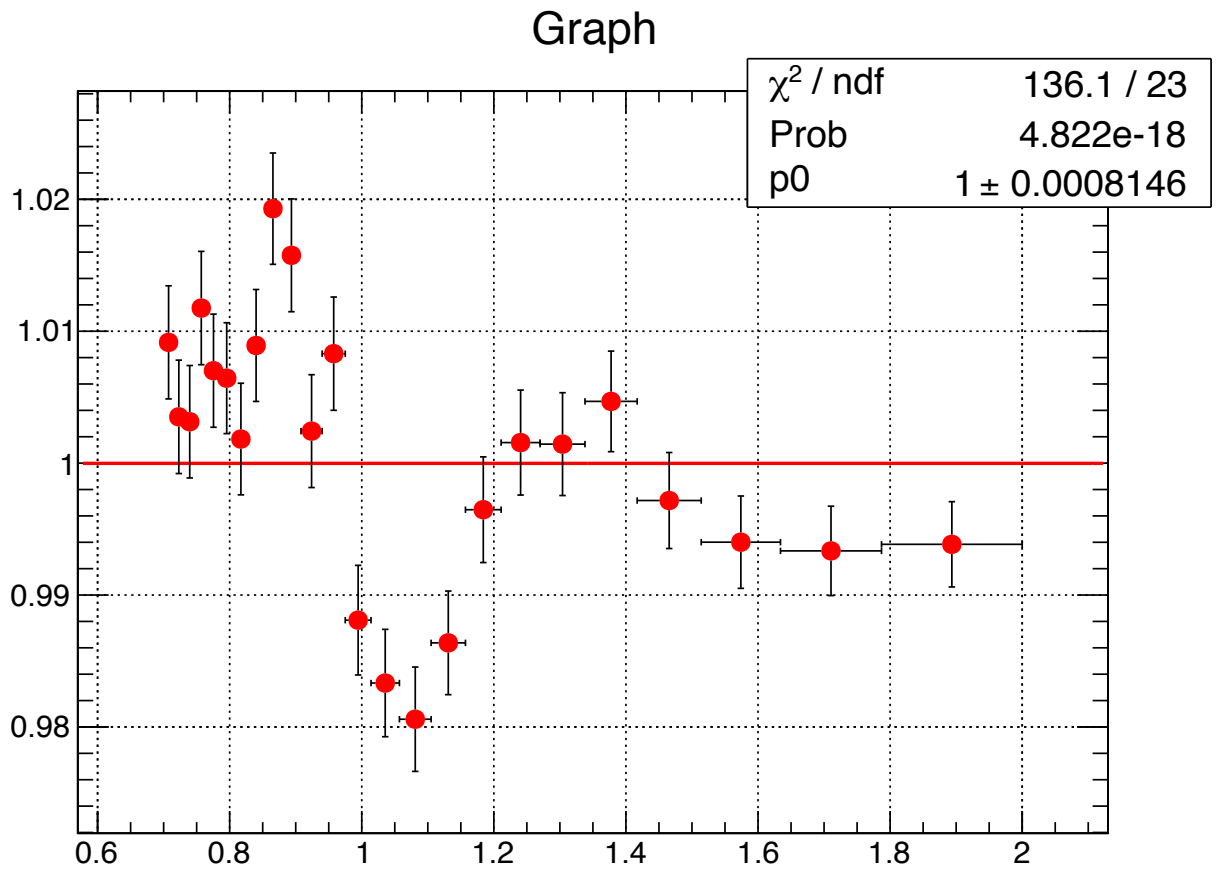


Moller hit distribution

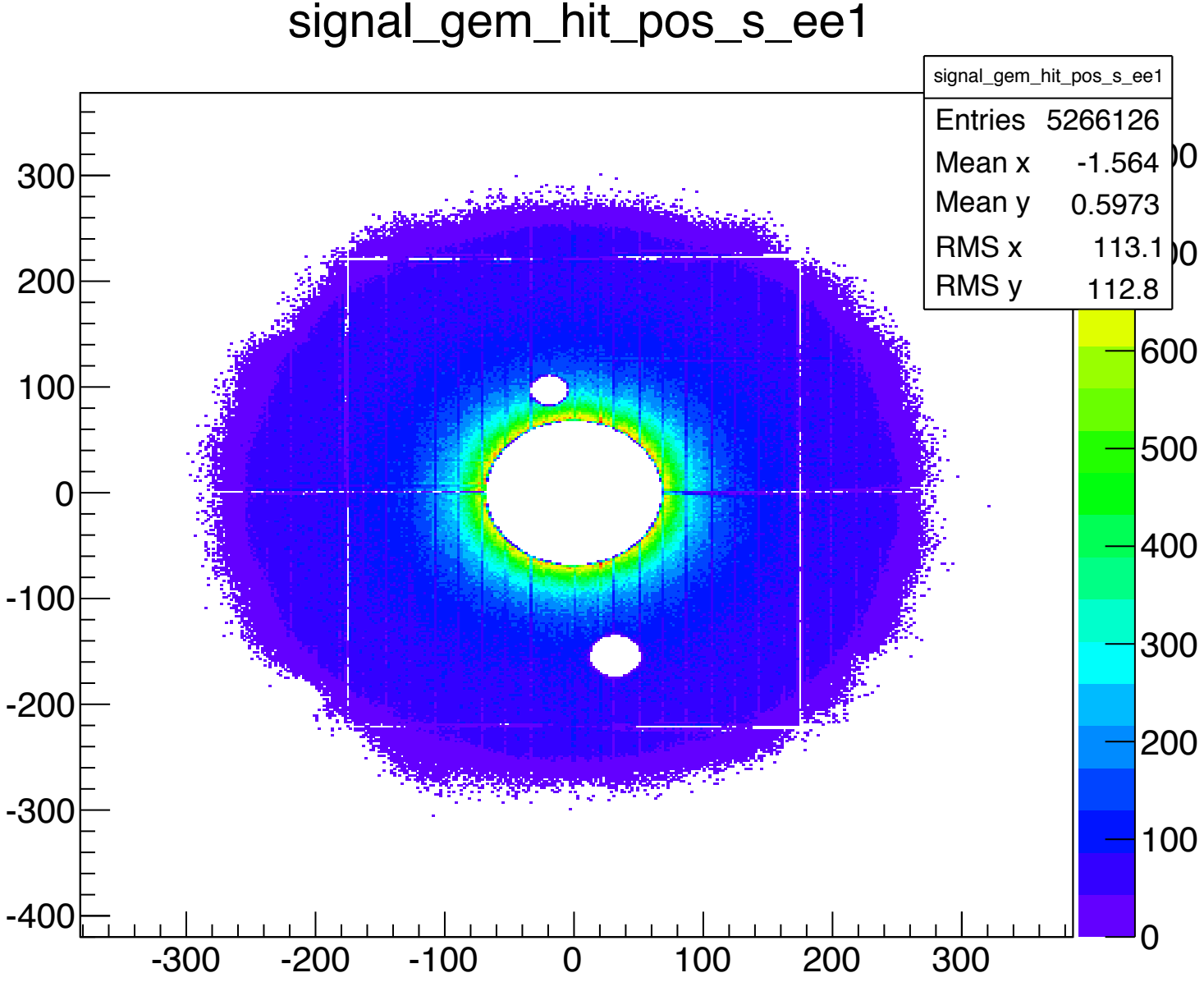


Simulation ep/ee vs data ep/ee in 2nd quadrant

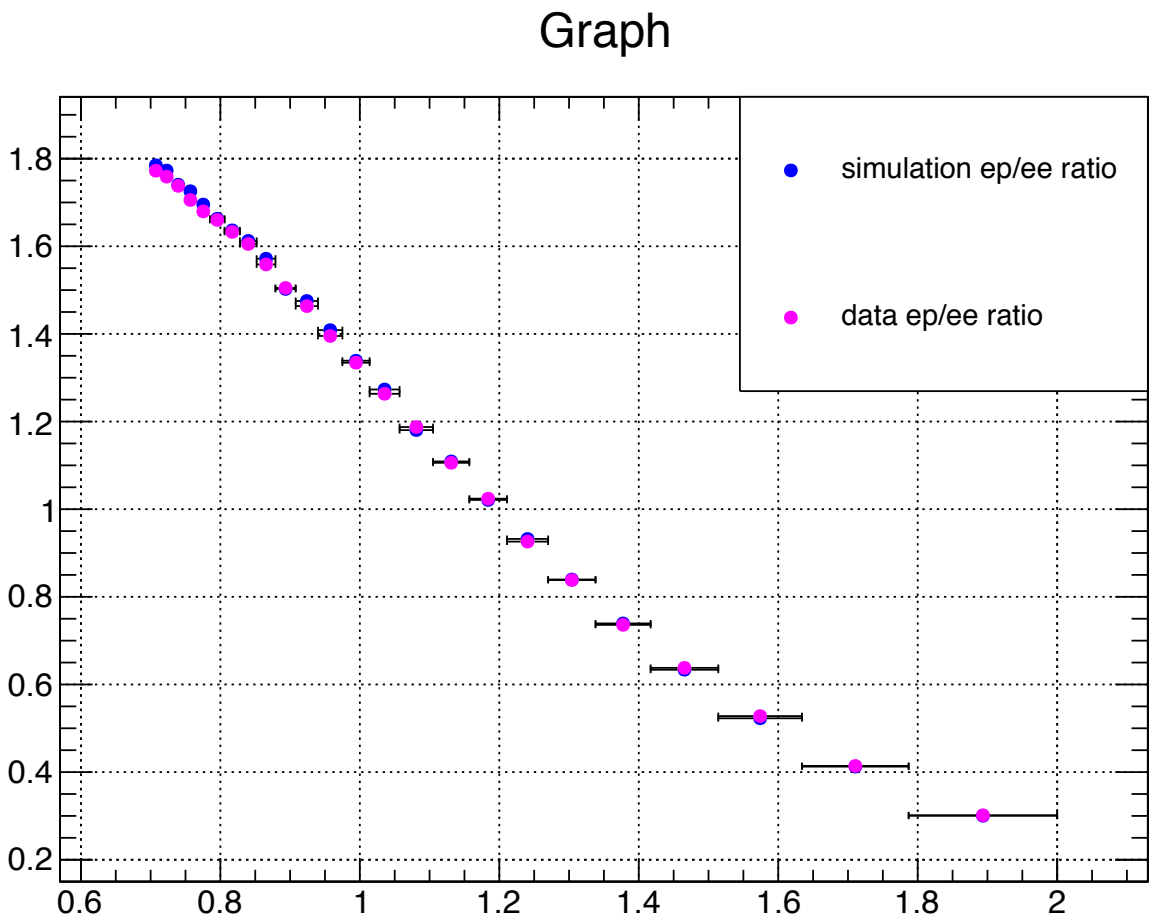


