4-pi Simulation for Dual-readout Calorimeter
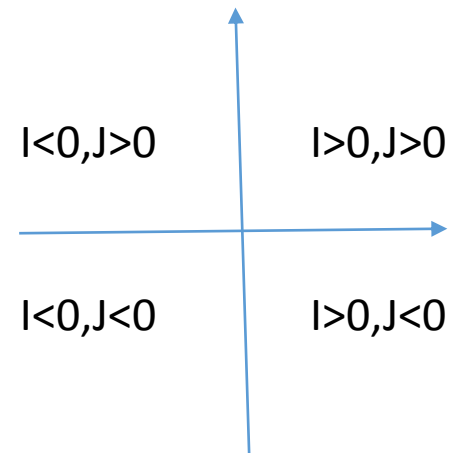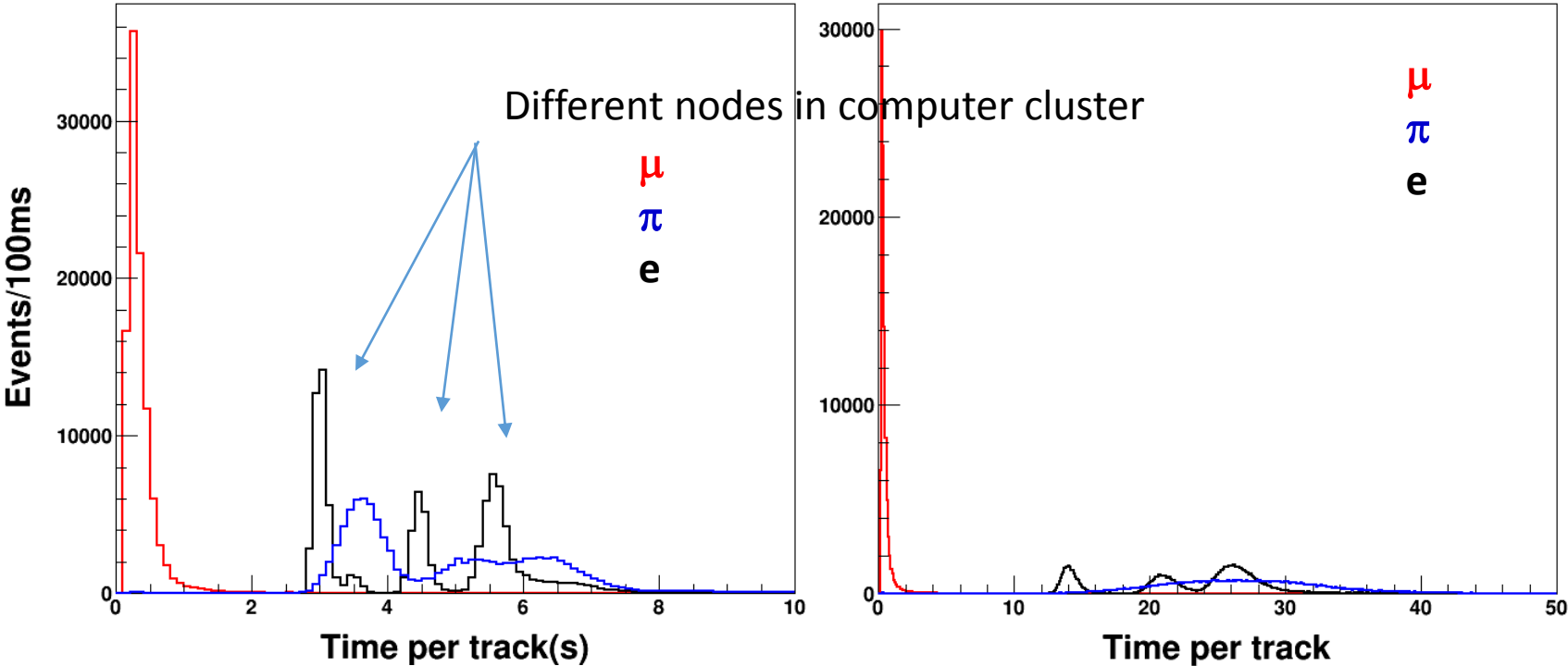
Chengdong FU

