

RAT Analysis and Reconstruction

By Chris Tunnell
University of Texas at Austin

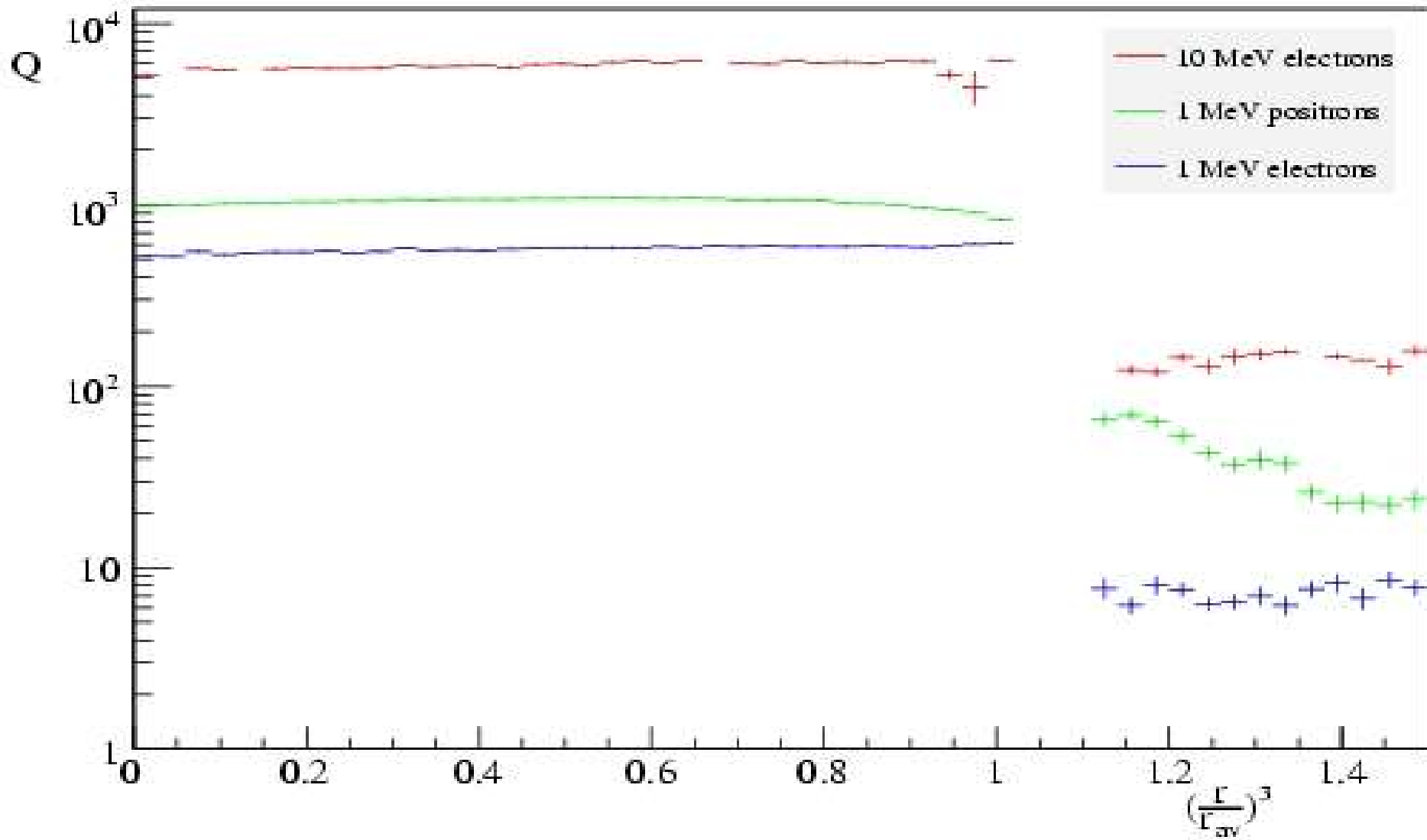
RAT Data-flow Review

- IBD generator (MW)
- The Monte Carlo (Geant4 team)
- Electronics simulation* (JK)
- Trigger system (JK)
- Reconstruction (A little of everybody)
 - For educated guess, must first look at RAT “data” to see what is given