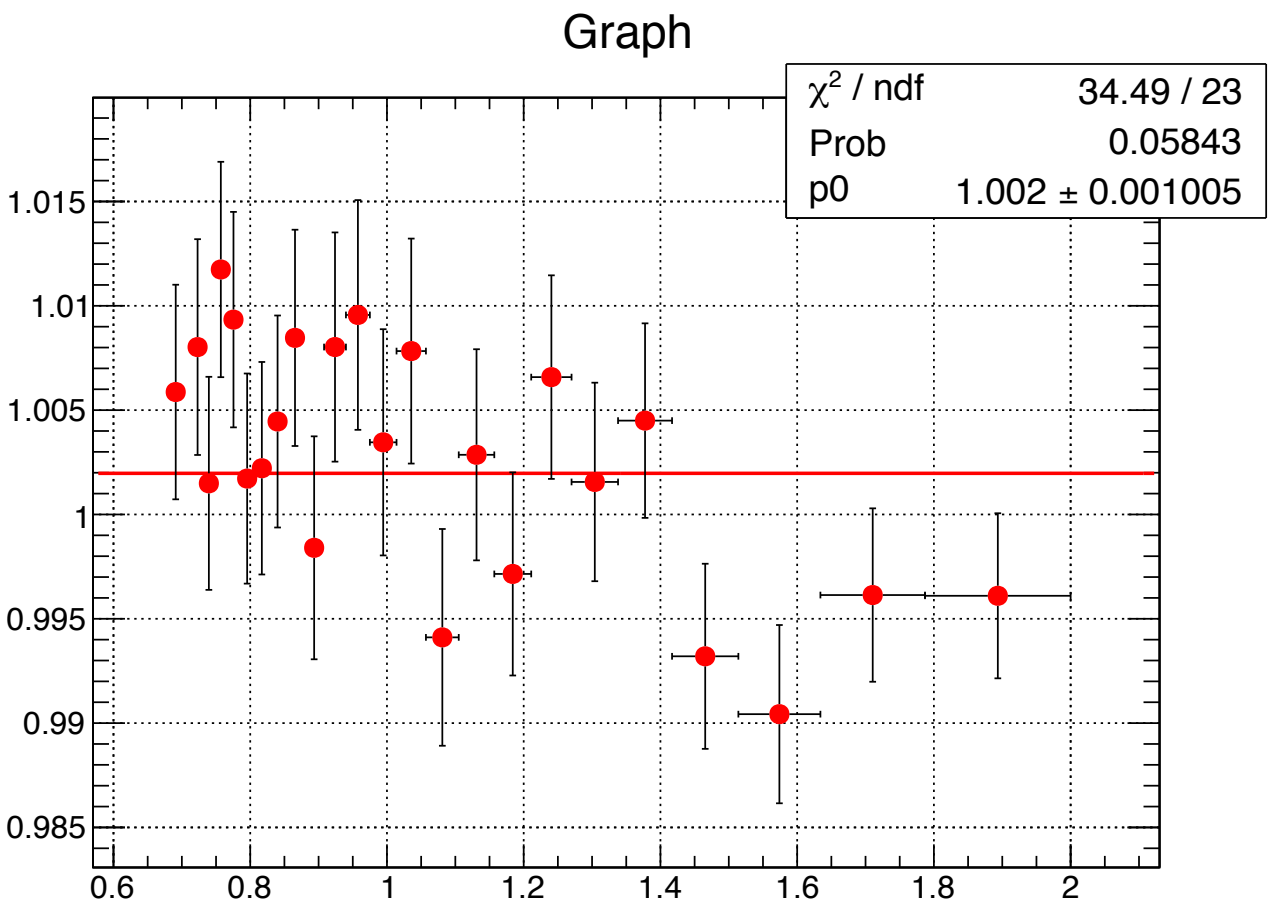


- Peng Chao suggested that this may due to offset difference between data and simulation
  - Averaged HyCal center in beam frame is at (0.89712, 1.45704) for 2GeV data, but (0, 0) in simulation
- The best way to treat this is probably by making two circular cuts on GEM, covering both real and imaginary dead modules, which effectively turn the HyCal effects into GEM dead area effect (can be canceled in ep/ee ratio)