IHEP

2017-7-13

Bug and Correction

- A bug of ID (phi) exceeding M range (0-255): in fact 284 fibers at phi direction
  - M(0-255)$\leftrightarrow$K(1-4096)
  - M: theta id
  - K-1: phi id

- Redefinition
  - I, J, GRZone $\rightarrow$ I, J (16 bits)

- Encoder:
  - idString: "S-1:8,M:8,I:16,K-1:12,GRZone:4,J:16"

I<0,J>0   I>0,J>0

I<0,J<0   I>0,J<0

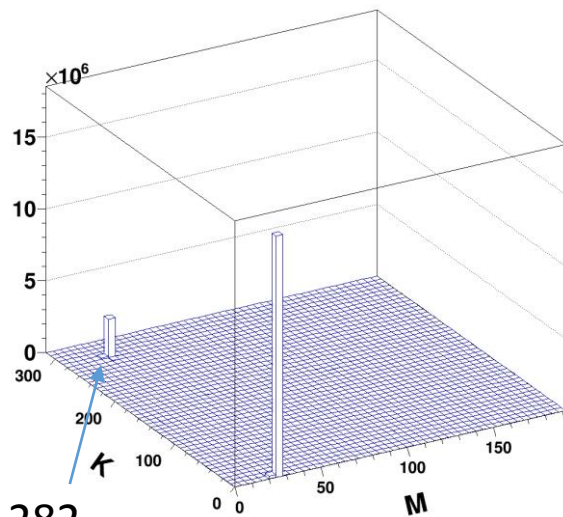# Spent time in simulation

