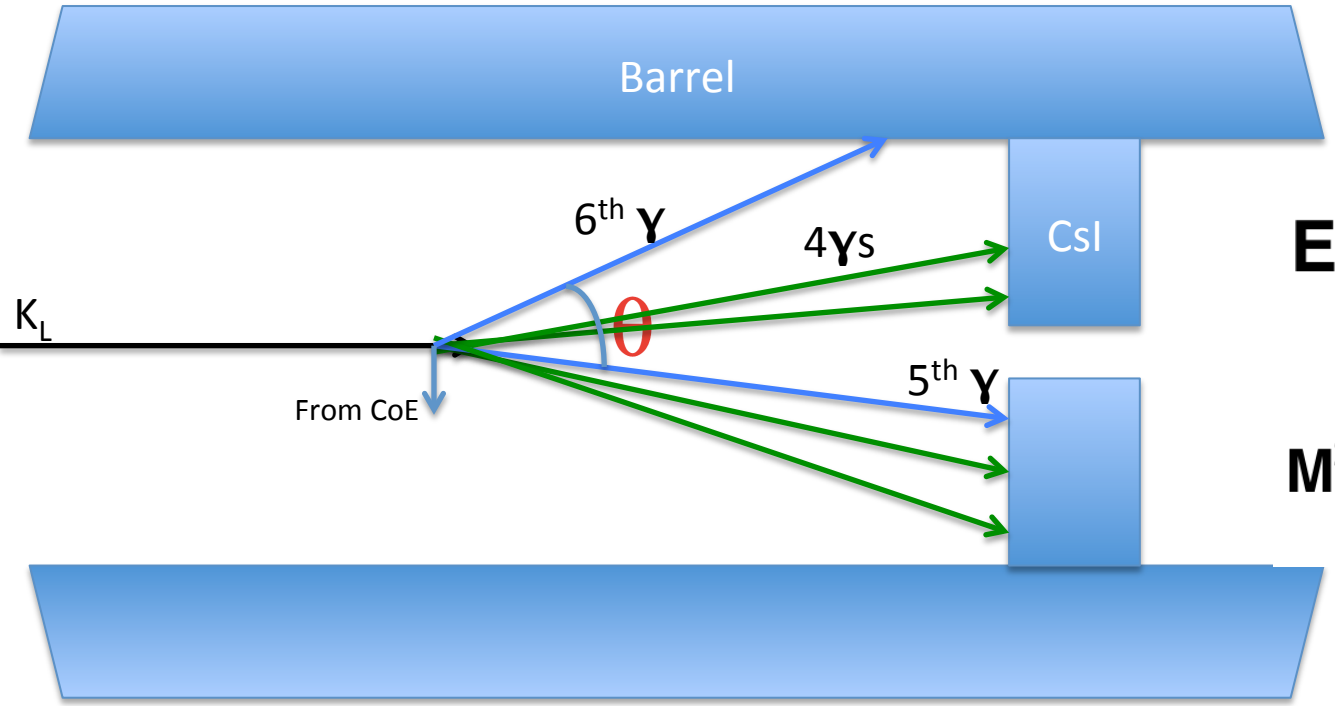
# 5g+1g analysis

# Analysis process




$$E_6 = \frac{M_\pi^2}{2E_5(1-\cos\theta)}$$

$$M_{K_L}^2 = \left(\sum_{i=1}^{6} E_i\right)^2 - \left(\sum_{i=1}^{6} \vec{p}_i\right)^2$$

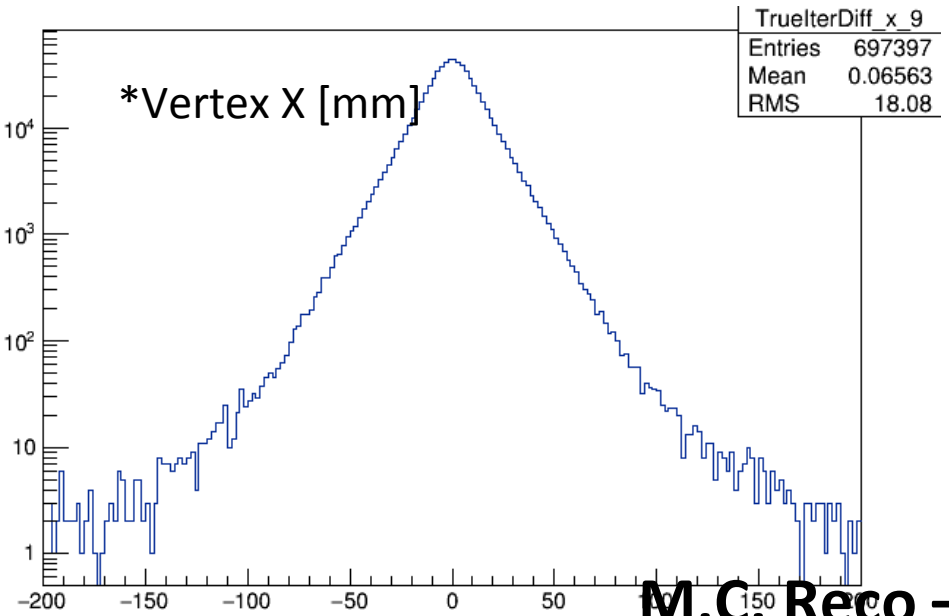
- 1) Reconstruct Vertex of 2pi0
- 2) Reconstruct energy of 6th gamma
  - Assumption of pi0 mass
- 3) Reconstruct X, Y of KlongVertex using CoE of 6 gammas
- 4) Reconstruct KlongMass