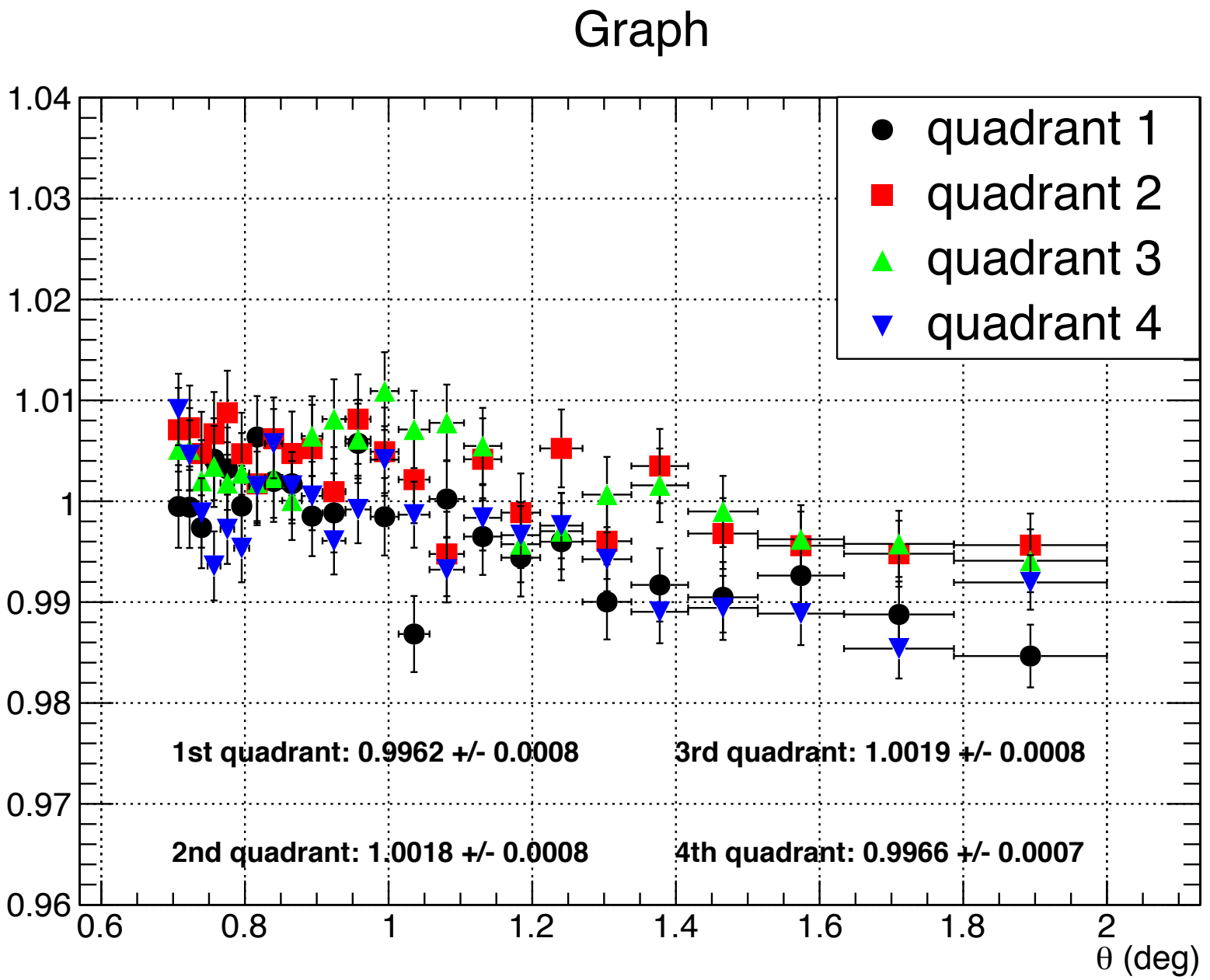

signal_gem_hit_pos_s_ee1
signal_gem_hit_pos_s_ee1
Entries 5266126
Mean x -1.564
Mean y 0.5973
RMS x 113.1
RMS y 112.8
300
200
100
0
-100
-200
-300
-400
-300
-200
-100
0
100
200
300
600
500
400
300
200
100
0