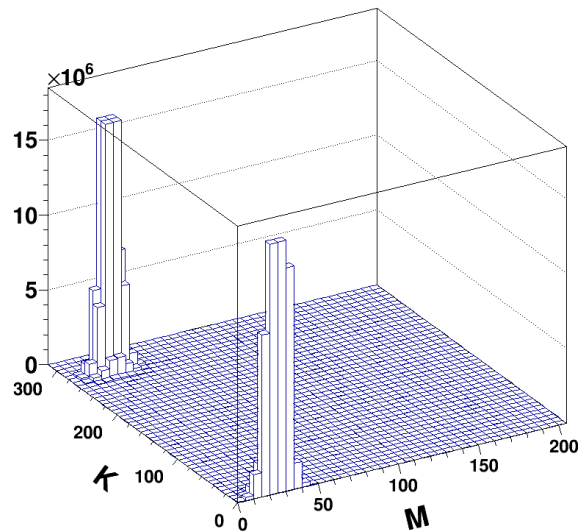20GeV

80GeV

Different nodes in computer cluster

μ
π
e

Tower id of hits

- Particle direction: (1,0,0.5955)→tower id (M25,K0)
- Particle energy: 80GeV

- Hits number: π's > e's, pions have more wide showers

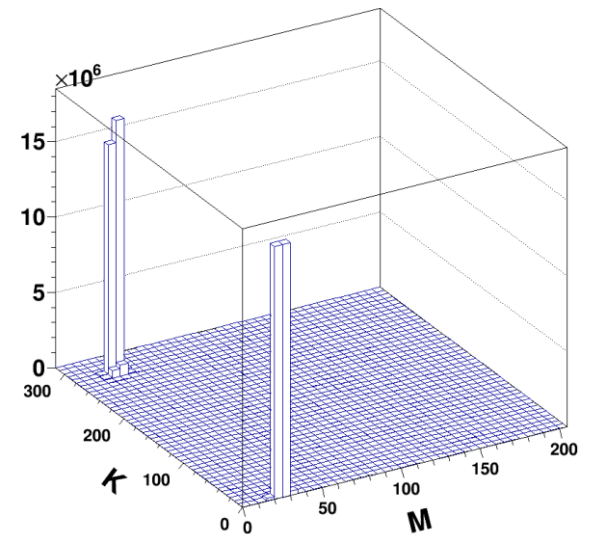μ   π   e
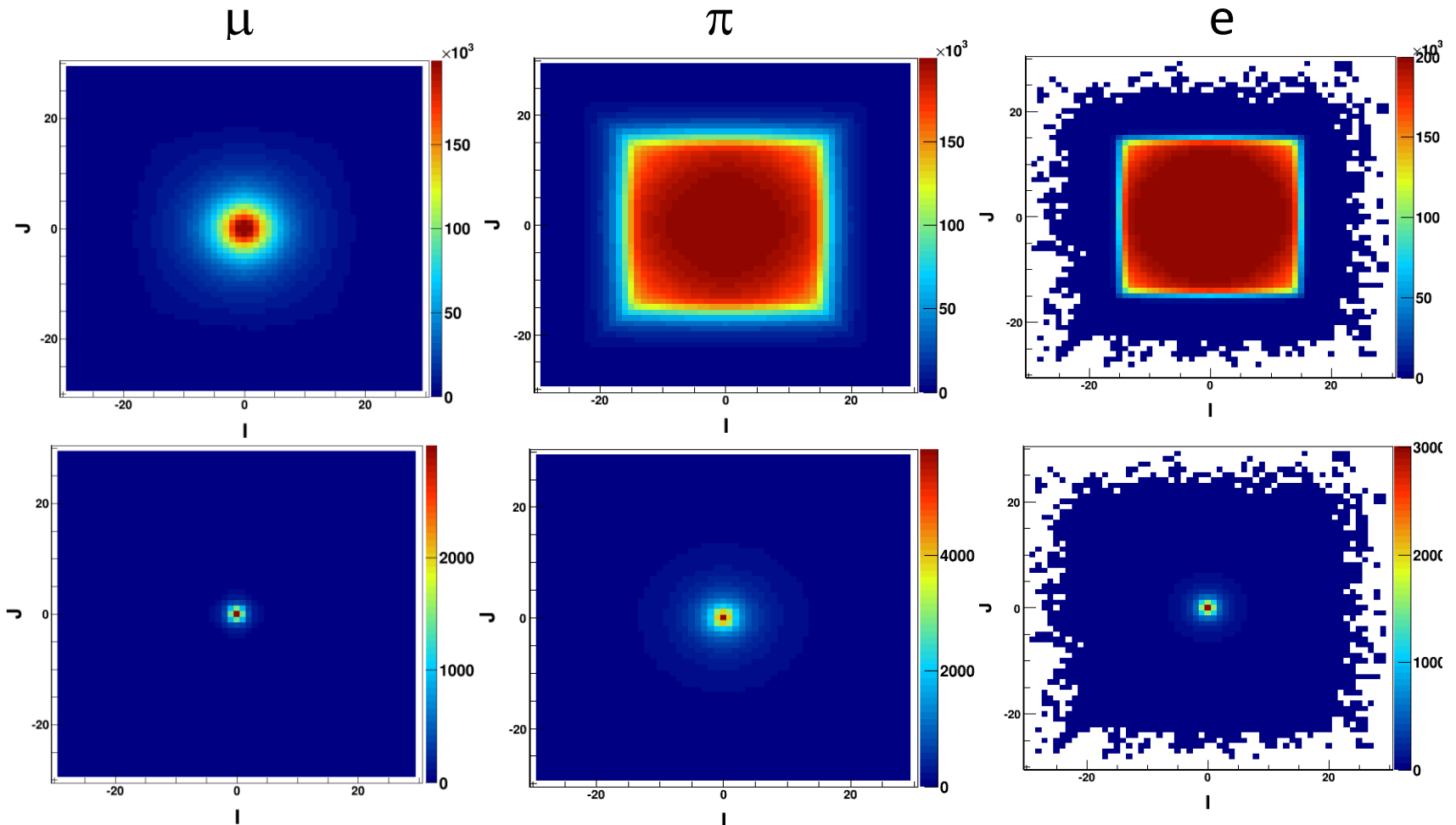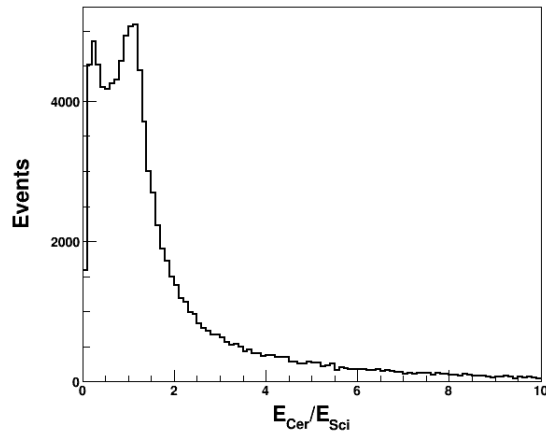