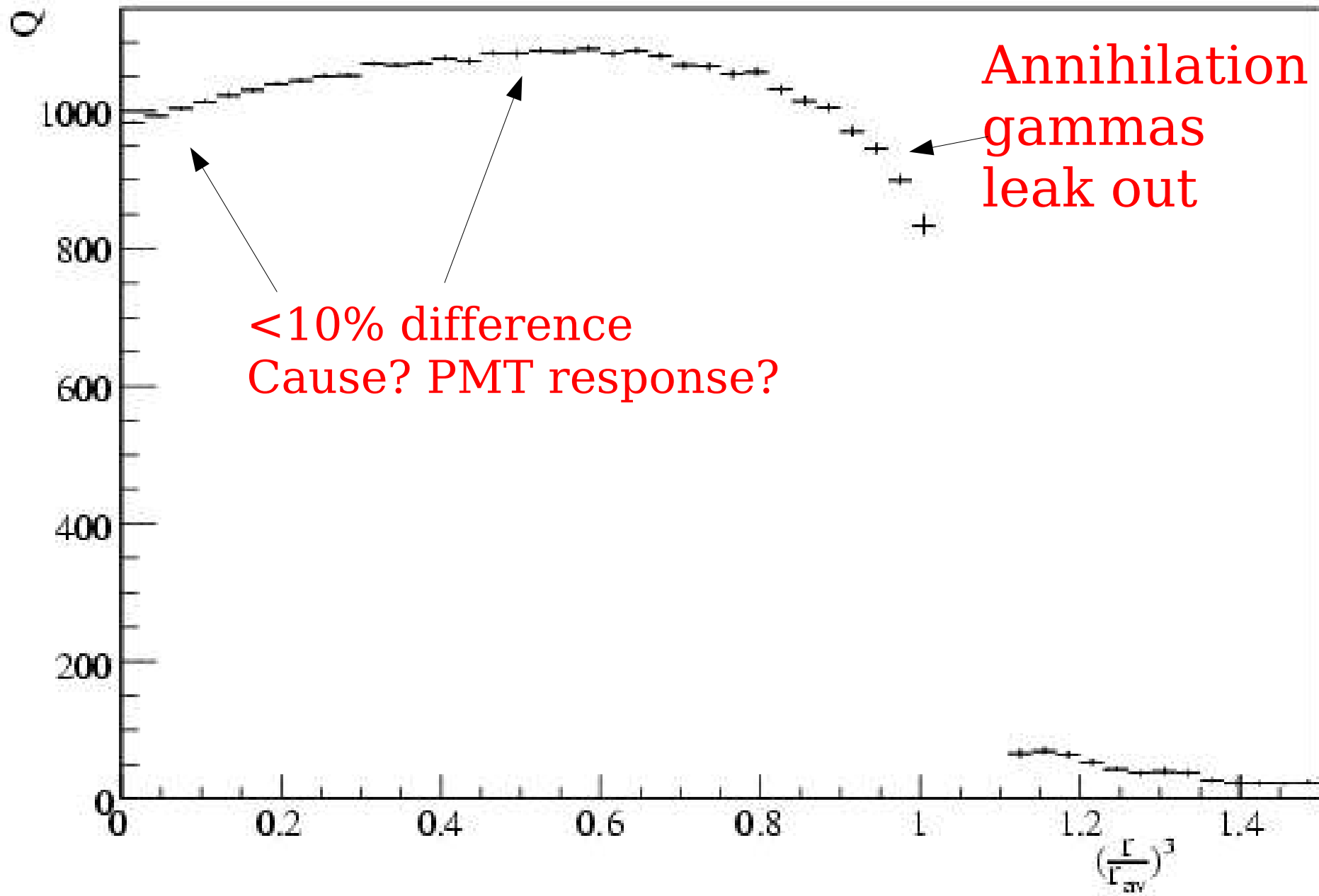
*Needs work

What do we have to work with?