Simulation ep/ee vs data ep/ee in 2nd quadrant

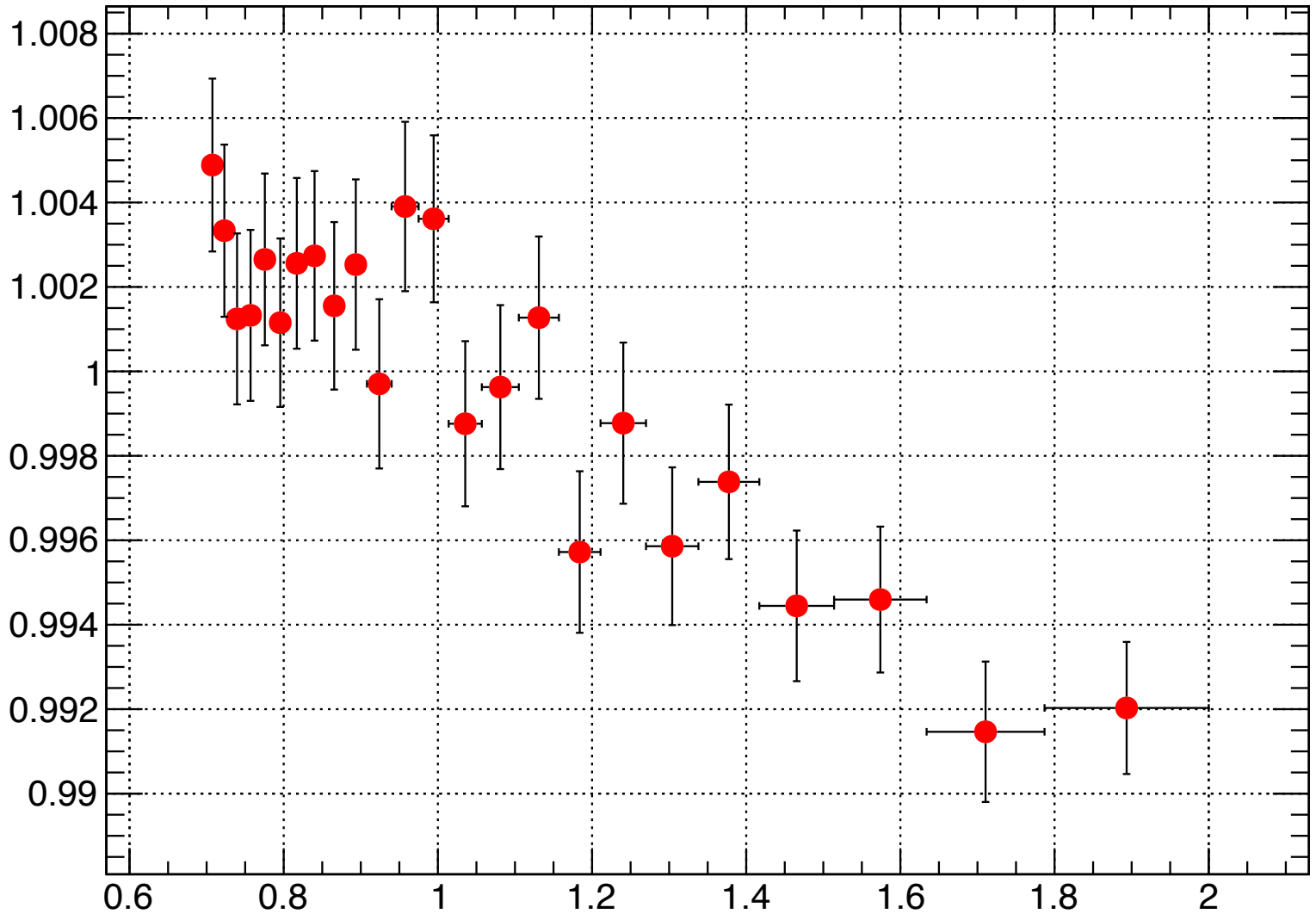




Simulation ep/ee vs data ep/ee in all quadrants



Simulation ep/ee vs data ep/ee in all quadrants

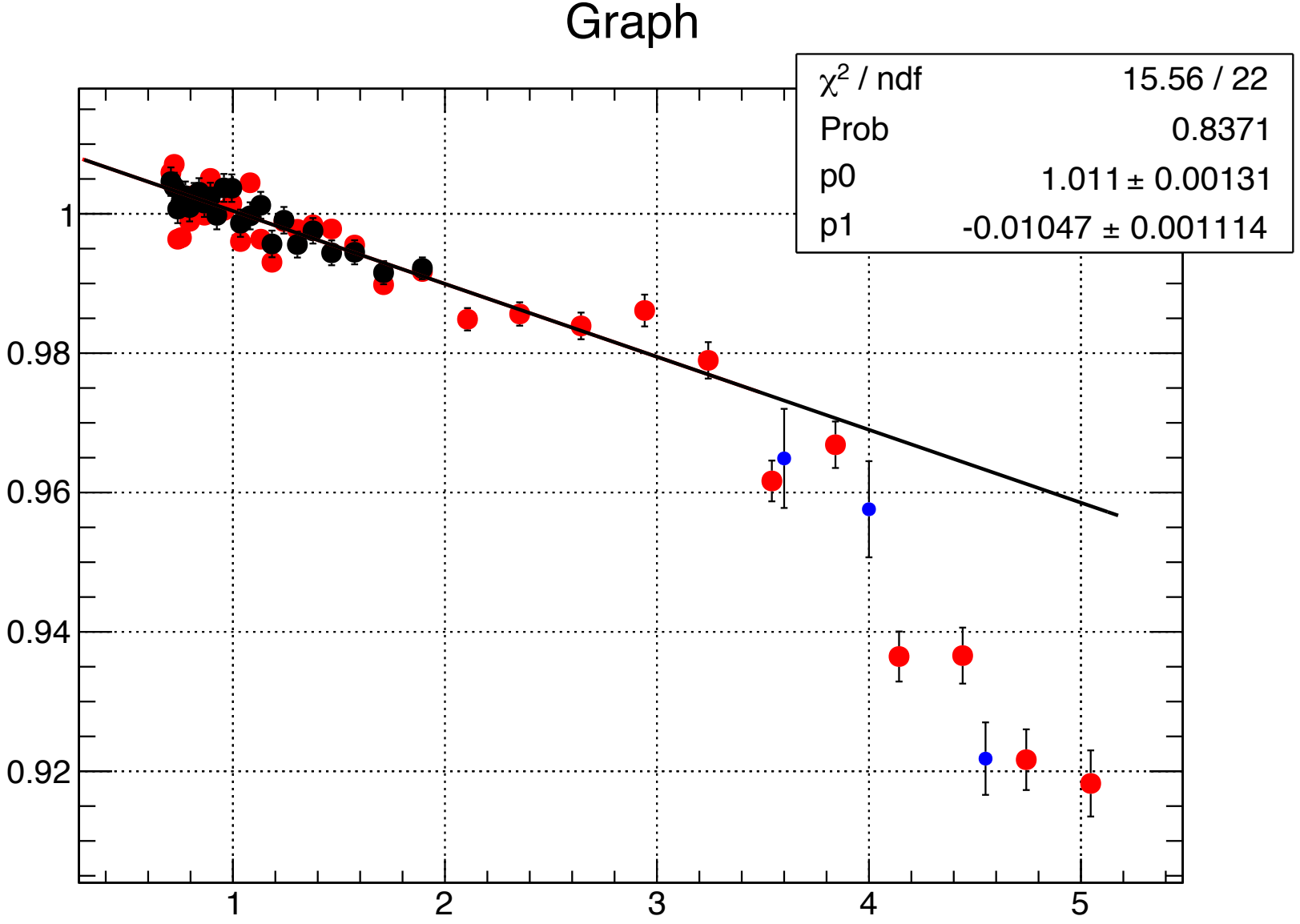


Problem at large angle (>3.5 deg)

- Simulation and data ratios have as large as 8% discrepancy at theta > 1.5 deg