282

Hits and energy for 100000 particles

- Hits number
- Sum of hits energy

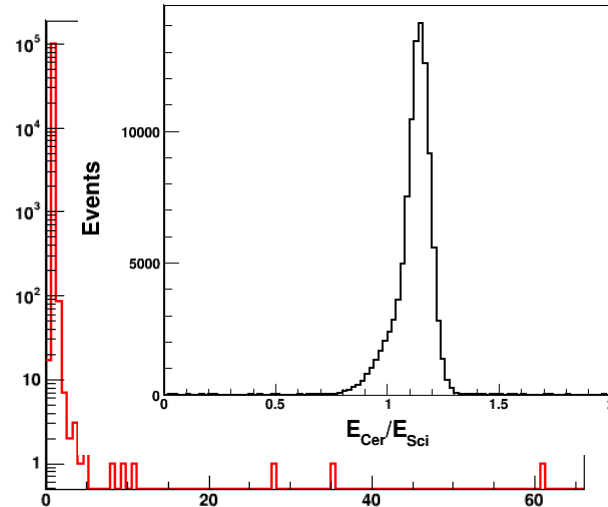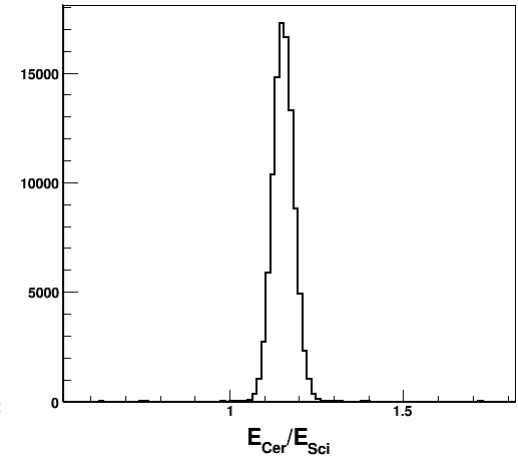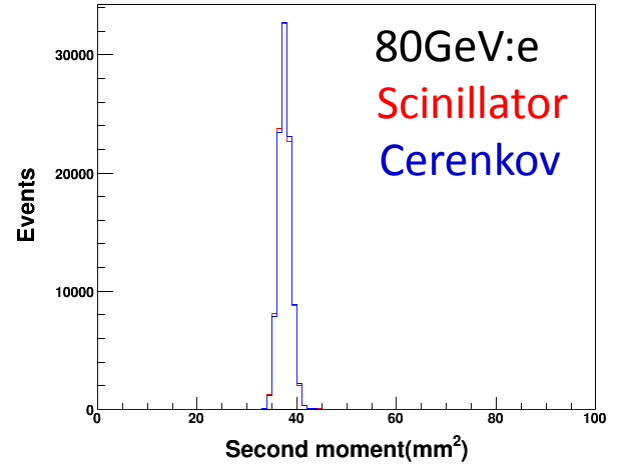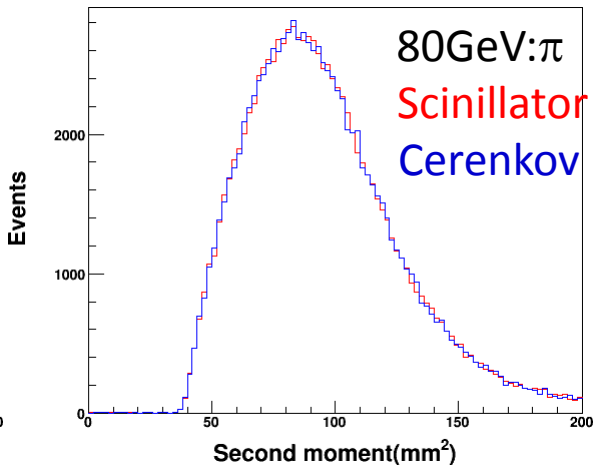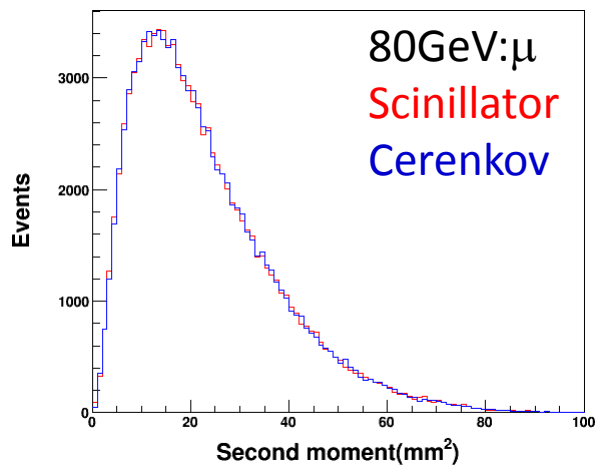# Ratio of energy
in Cerenkov and scintillator fibers

