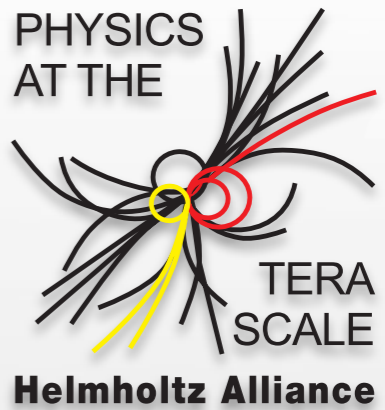
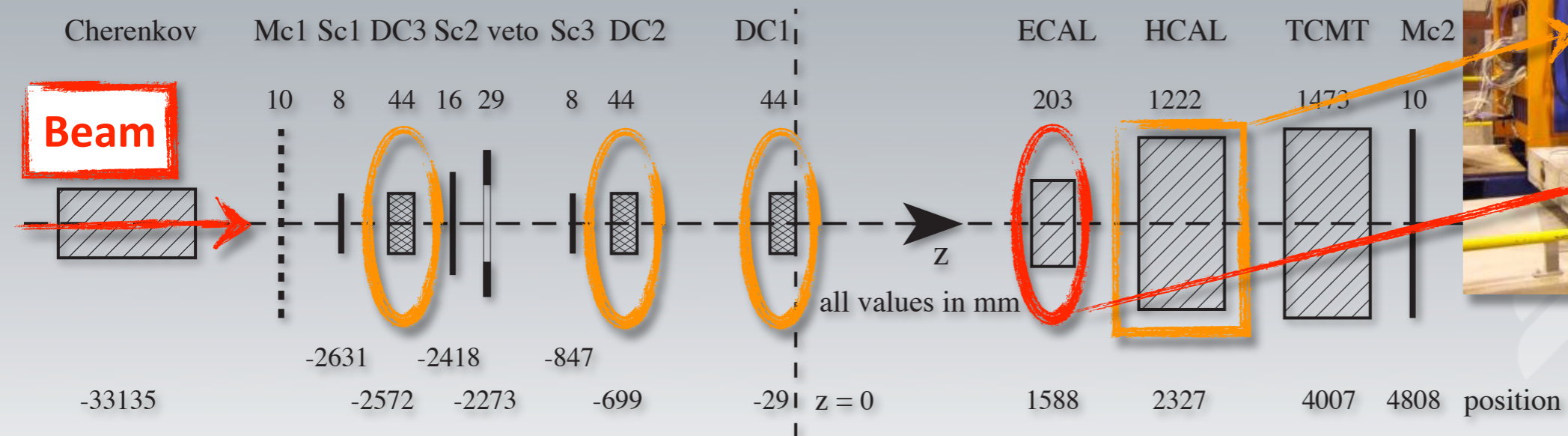


Uniformity of the response of the AHCAL to pions



Testbeam setup

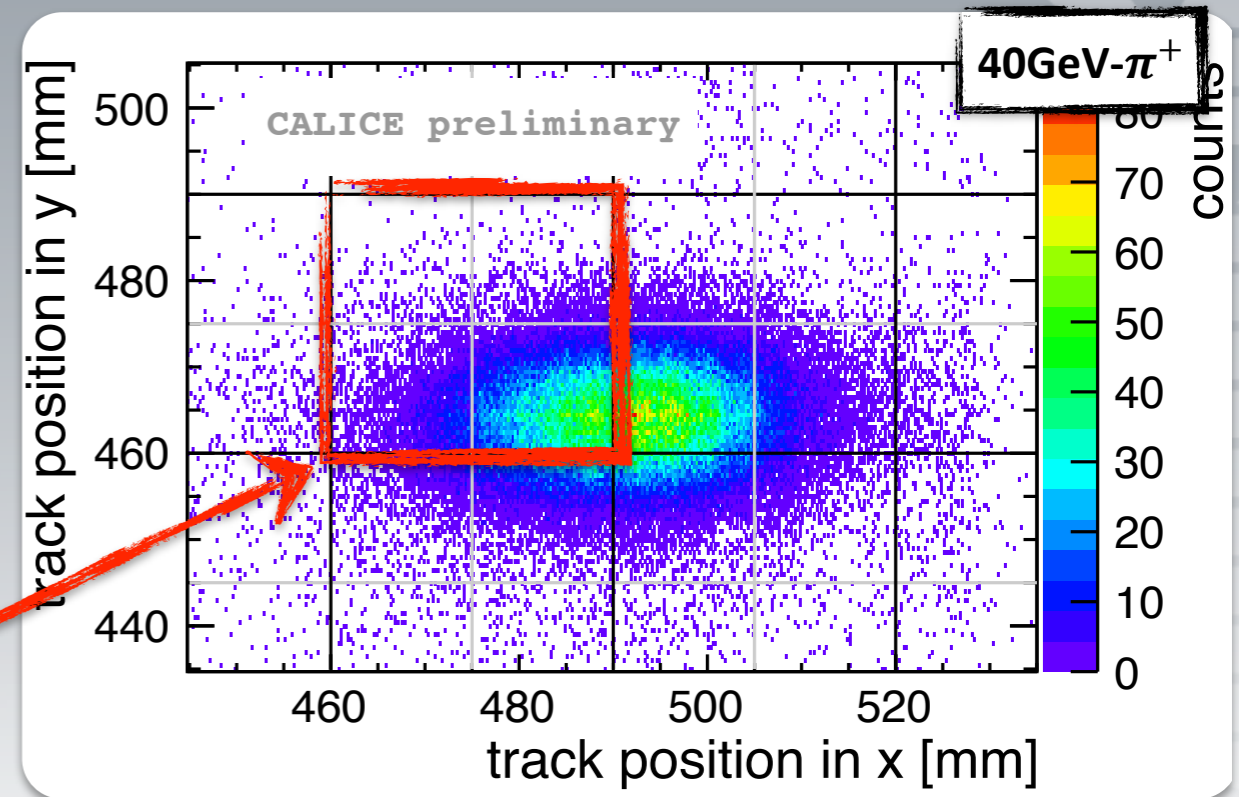


- ▶ Track: delay wire chambers (DC)
0.2 mm in x-direction & 0.4 mm in y-direction
- ▶ Runs **without** ECAL
- ▶ data:
 - ➔ CERN 2007, energy range 30-80 GeV

