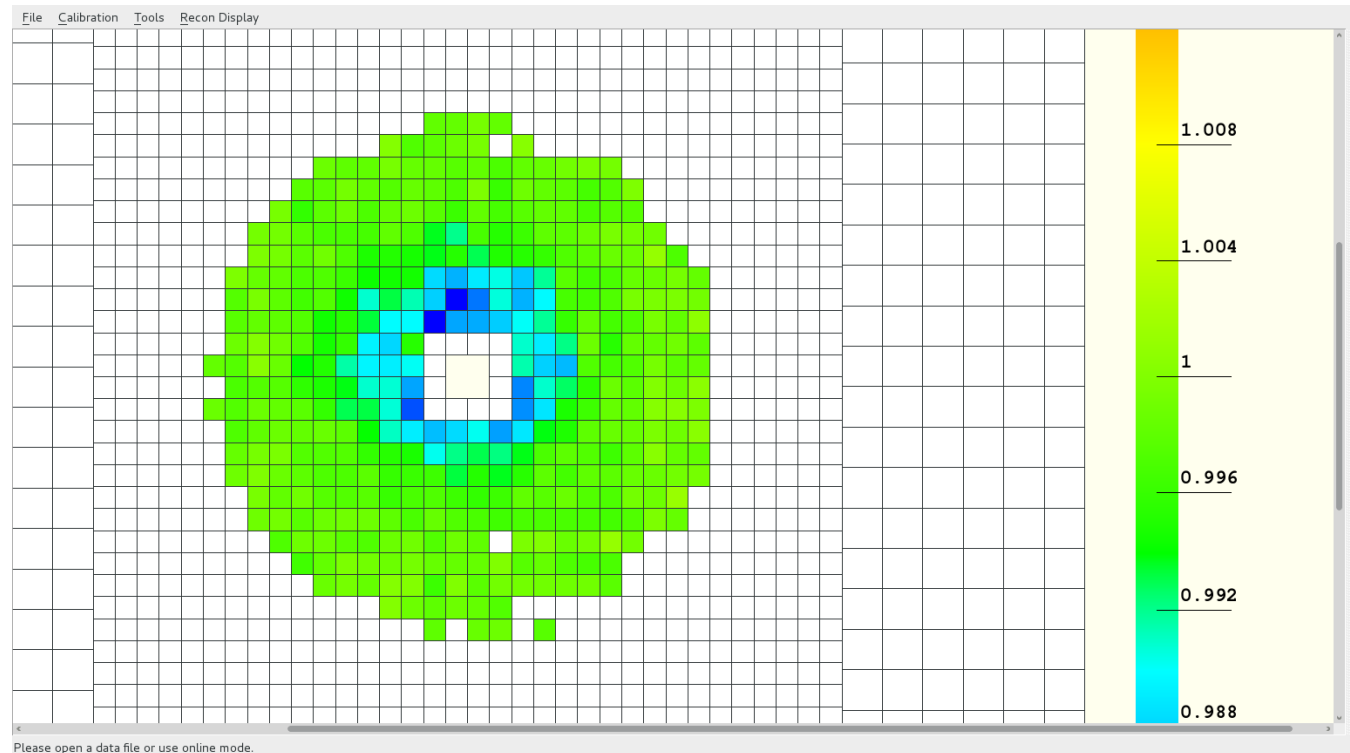


# HyCal Physics Calibration Status Update

- About to finalize physics calibration periods for 70% of 1.1 GeV data
  - 1238 ~ 1345
- Result consists of a set of calibration constants, a set of non-linearity constants, and a set of reference gain (mean value of the period)
- There are two new issues discovered this week, hope to spend a few more days on them
  - Radiation damaged modules cannot be fully corrected by LMS
  - LMS measurement of LG seems to have some problem for a few runs

# Radiation Damaged Modules

- Apply the calibration constants on the first few runs of the period (1238 ~ 1287)
- Apply LMS correction on each of the runs separately
- Look at the ratio between the reconstructed energy of a **ep** cluster over expected energy