Second moment

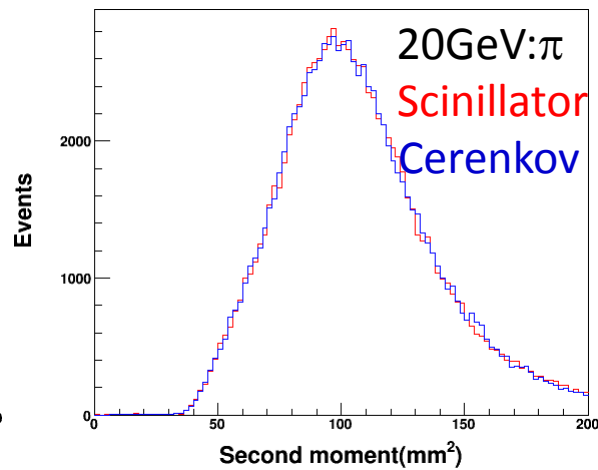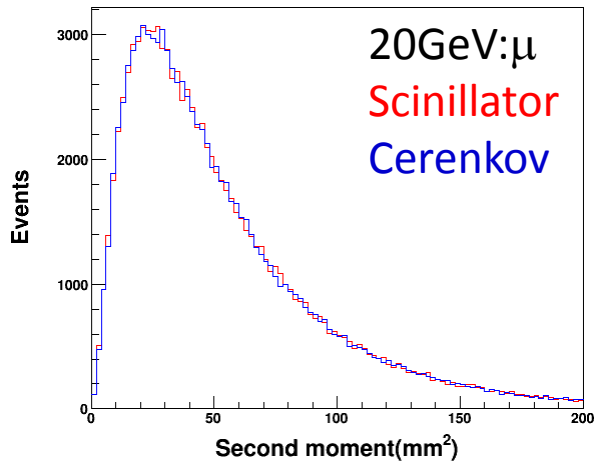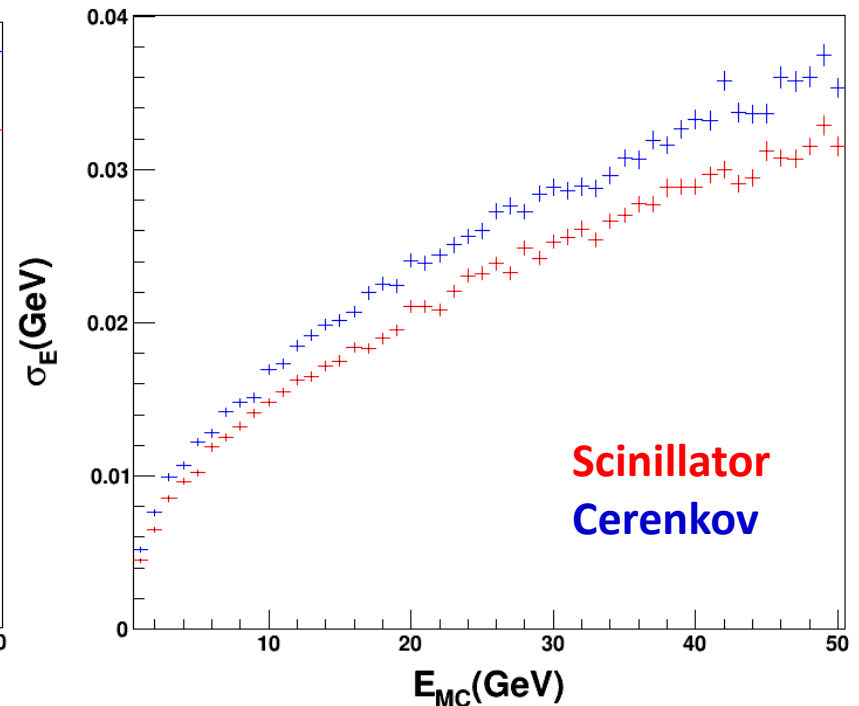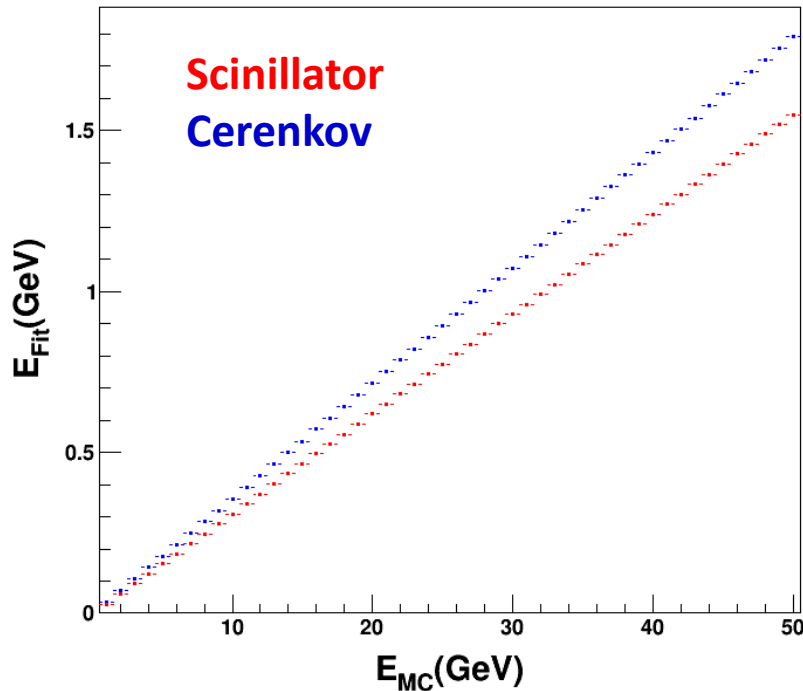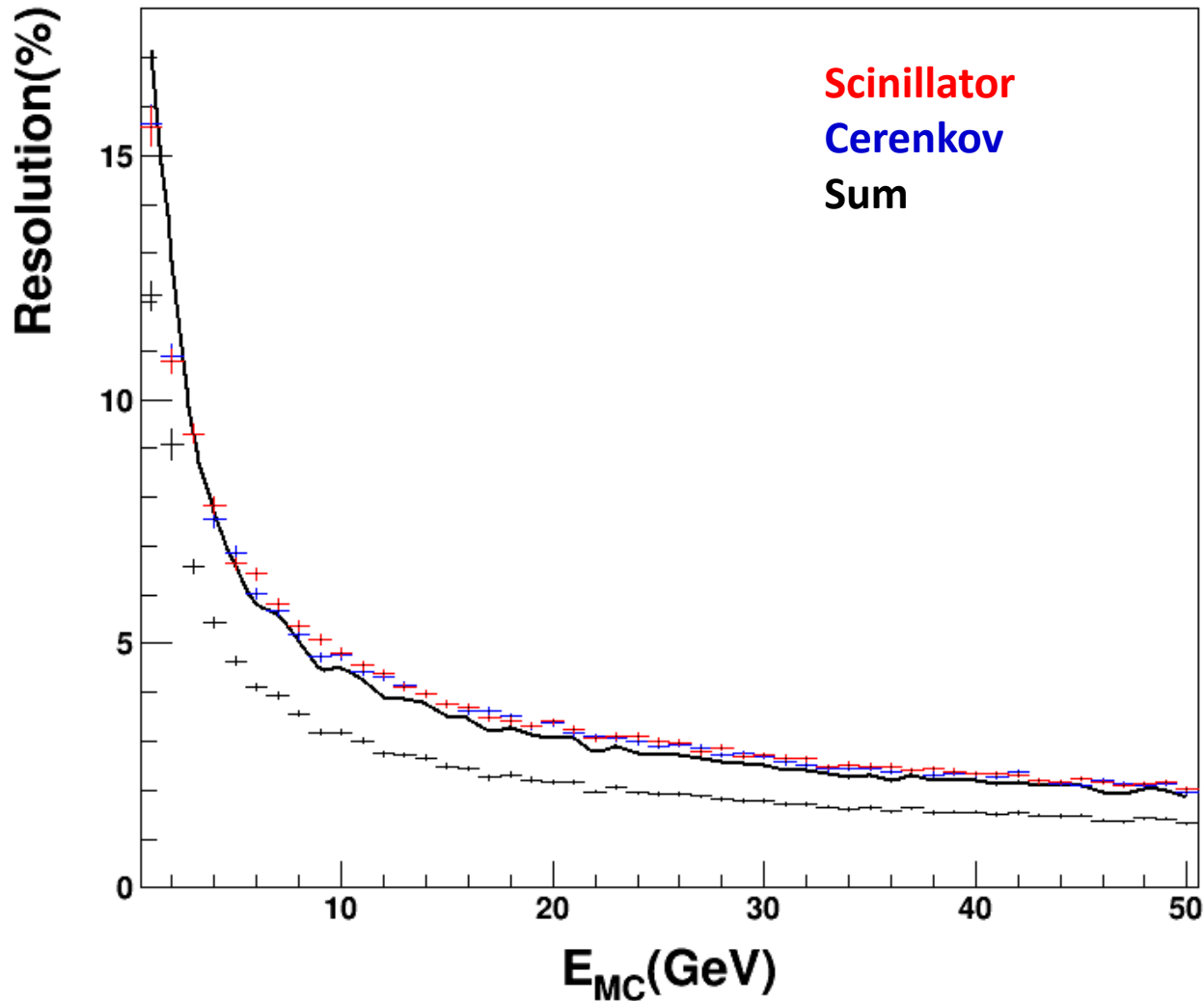- $\Sigma e_i r_i^2 / \Sigma e_i$