Note: Want flat since random in R^3



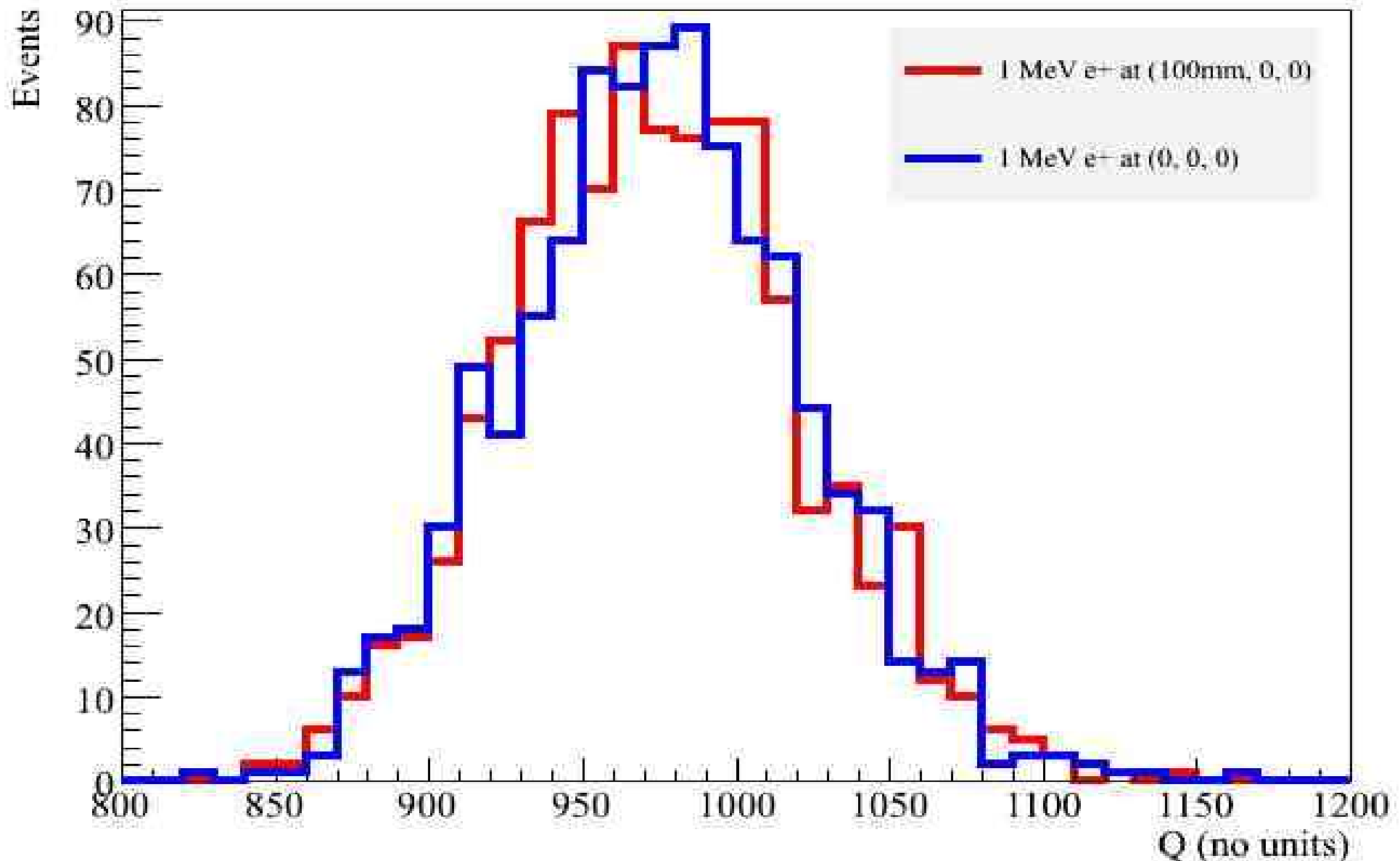
Not flat thus harder problem



What isn't important in reconstruction?

- Position
 - Small variations acceptable (see plot)
=> small change in E resolution