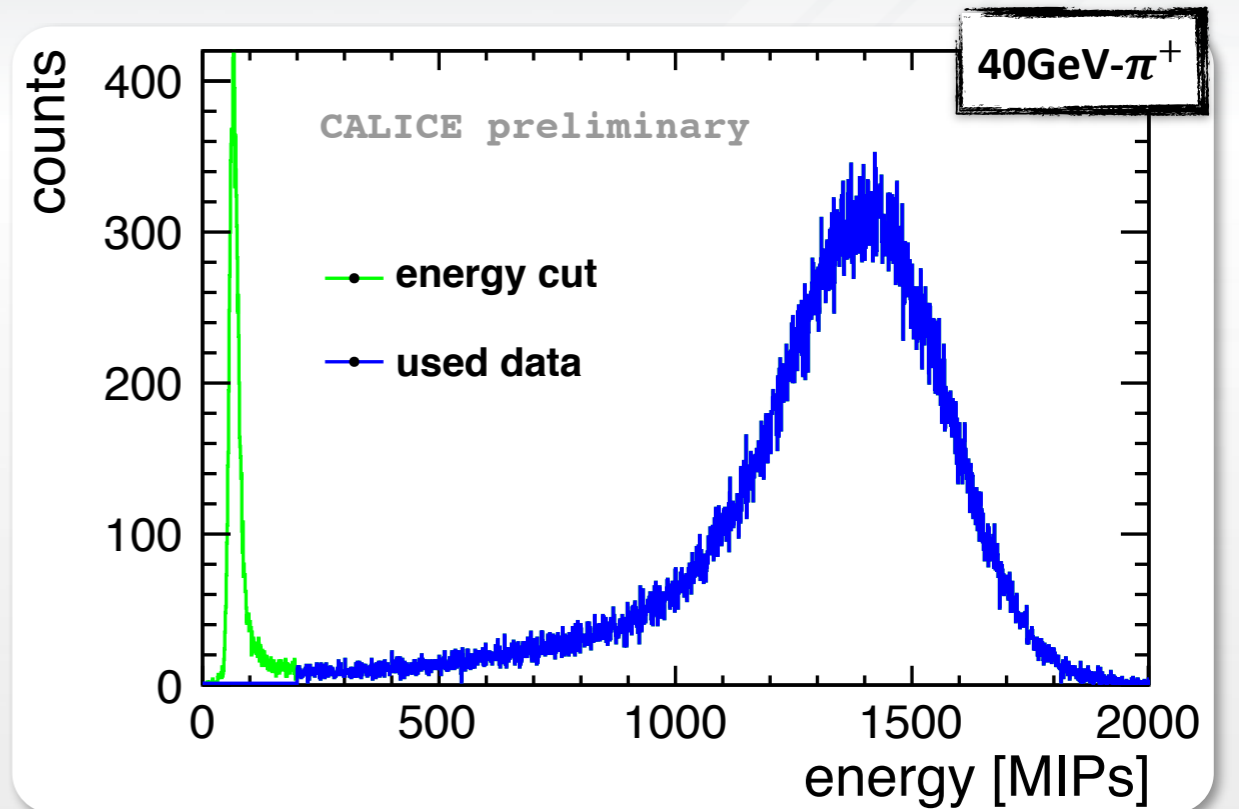
Event selection

- Beam profile in y-direction shorter
➔ More statistic in x-direction

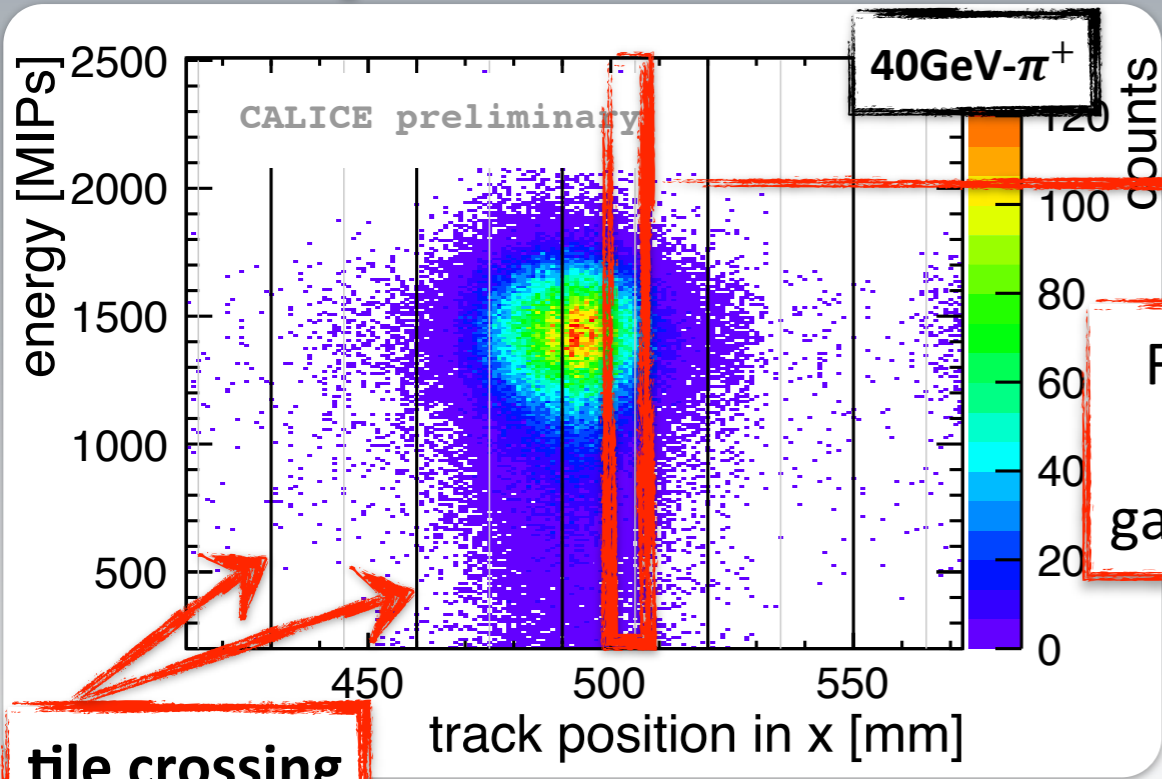
3x3cm² tile



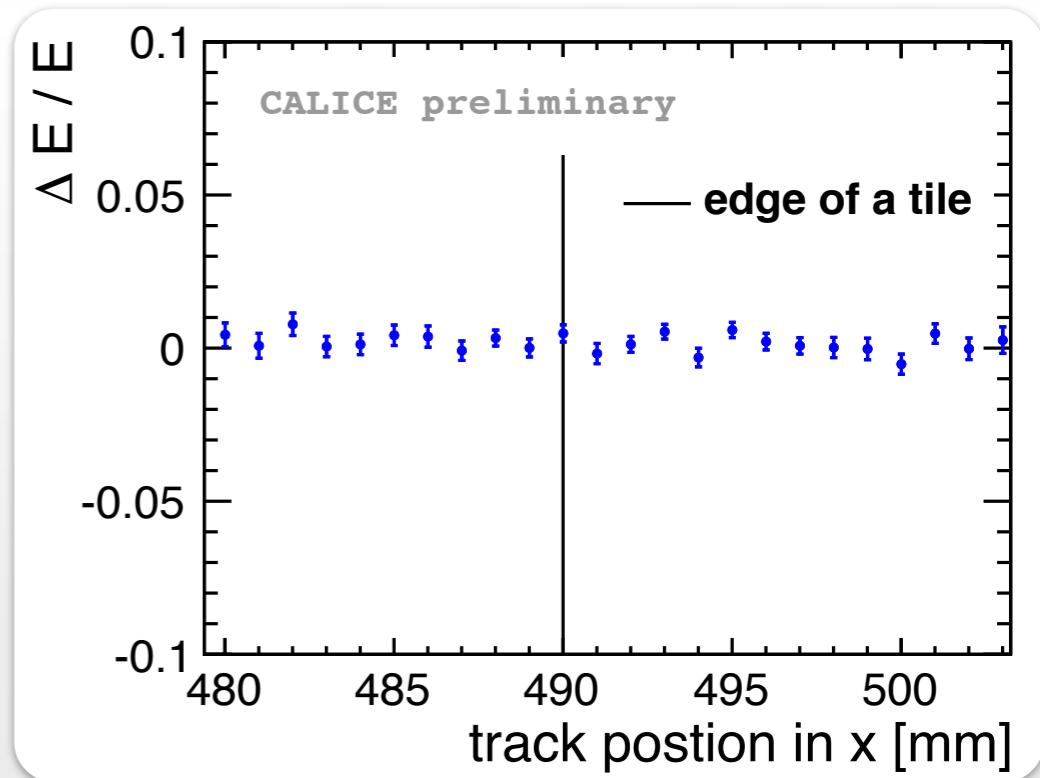