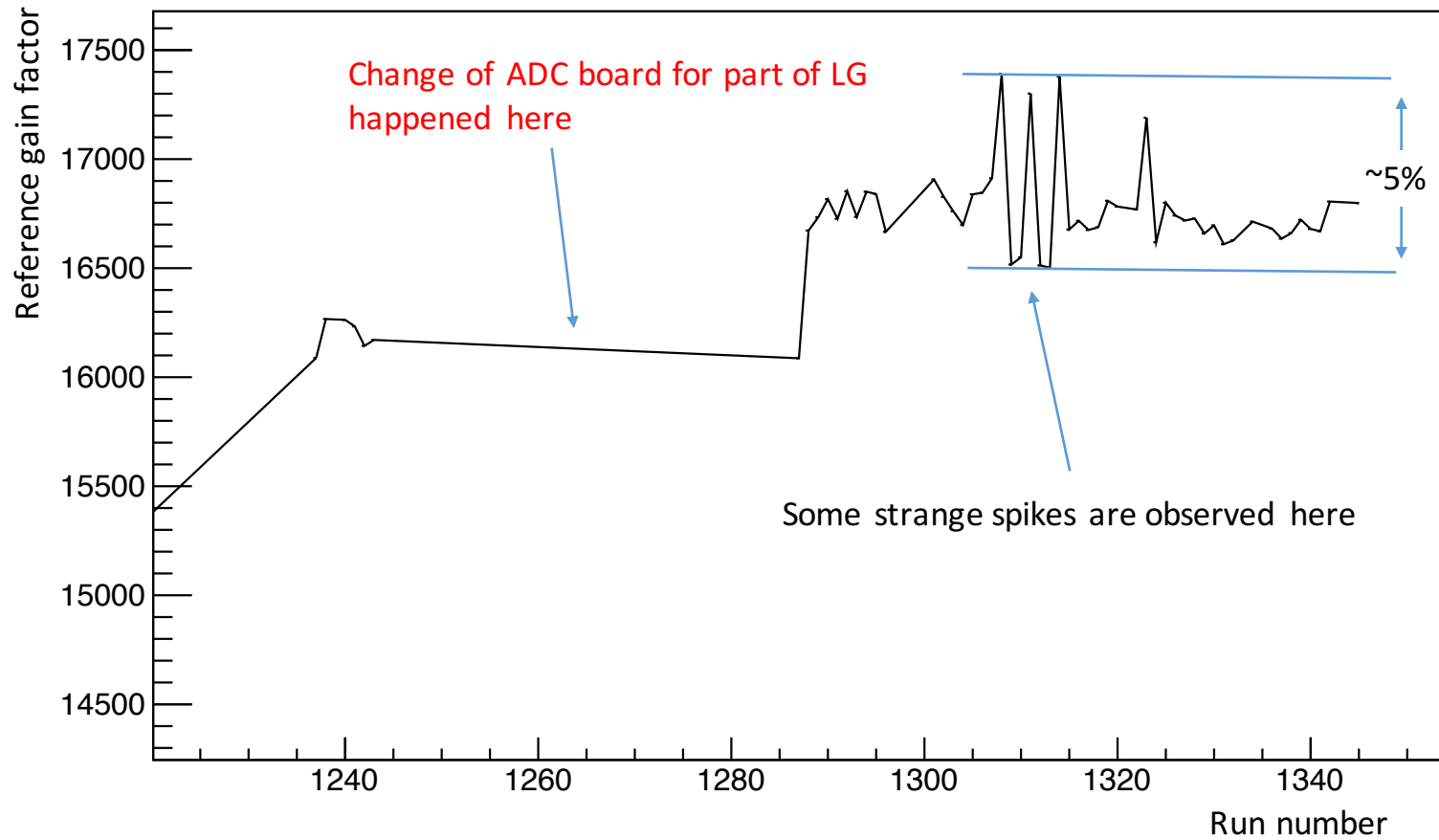


# Radiation Damaged Modules

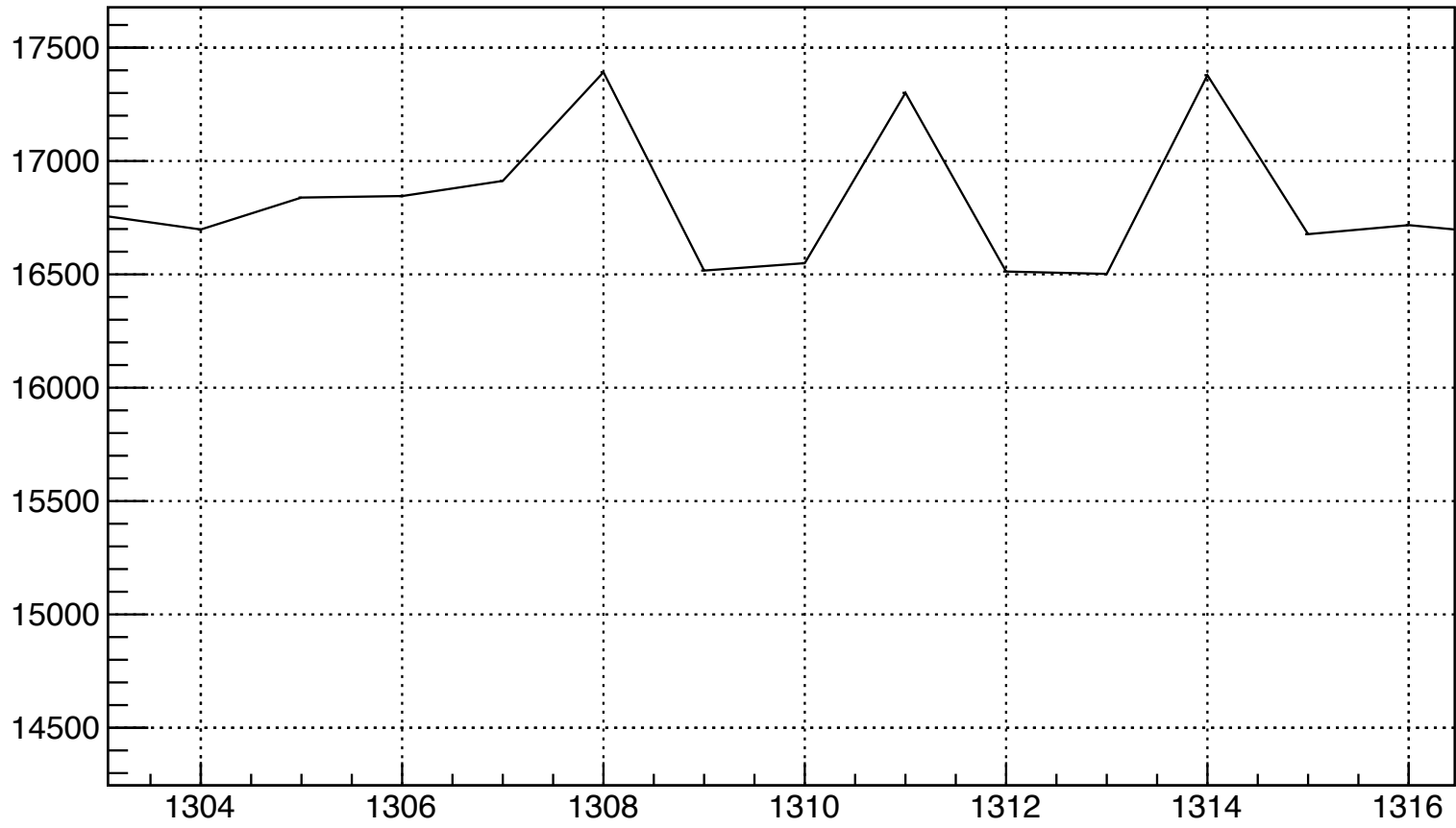
- Proposed solution:
  - We further divide this 70% of data into 5 sub-period (each contain about 100M events)
  - For all modules within  $r < 210$  cm (about the size of 10 PWO modules), we update the calibration constants, linearity constants and reference gains based on the sub-period. Others will use the averaged over the entire period
  - Since LMS can effectively correct the outer part of the circle, by doing this, there should not be any discontinuity