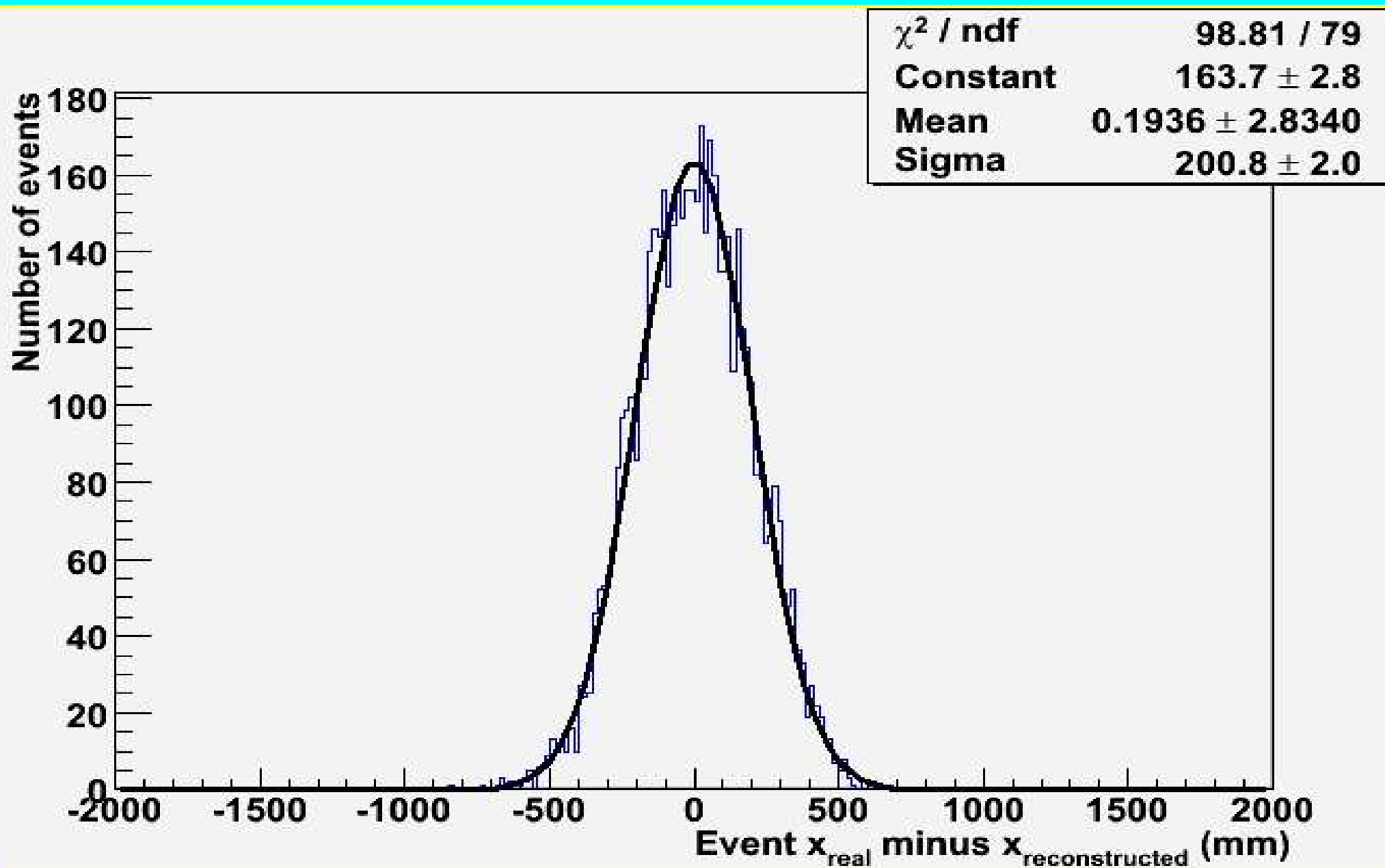
Small variations in position do not matter



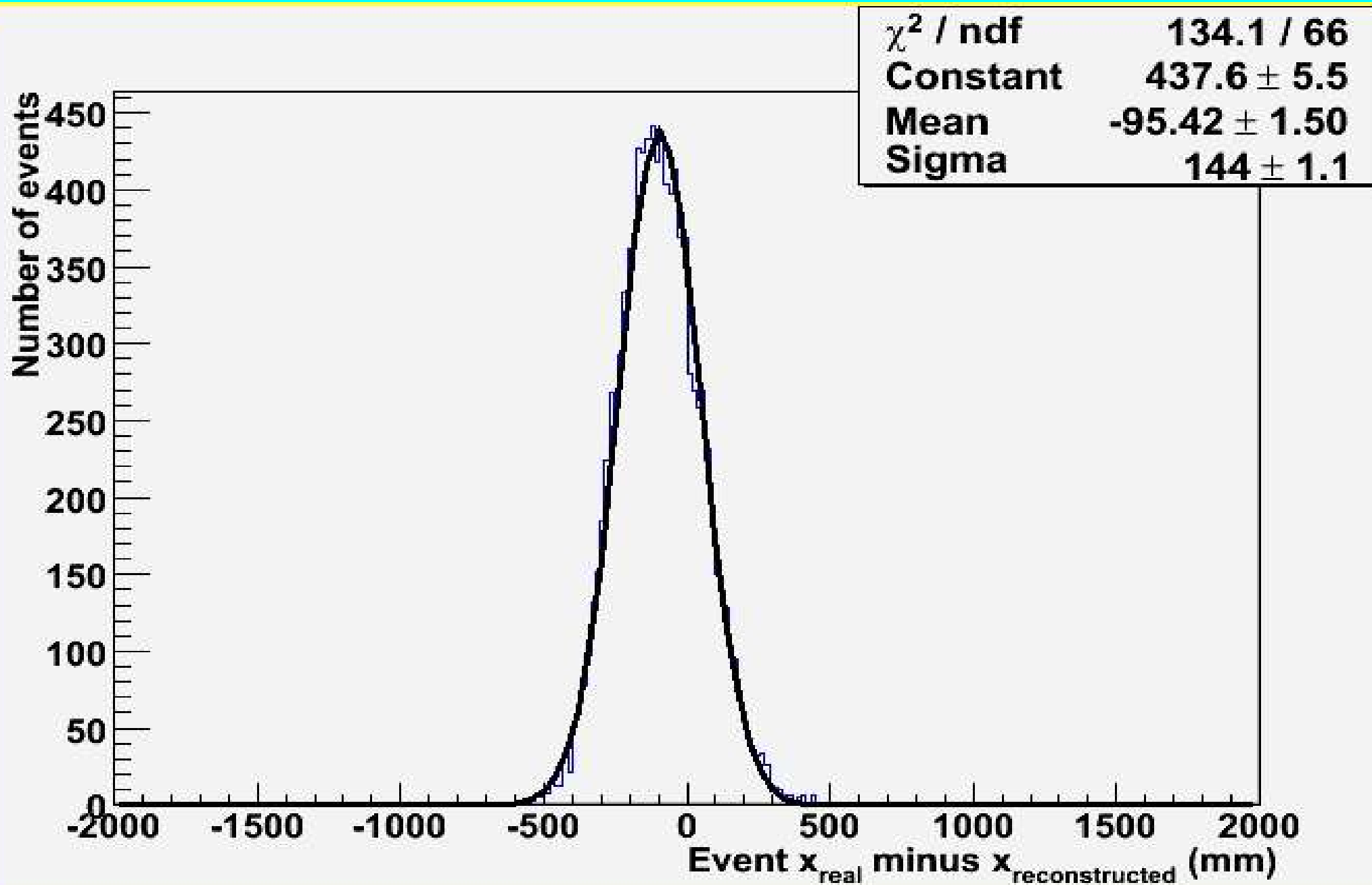
What isn't important in reconstruction?