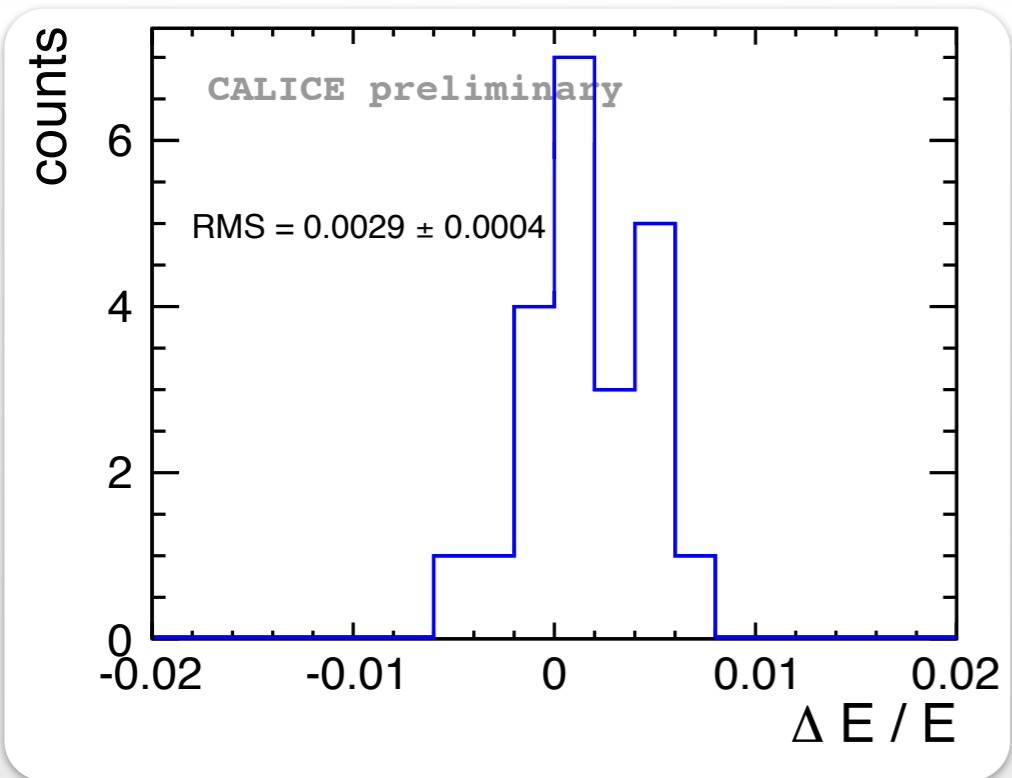
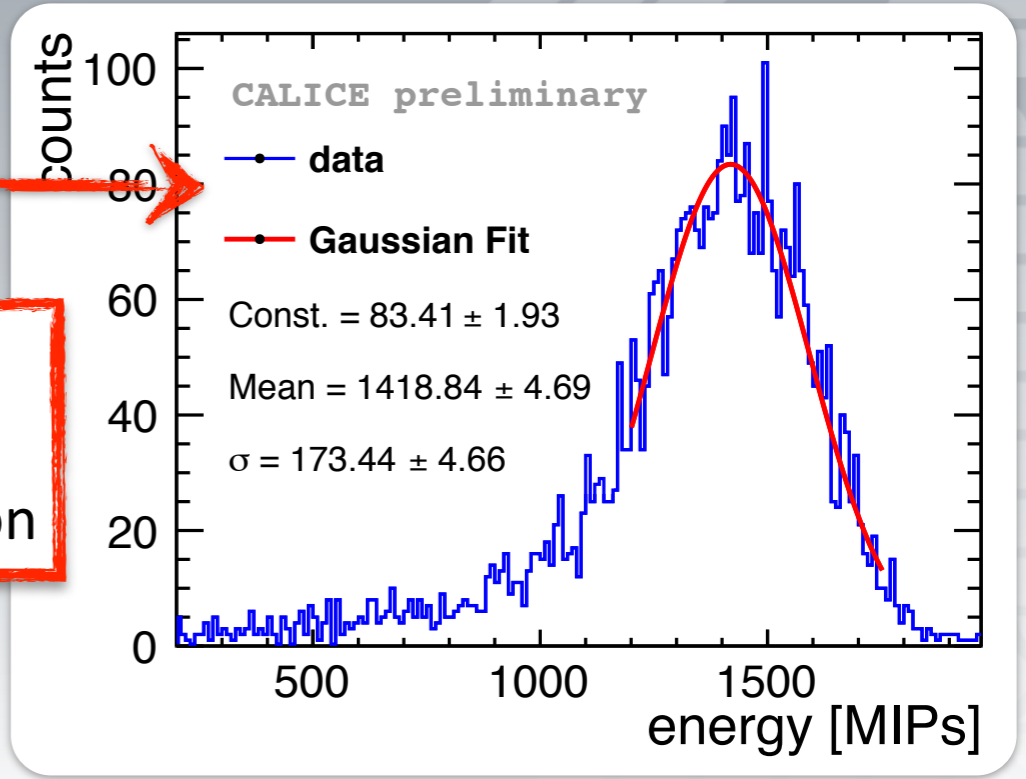
- Energy cuts:
 - ➔ 0.5 MIP per tile (reduce noise)
 - ➔ 200 MIPs on total energy (cut away the muons)