# Problem with the LG LMS

AvgG\_Gain3

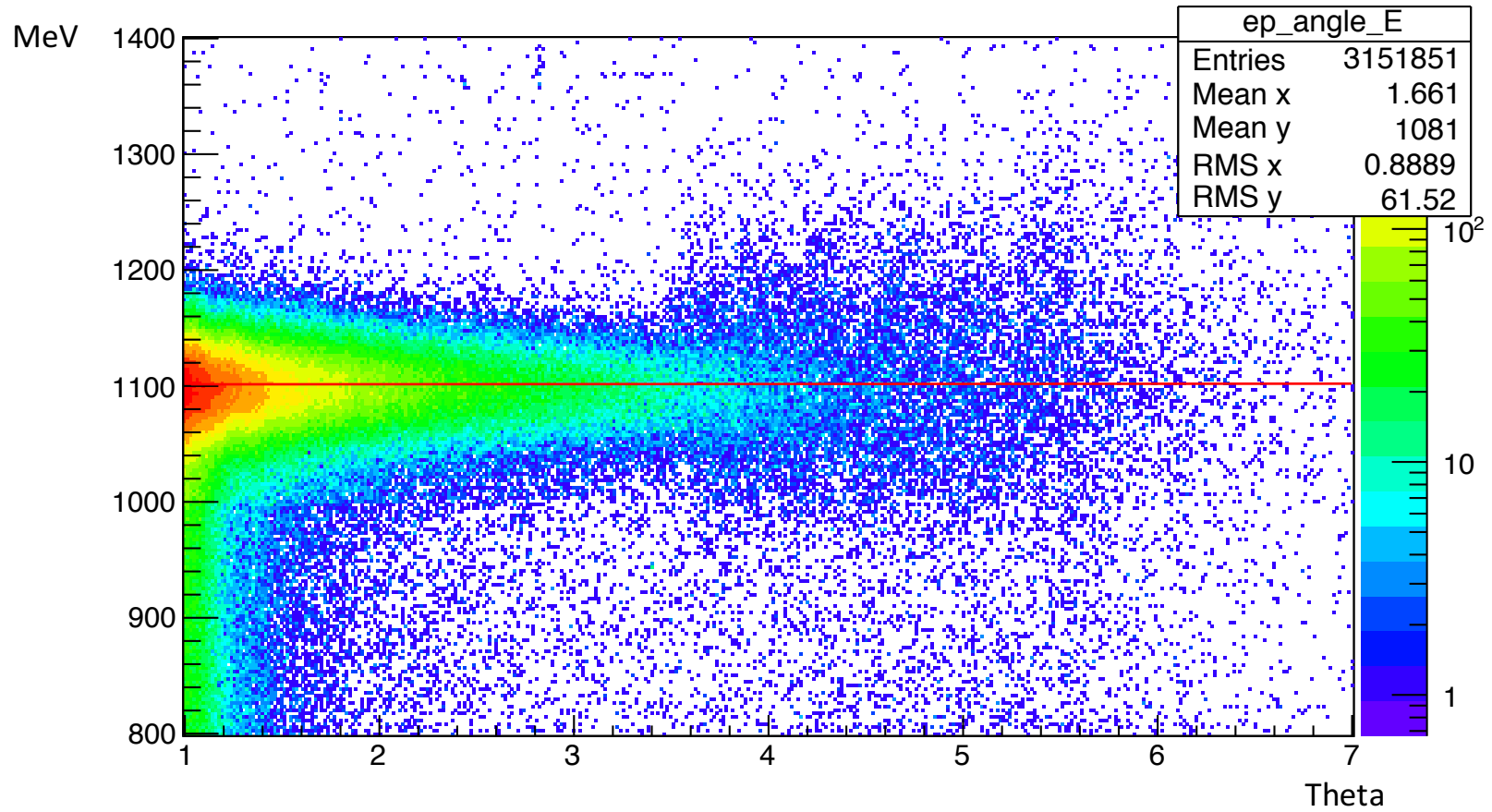


AvgG\_Gain3



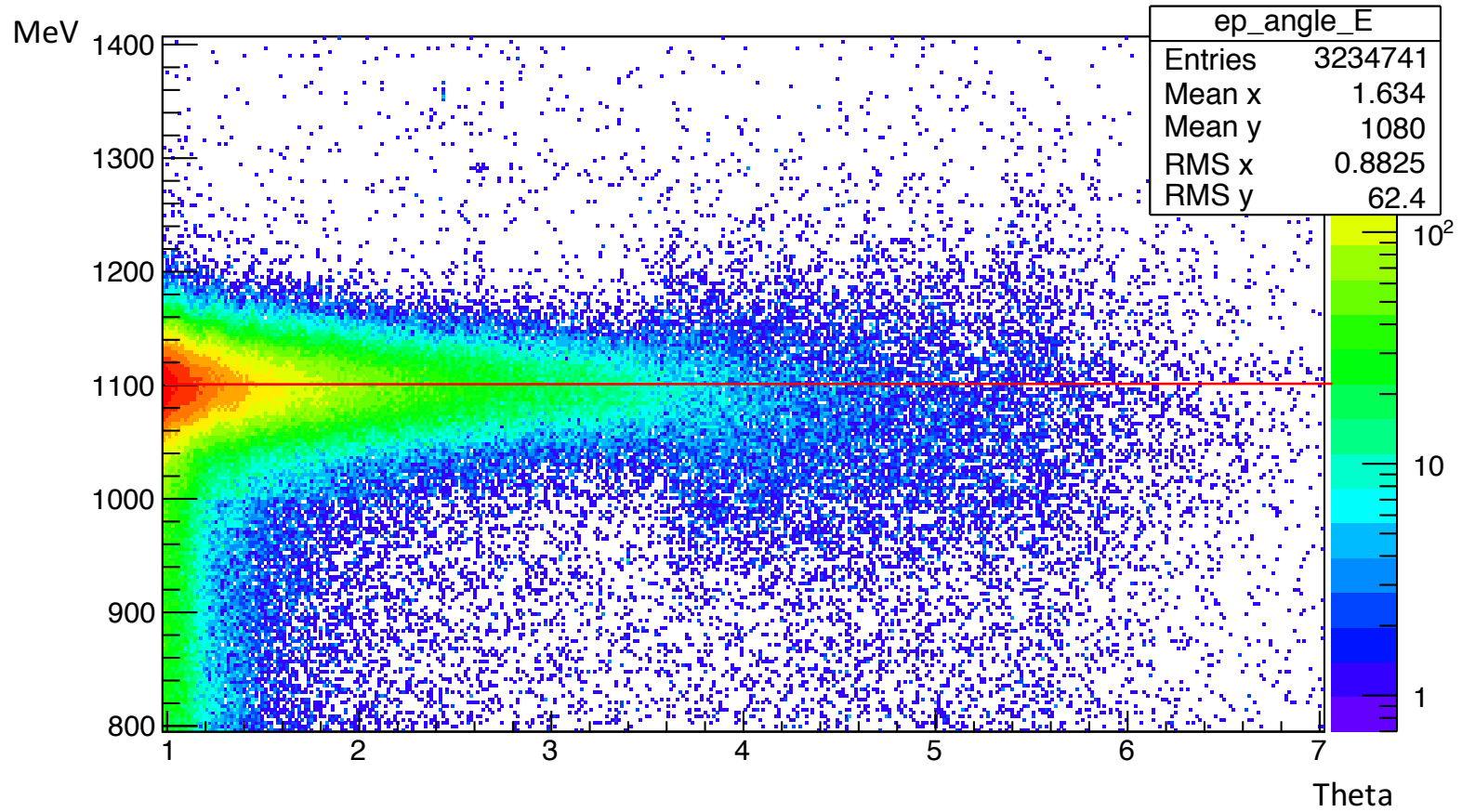
# Cluster E vs Theta for Run 