- Position
 - Small variations acceptable
 - => small change in E resolution
 - PMT charge-squared centroid works (for now)
 - No algorithm needed

Centroid error for 1 MeV e⁺ at (0,0,0)



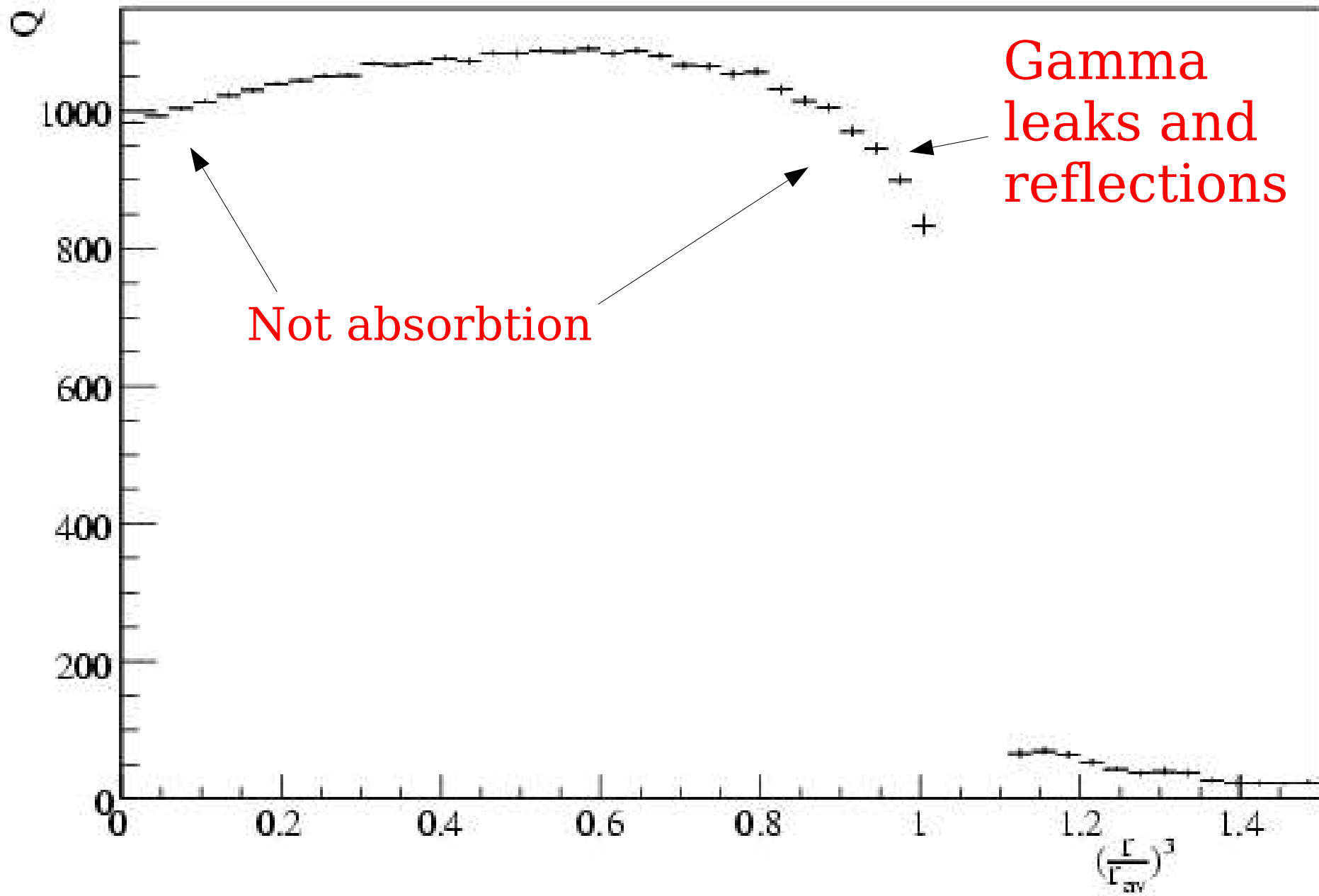
Centroid error for 1 MeV e⁺ at (2m,0,0)