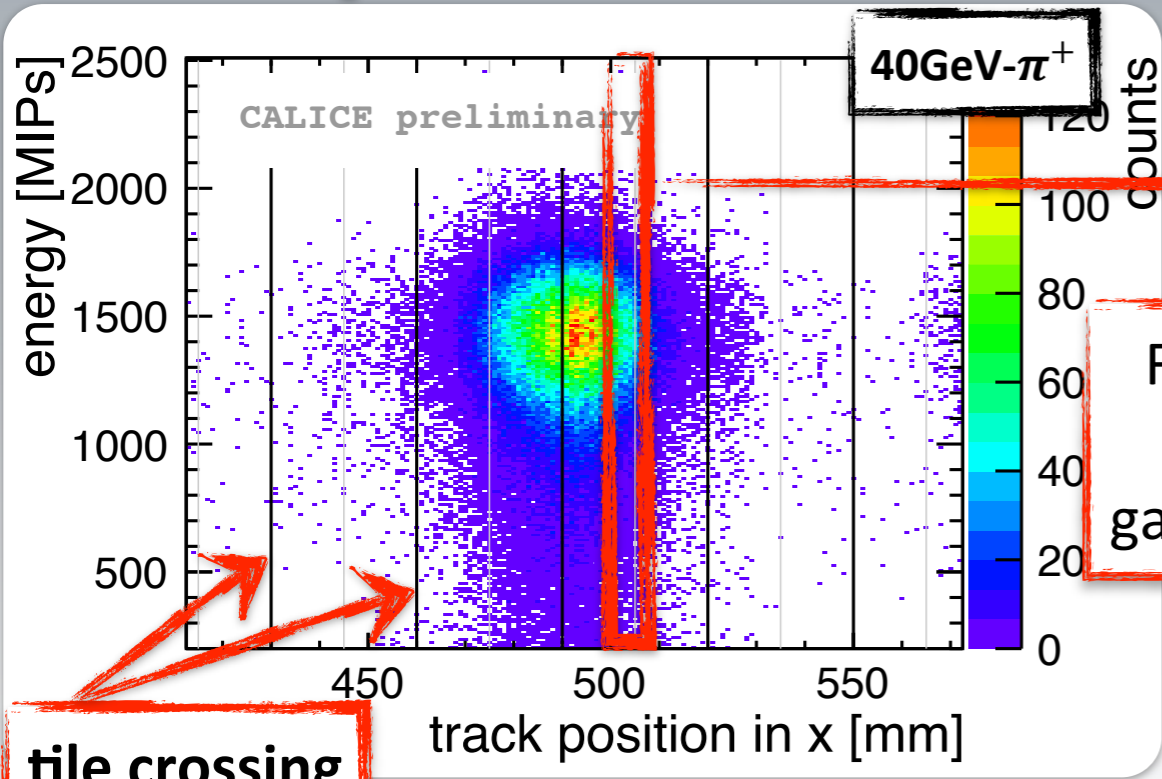
Trackposition <-> Energy



Fitting every 1mm track-bin with gaussian distribution

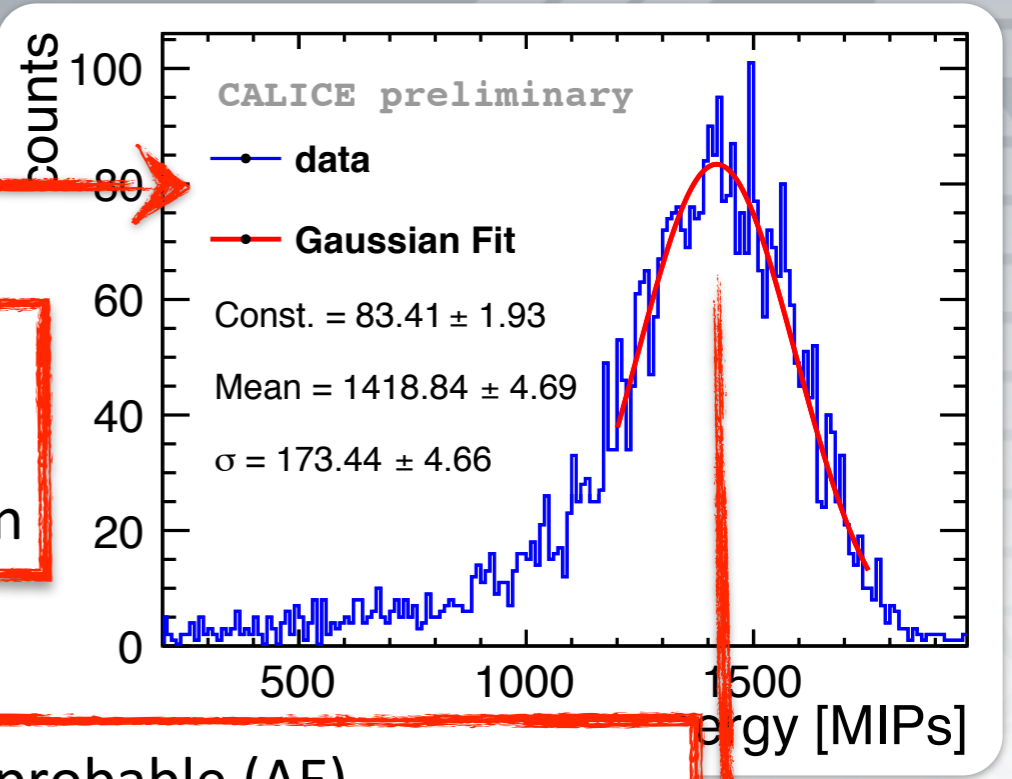


Trackposition <-> Energy

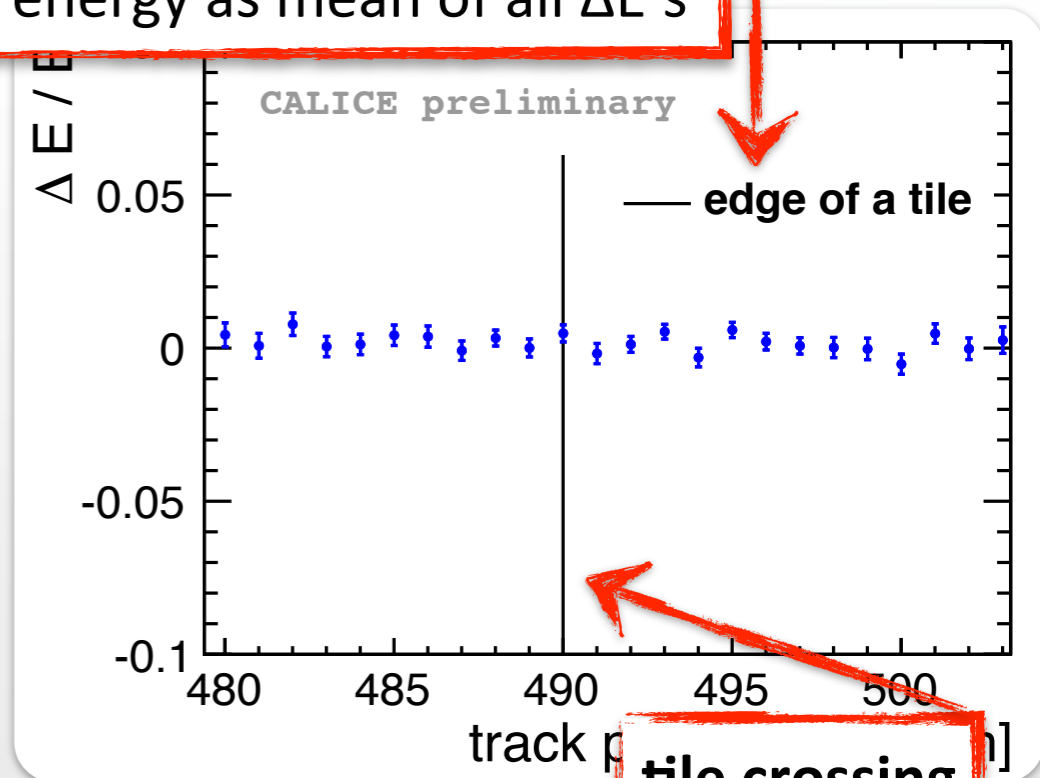
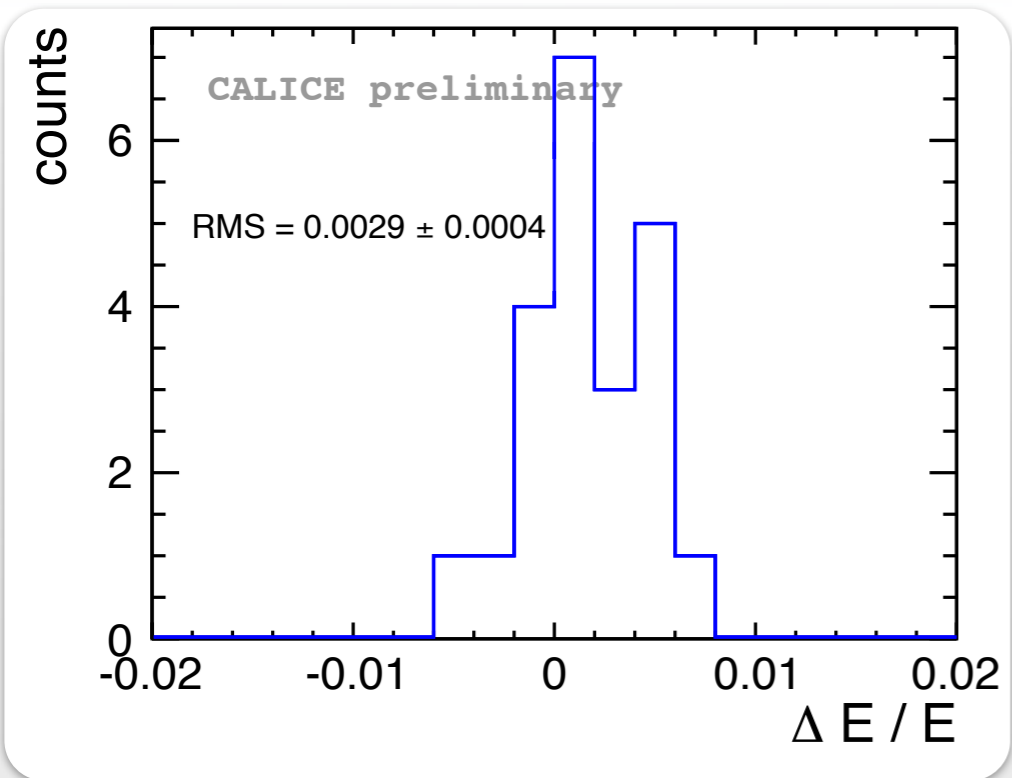