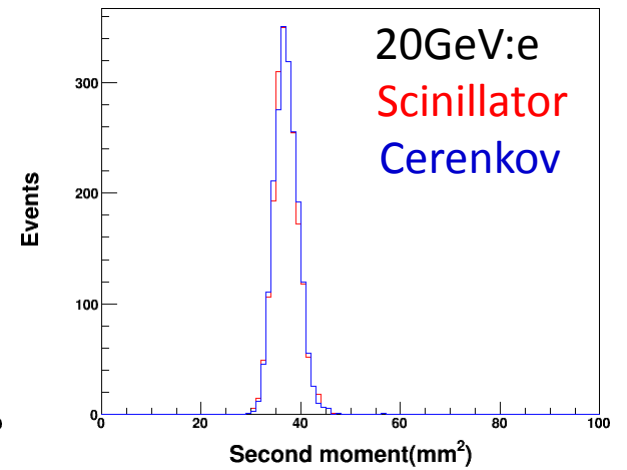
Linearity and Energy resolution for electron

- Simply sum of deposited energy and fit

Resolutions

- Compare to statistics line (Sum's resolution $\times\sqrt{2}$)

Next to do

- Even without light process, time on simulation are long for high energy hadronic particles.

- Correlation between scintillator fibers and Cerenkov fibers seems not evident while no light process in simulation?

- Build a geometry with only one type of fibers, to compare the resolution…