- May be less than 8% before there is already a slope between data and simulation at smaller angle
- Possible causes for the discrepancy:
  - GEM efficiency
    - Improving cosmic rejection
  - Elastic tail in LG
    - Might due to non-linearity
  - Event generator
    - Compare the two ep event generators

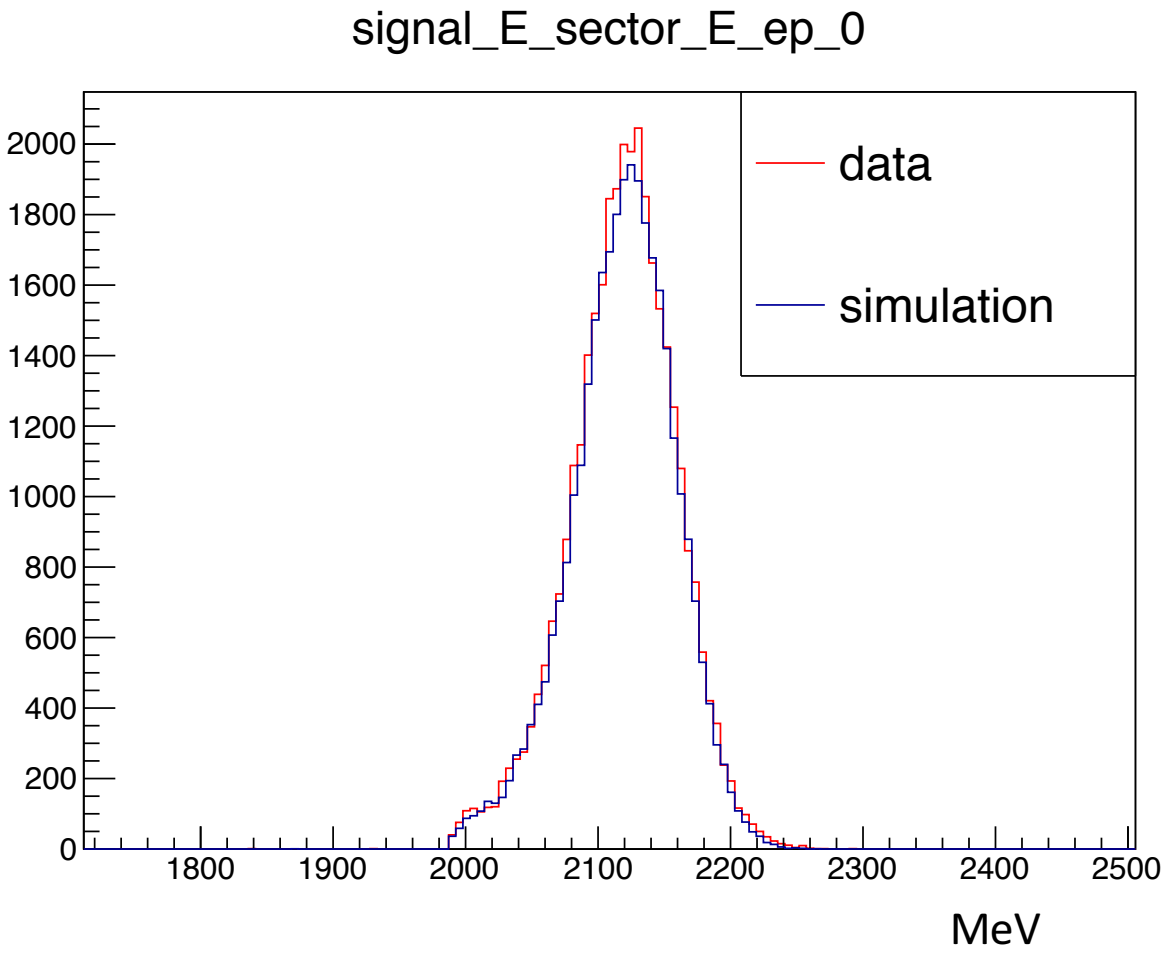
Problem at large angle (>3.5 deg)