Fitting every 1mm track-bin with gaussian distribution

tile crossing

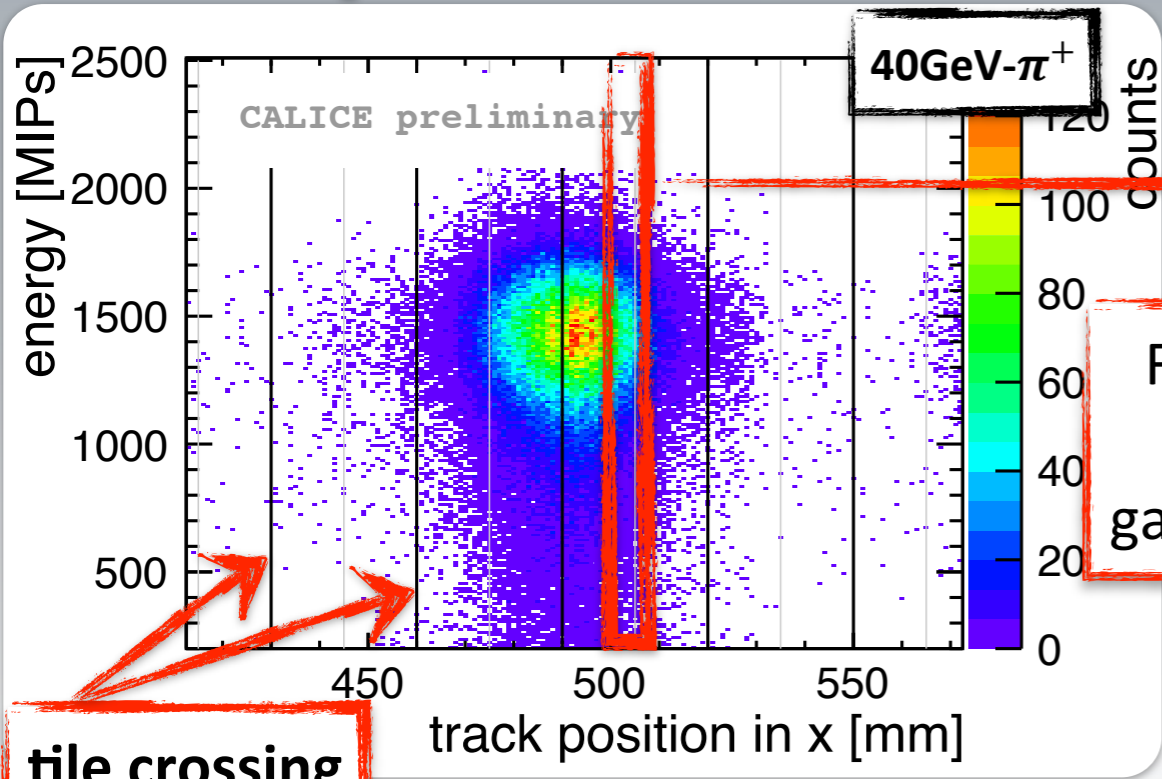


- Get most probable (ΔE)
- Get total energy as mean of all ΔE 's



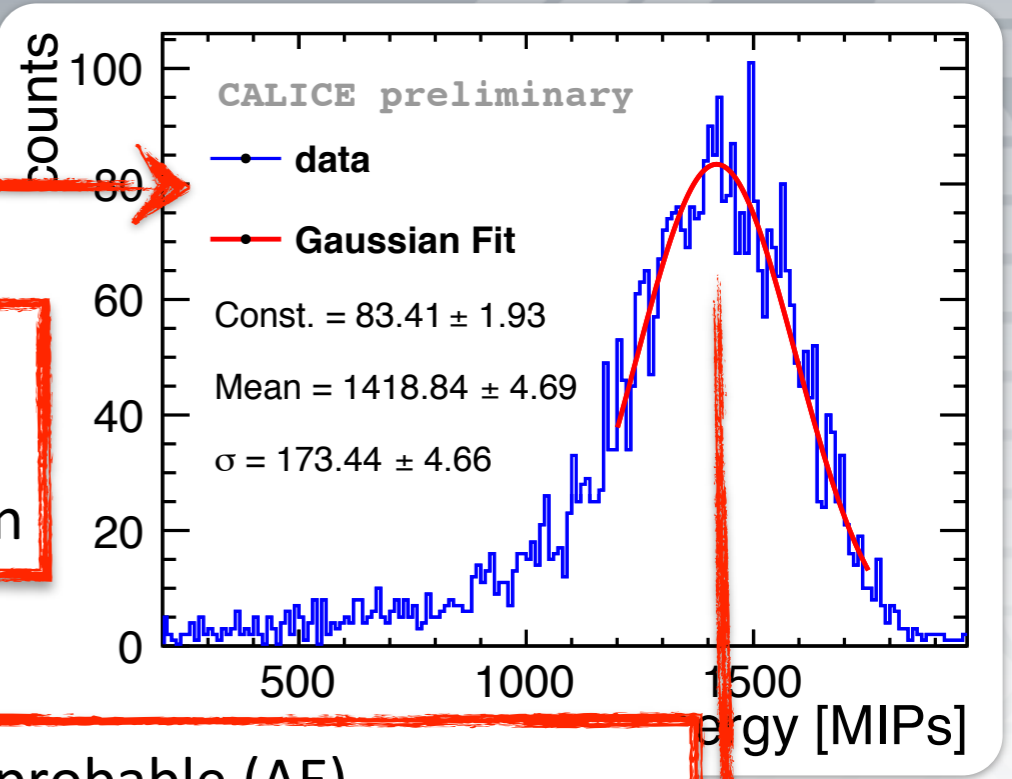
tile crossing

Trackposition <-> Energy

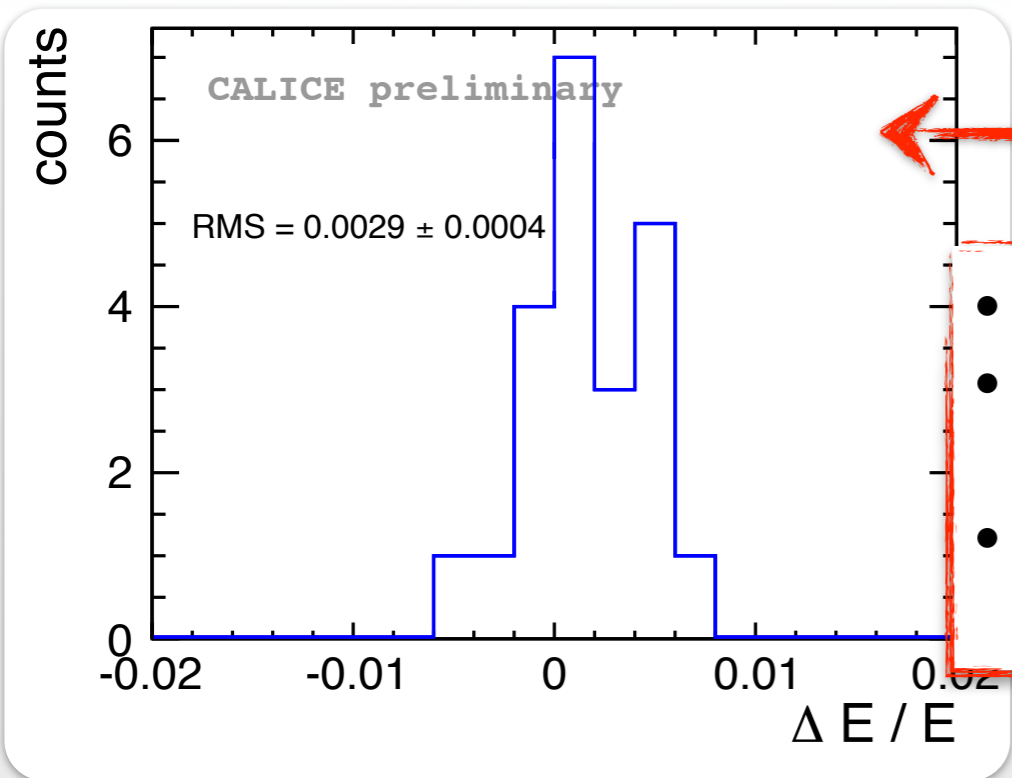


Fitting every 1mm track-bin with gaussian distribution