1288

ep recE vs angle



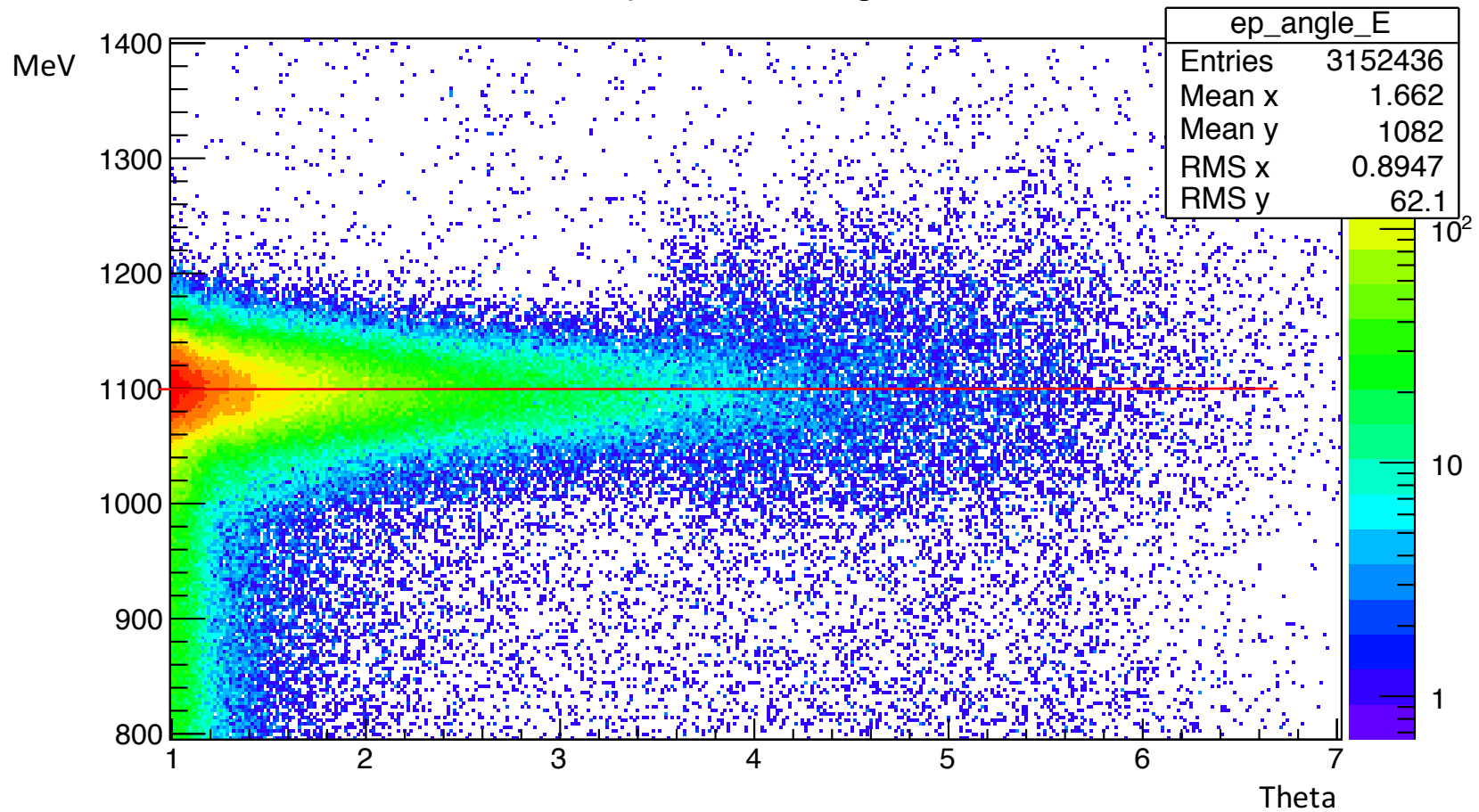
# Cluster E vs Theta for Run 1308

ep recE vs angle



# Cluster E vs Theta for Run 1309