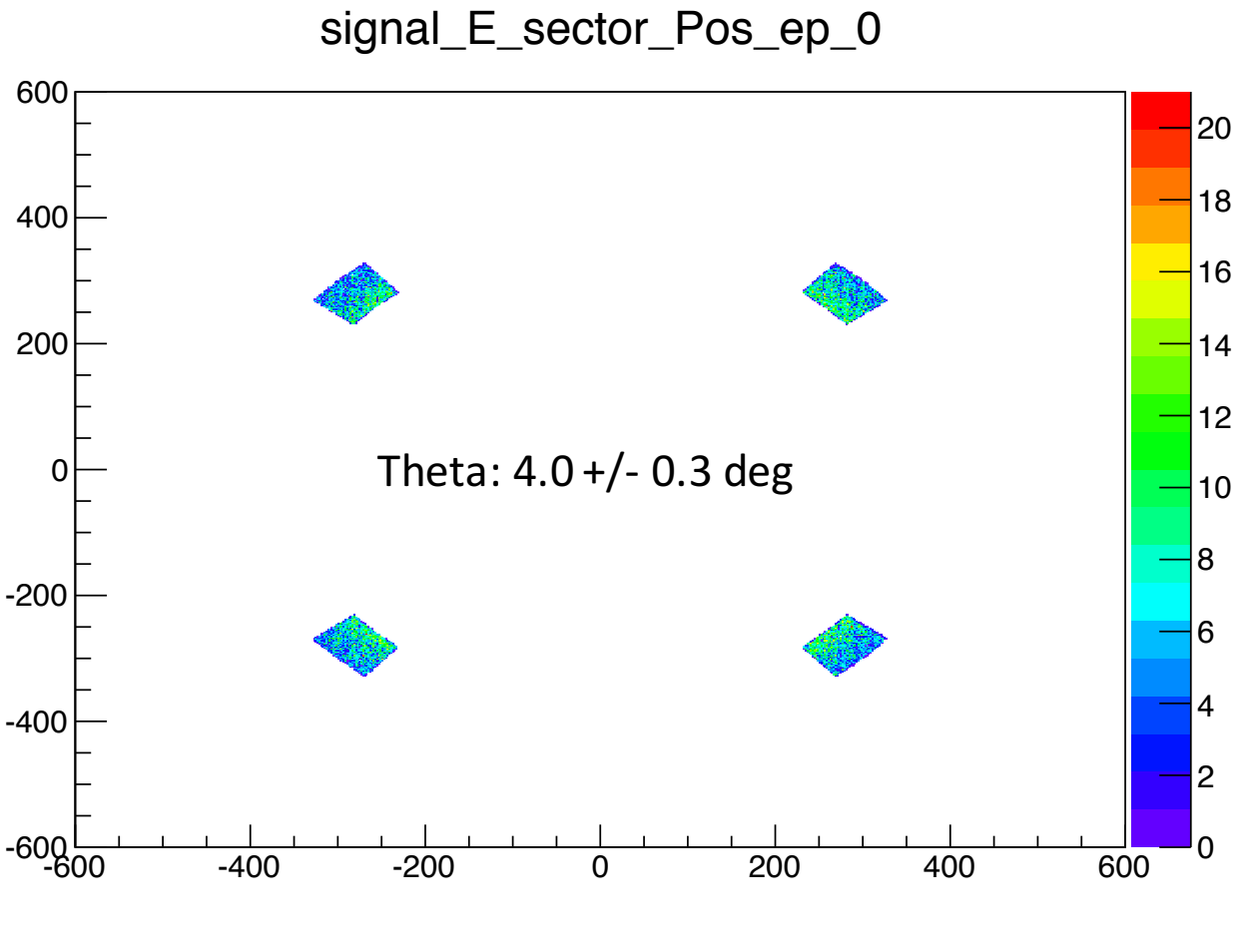
- Black data points from the bin by bin method
- Black line is a fit to the black data points
- Red data points from the integrated Moller method
- Blue points are also from integrated Moller method, but ep are chosen from specific regions that are completely in either PWO or LG



Problem at large angle (>3.5 deg)

- Using the amount of Moller electron to normalize the luminosity in data and simulation (data after GEM efficiency correction)
- Study the energy spectrum and ep counts after scale to the same luminosity