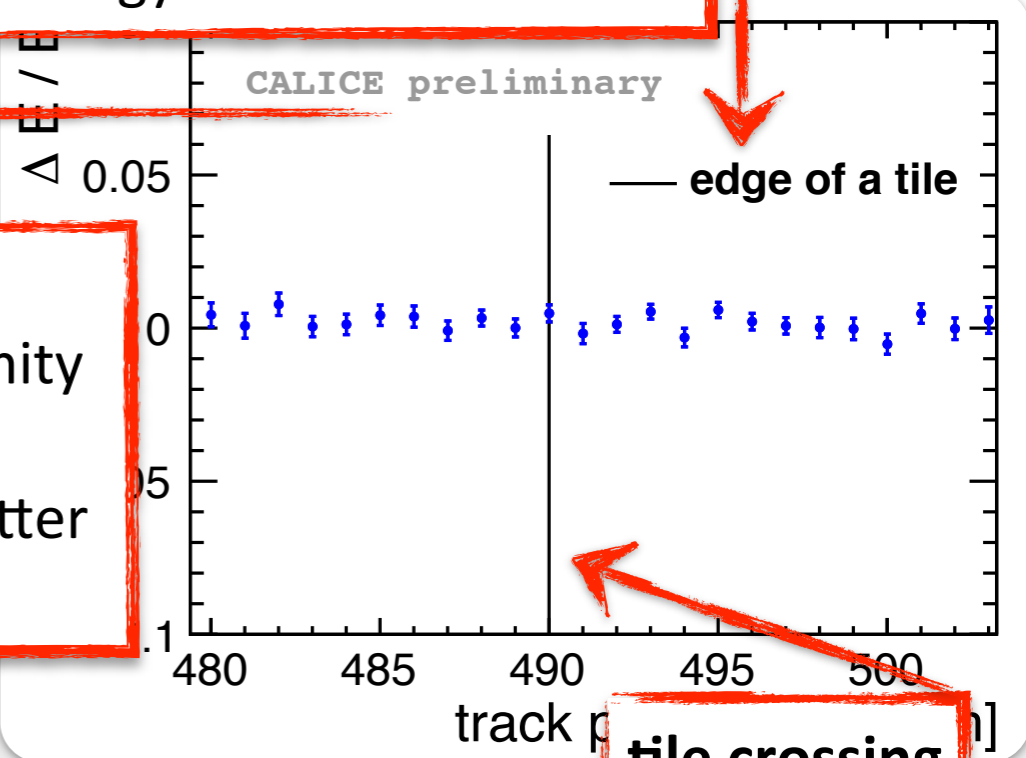
tile crossing



- Get most probable (ΔE)
- Get total energy as mean of all ΔE 's



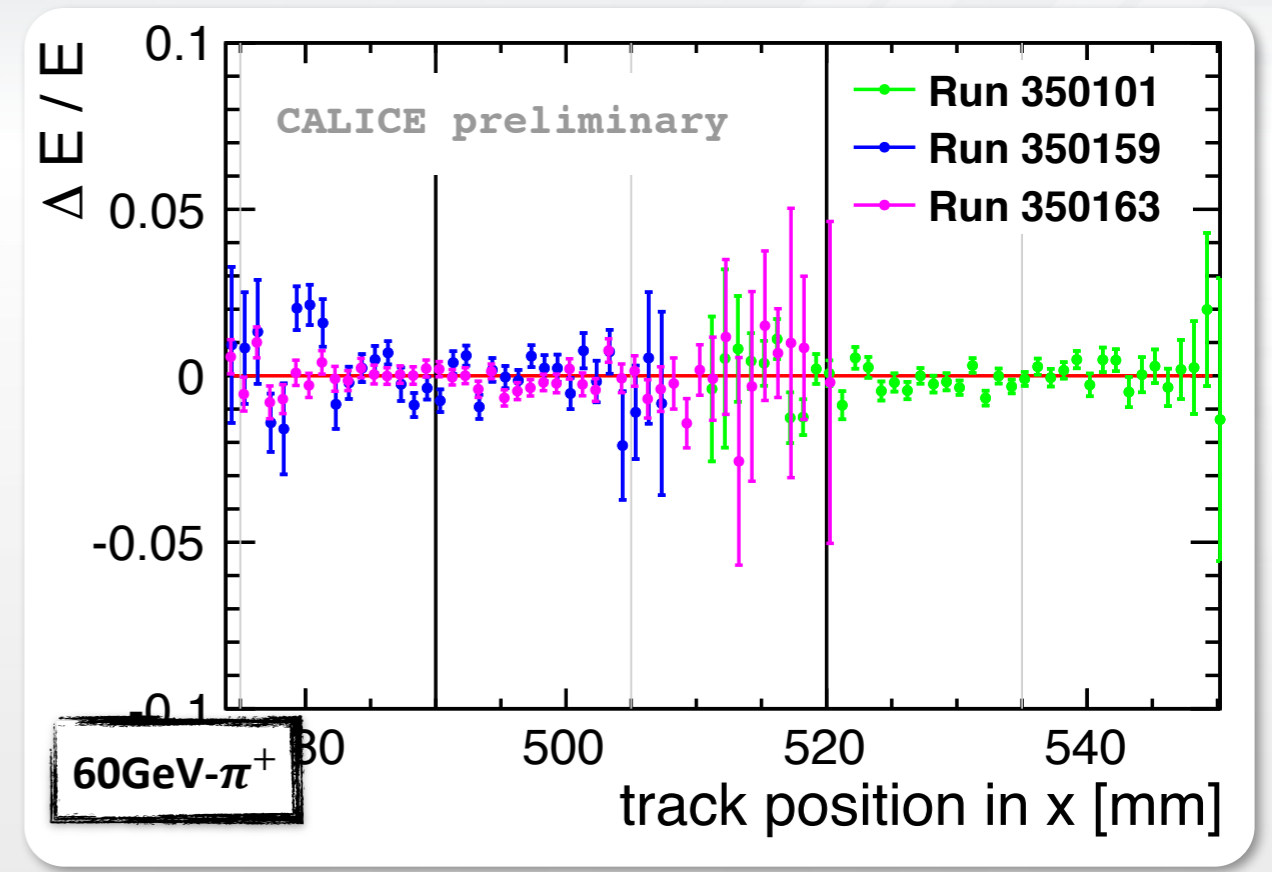
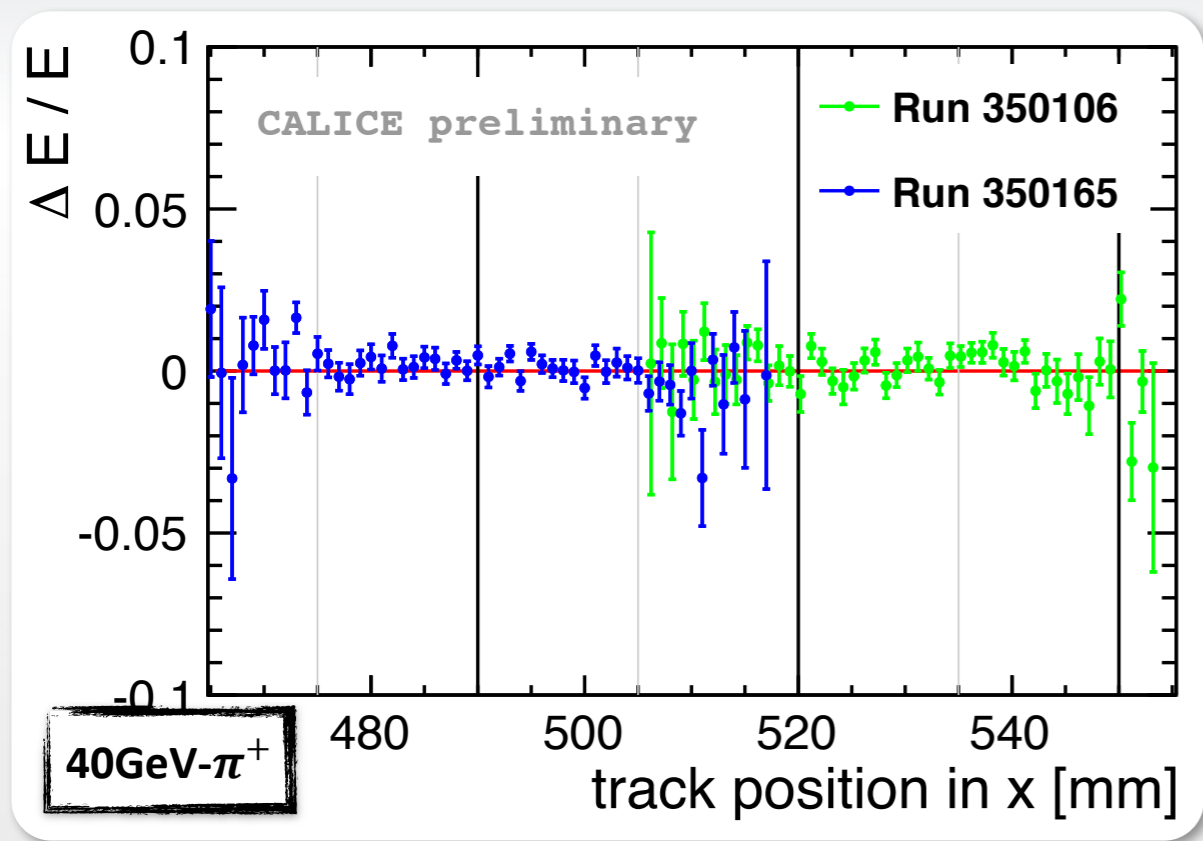
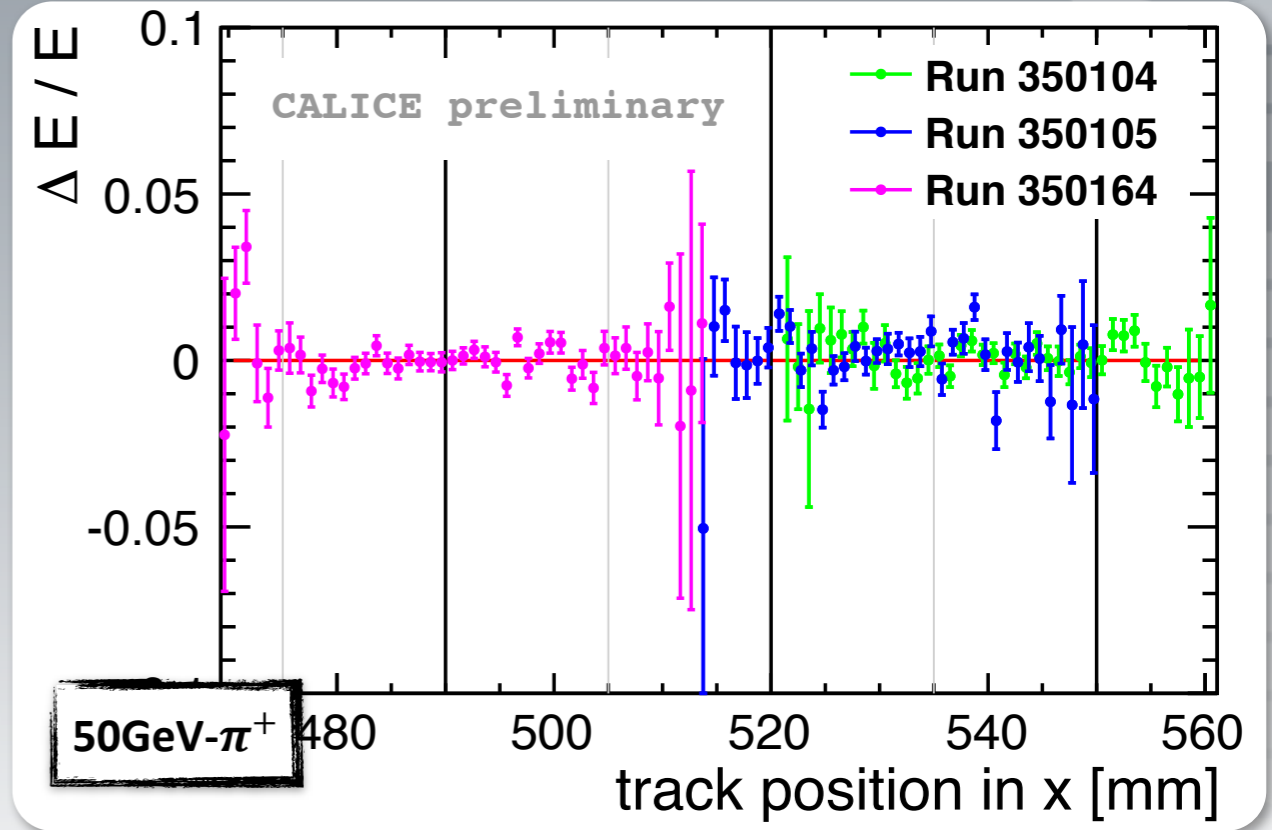
- Residual
- RMS-value as uniformity measurement
- for all runs RMS is better than 0.8%