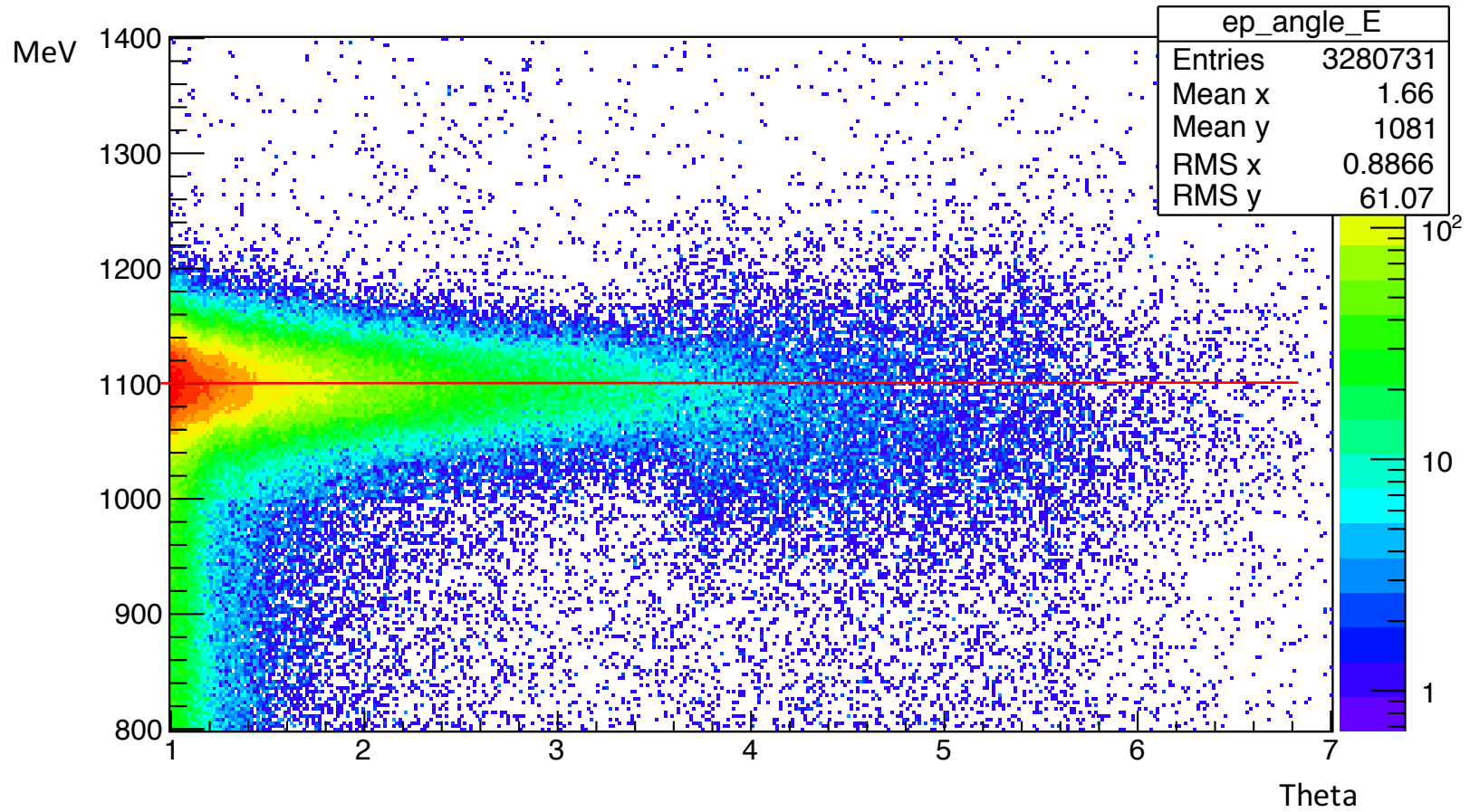
ep recE vs angle





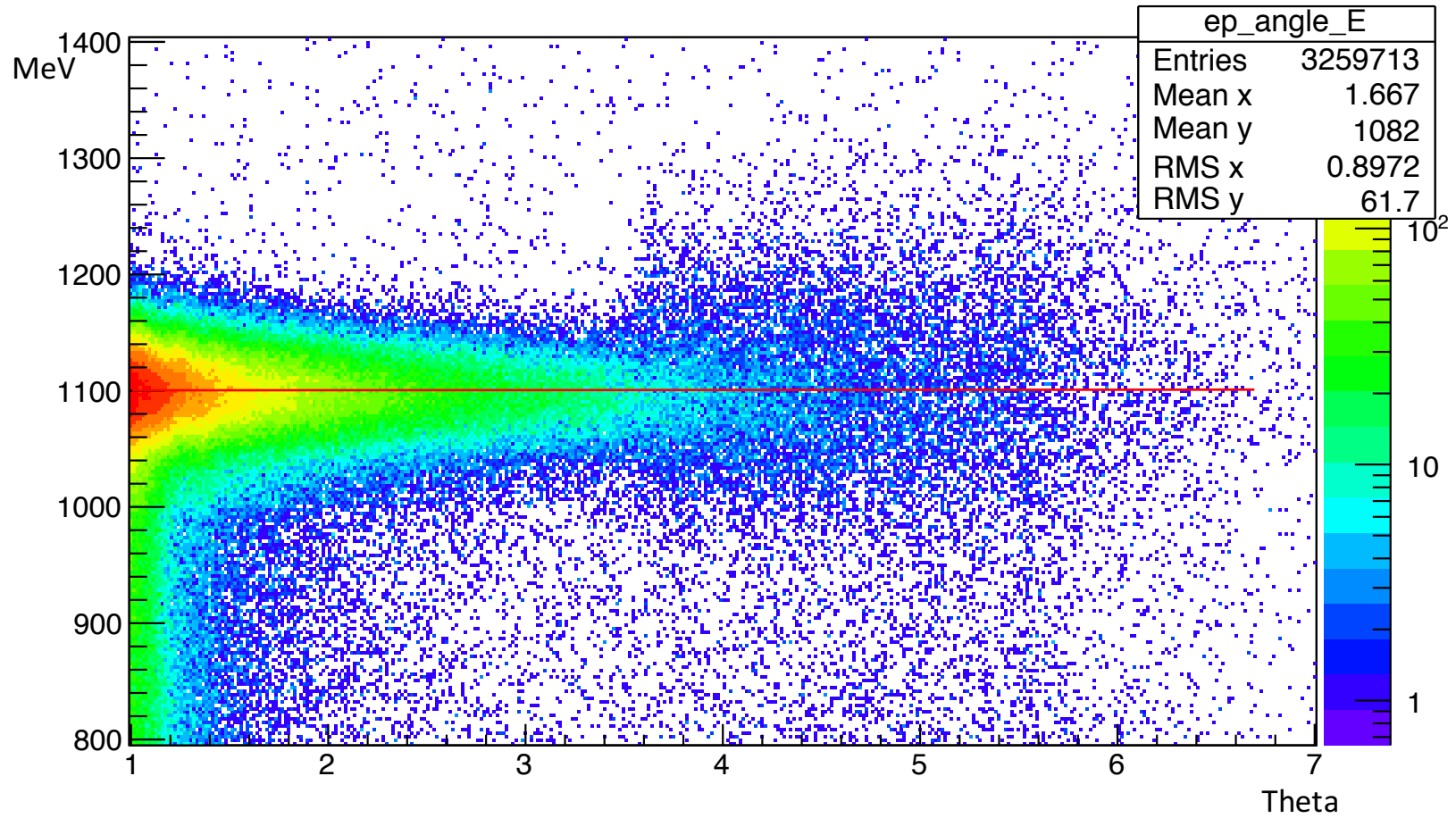
# Cluster E vs Theta for Run 1314

ep recE vs angle



# Cluster E vs Theta for Run 1315

ep recE vs angle



- Selecting ep clusters on LG, requiring theta > 4.5 and < 5.5 deg
- For the run that is on the spike, the ep peak shift down by 30 MeV
- Are the spikes really due to gain change?
- What if we use the LMS of 1309 to correct 1308
- In the worst case, we will need to enlarge the cut on LG clusters