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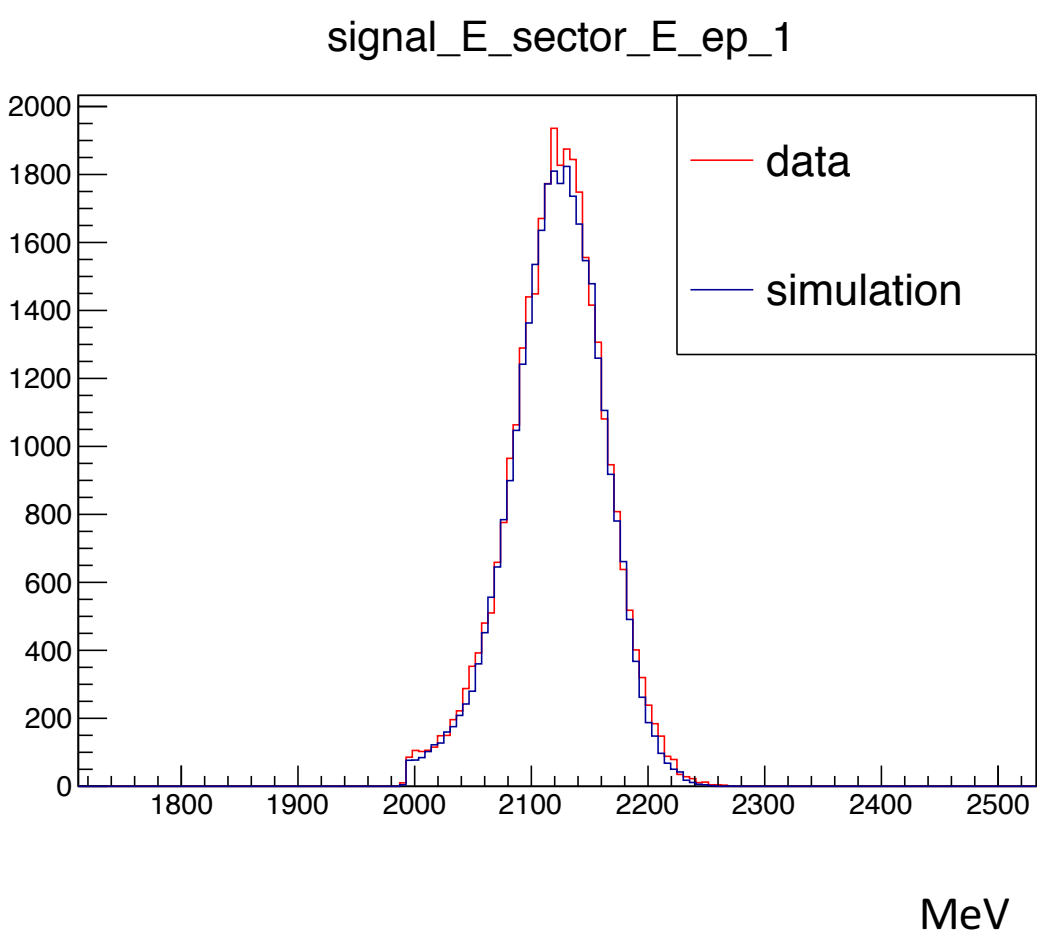

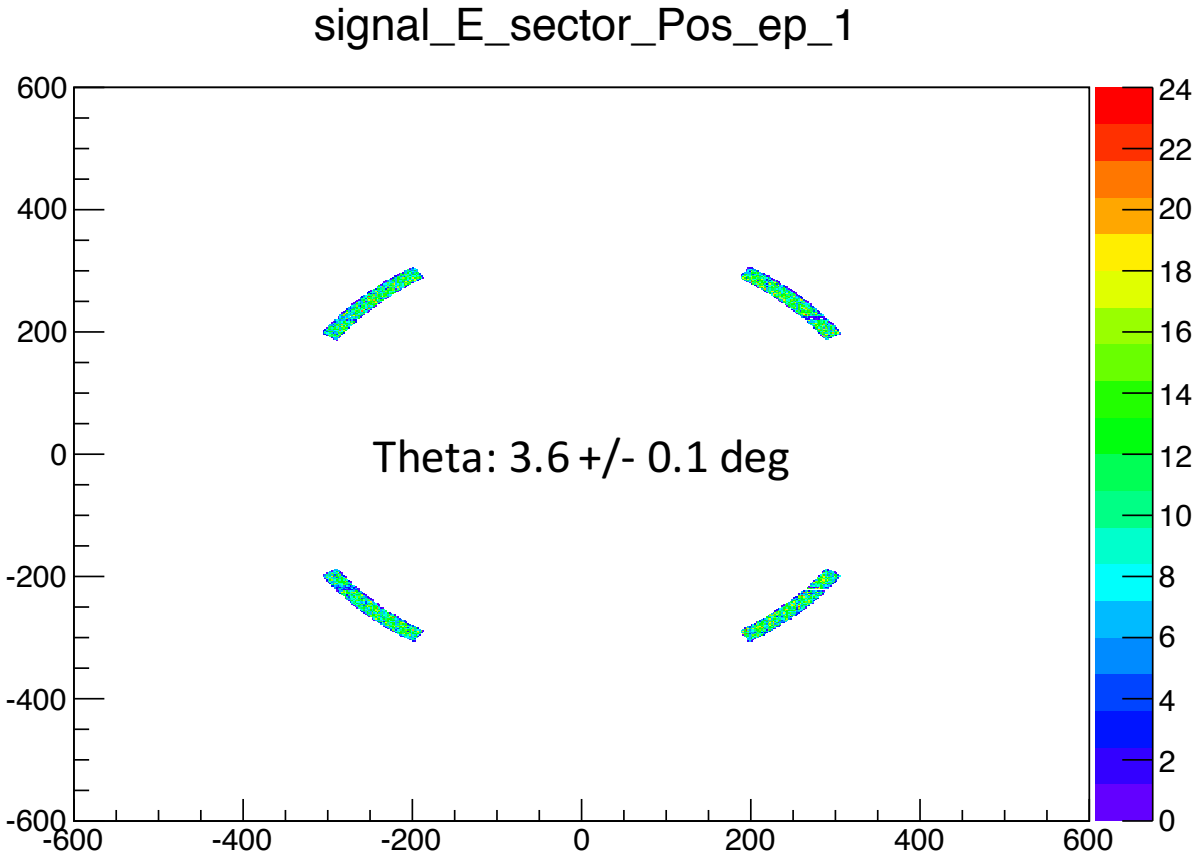

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