tile crossing

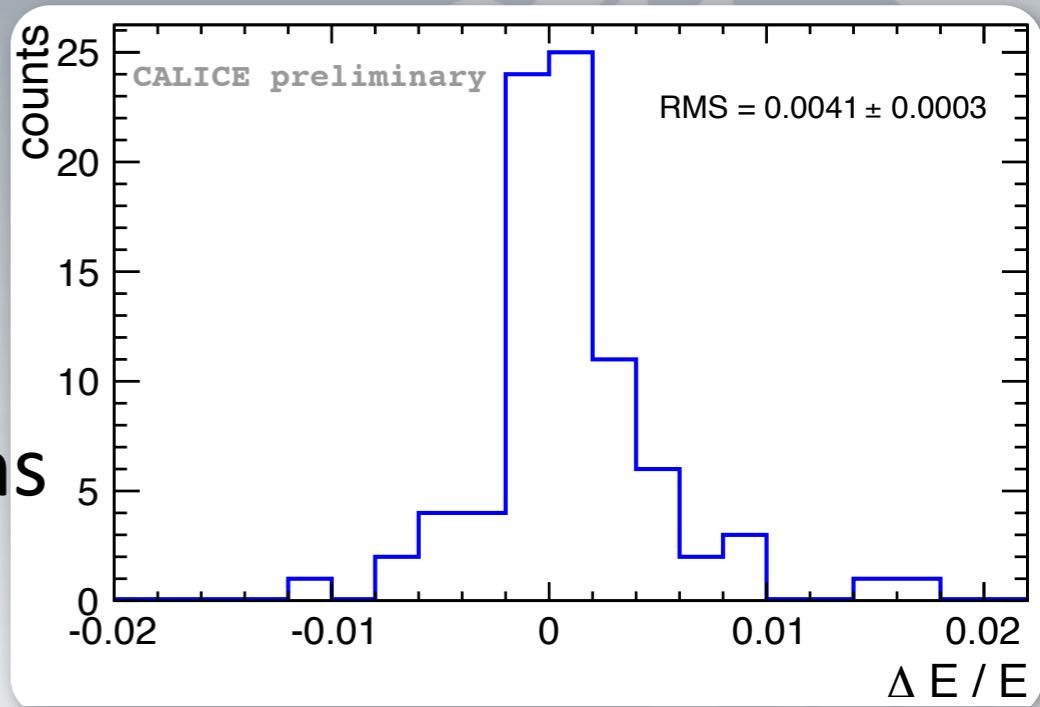
Combination of runs I

- Combination of runs with same energy after „normalization“
- RMS value is better than 0.6 %