What is **not** most significant in reconstruction?

- Position
 - Small variations acceptable
 - PMT charge-squared centroid works (for now)
 - No algorithm needed
- Photon absorption
 - Previous Fsim efforts use this*
 - Simulating 10m attenuation lengths
 - Why?
 - * We thought only these things were important before!

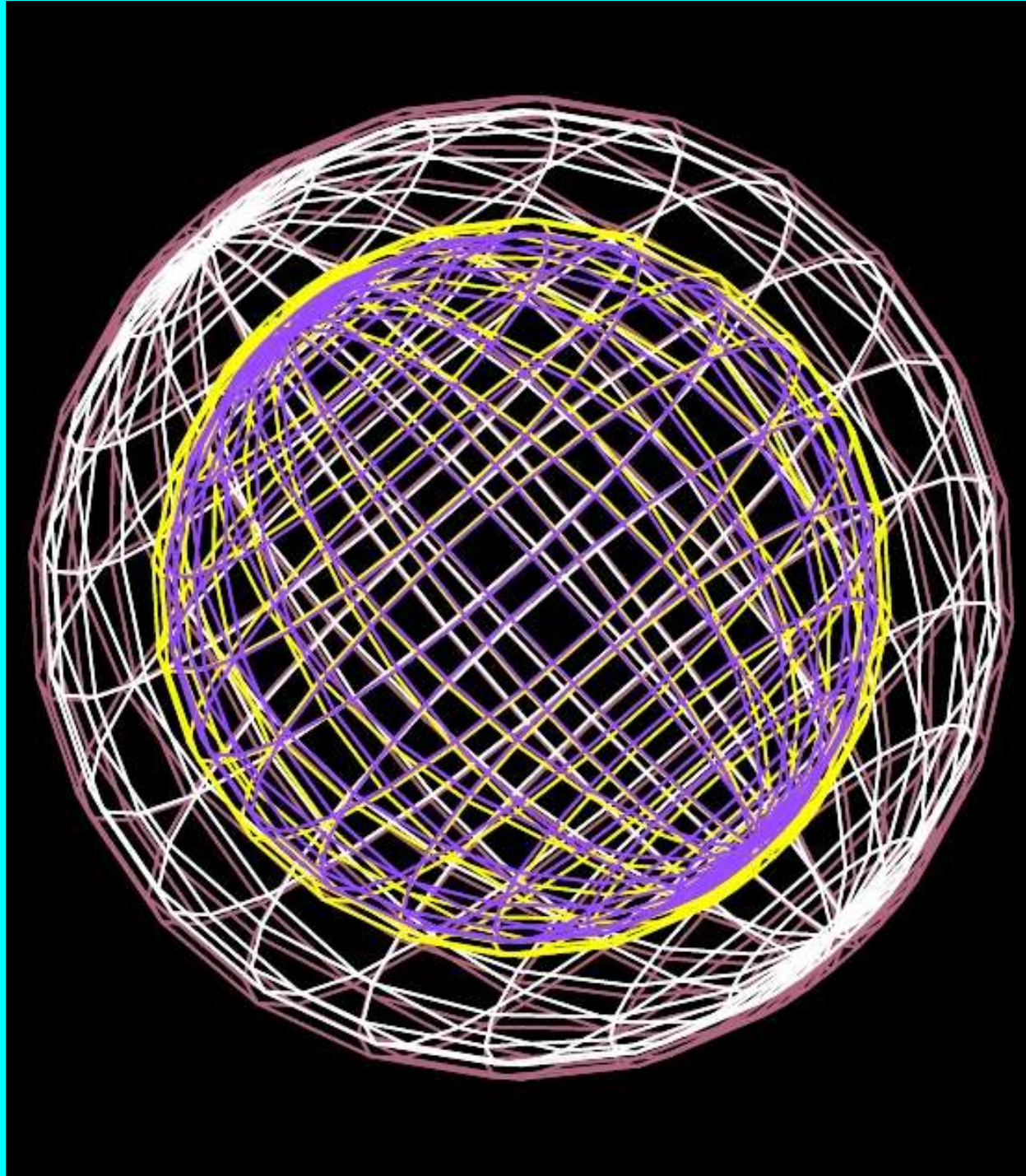
Not flat thus harder problem



What is most significant for reconstruction?

- Geometry

Simple geometry w/o PMTs

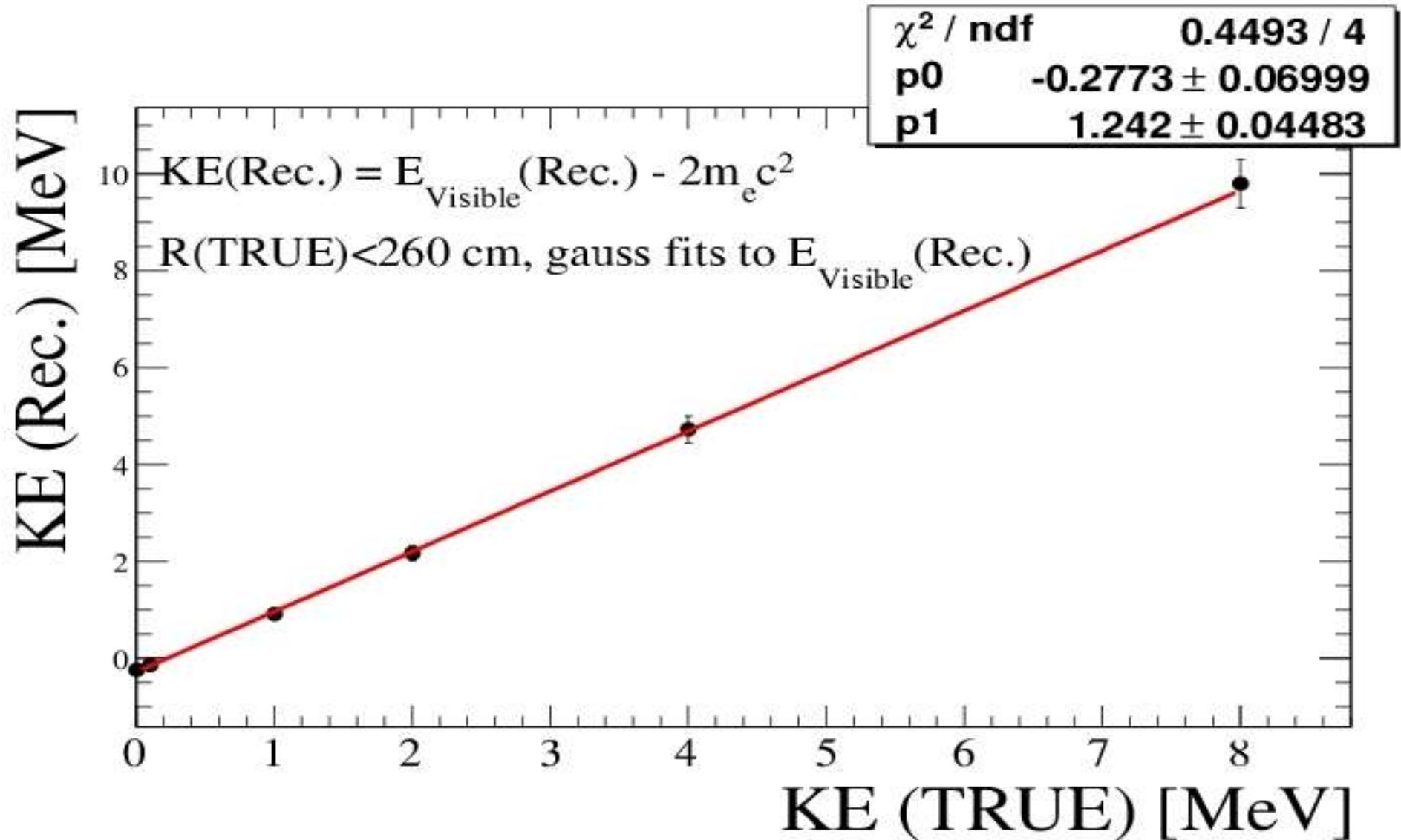


Finally: What is important for reconstruction?