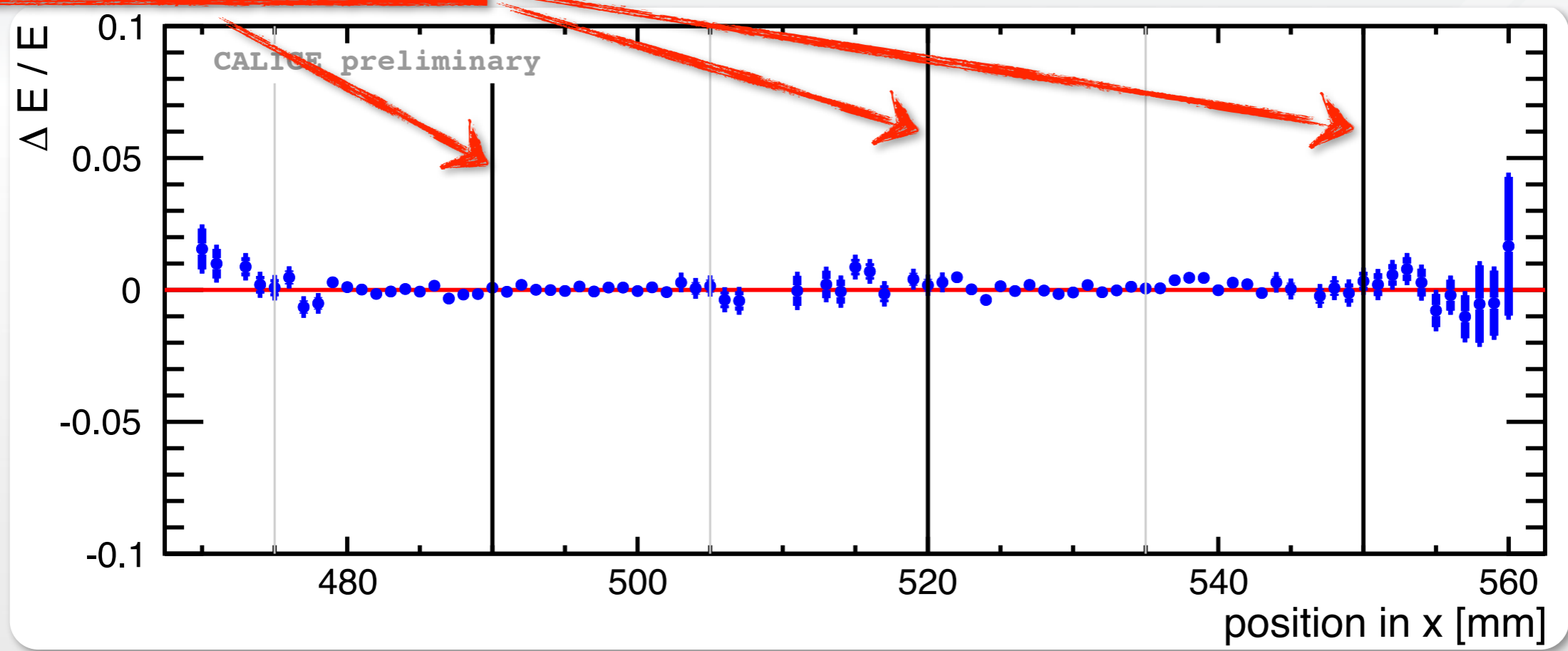


Combination of runs II

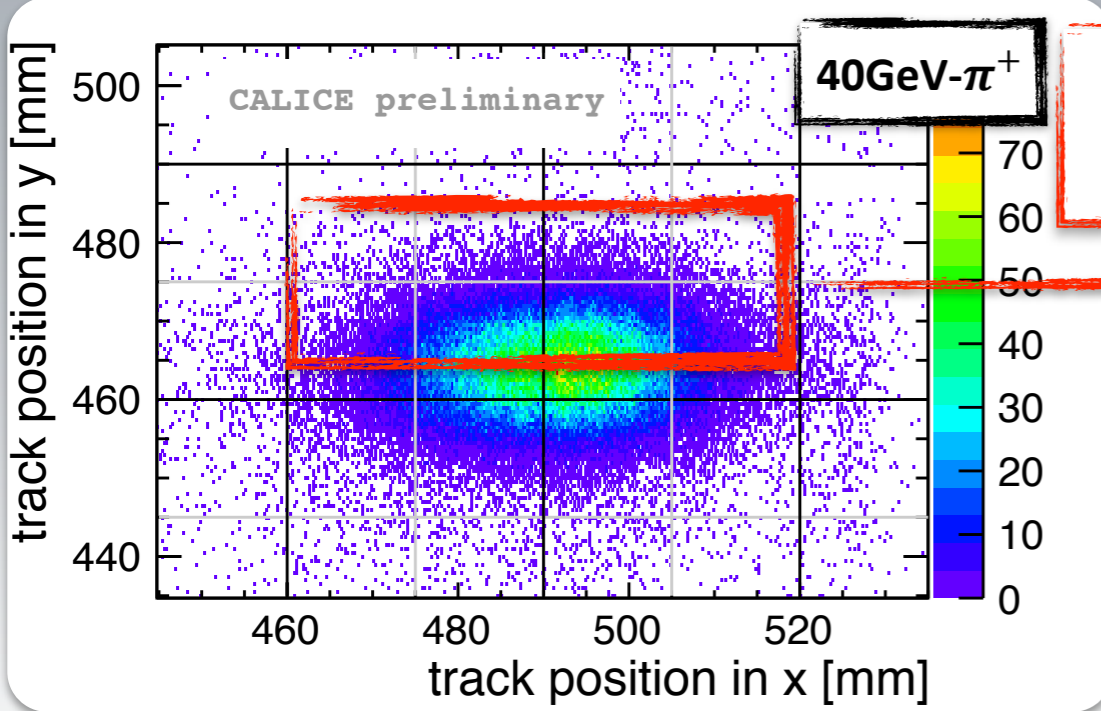
- Combination of all runs after „normalization“ (all energies & positions)
- RMS value is the weighted mean of all runs
- RMS value is better than 0.45 %



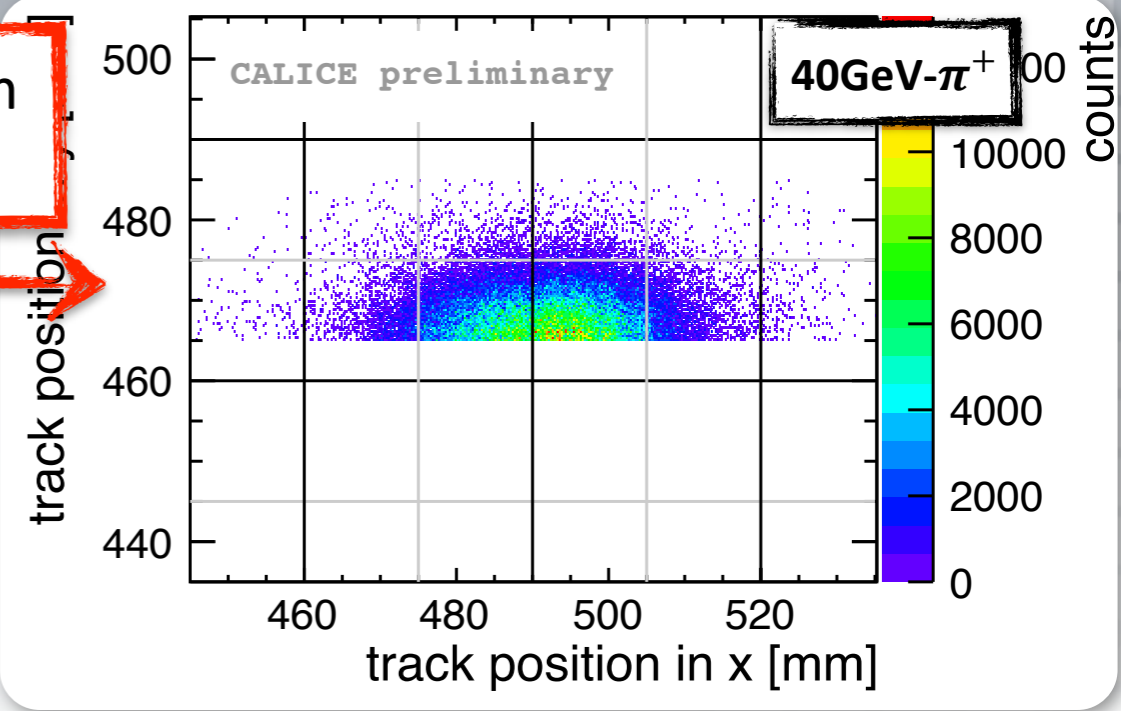
tile edges (covering 3-4 tiles)



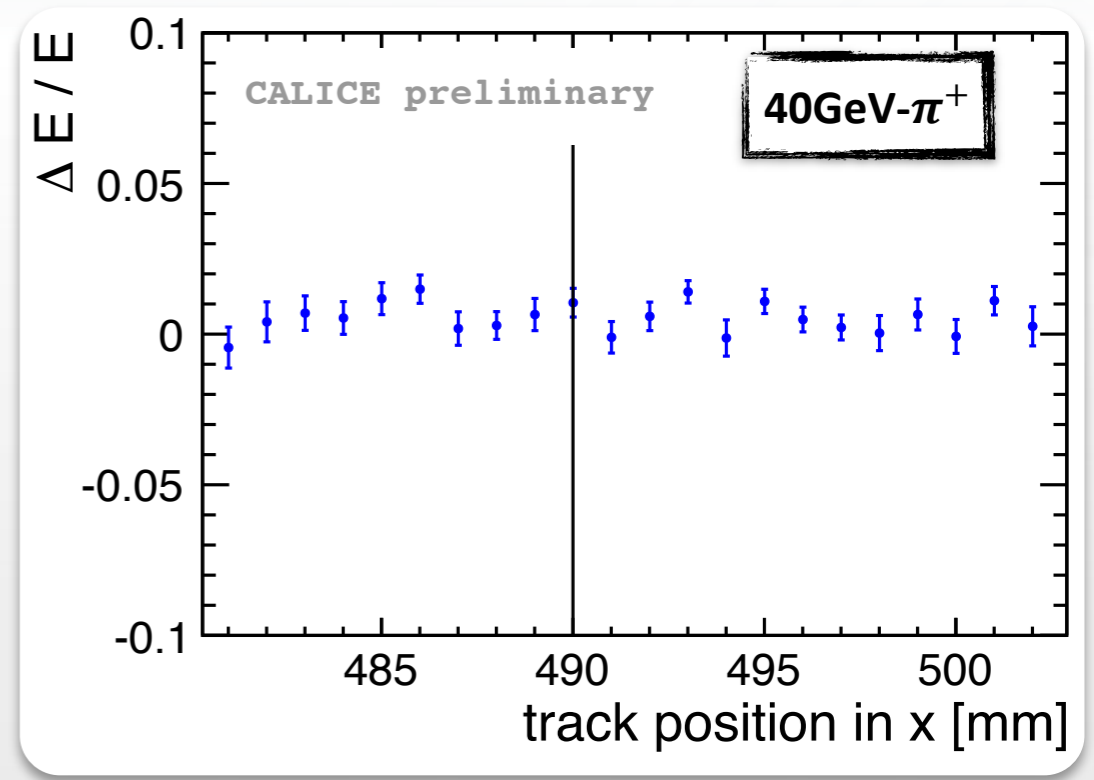
Check Beamprofile



only middle 2 cm
of 3x3cm² tile



- Using only middle 2 cm
- Reduced statistic
- RMS value is better than 3.6 %
 - ➔ Statistical consistent with old result



Conclusion

- Single Runs no anomaly within 0.8%
 - Combine energies no anomaly within 0.6%
 - Combination of all Runs no anomaly within 0.45%
 - Only centre part of tiles, RMS value better than 3.6%
-
- Note currently in editorial board (will upload new draft soon)