- Geometry
- Electronics

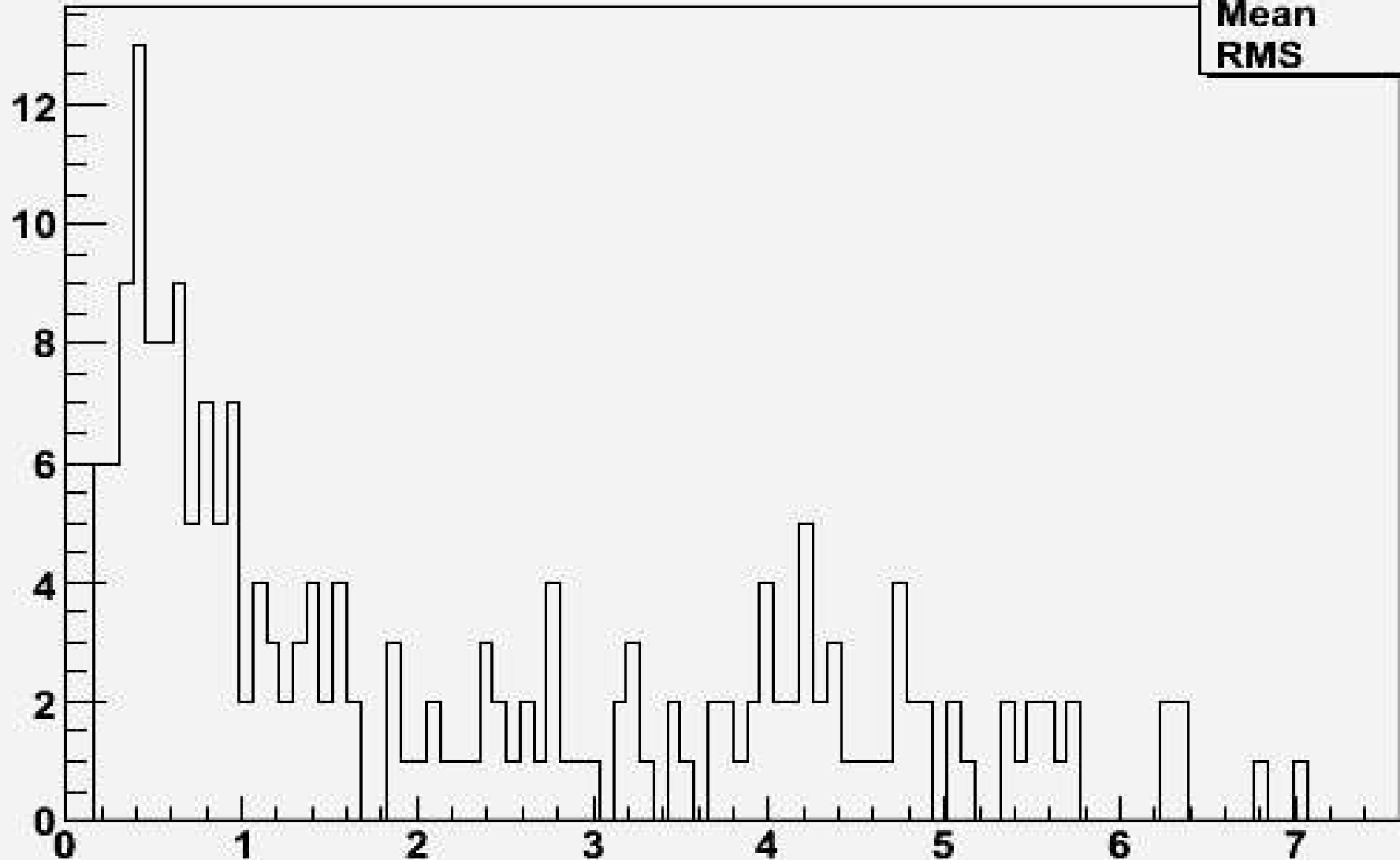
We get a direct-light anti-simulation

Reconstruction accuracy



IBD Deposited E Reconstruction

ev.effit.ke



htemp

Entries	200
Mean	2.207
RMS	1.844

Is this good?

- Good enough for now
- A lot of approximations made
- Very simple & fast algorithm
- Calibrations will tell about future
 - If not, just make a new processor!

FIN