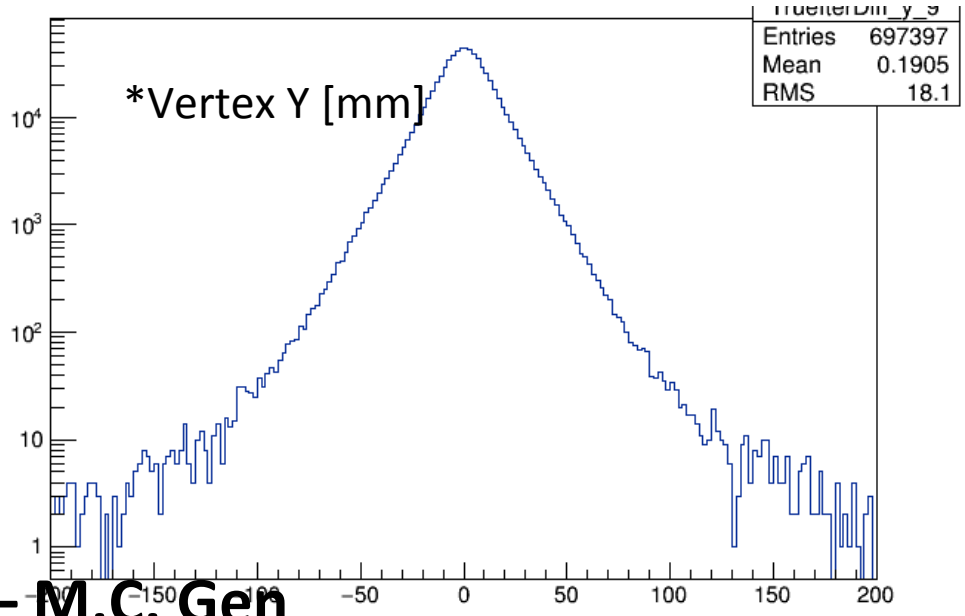
Iteration

# M.C. vs RunData

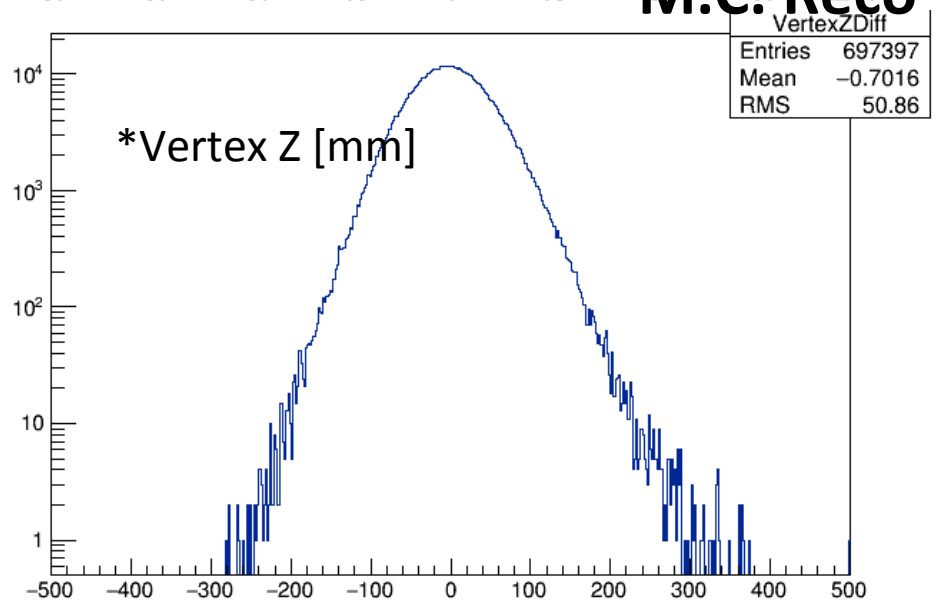
- Data, #KLs = 7.36e8
  - Run62, 27kW, Minimum Bias Trigger data
- M.C., #KLs = 5e8
    - Specific decay mode is defined (Kaon0L in our gsim)
- Data/M.C. = 1.47

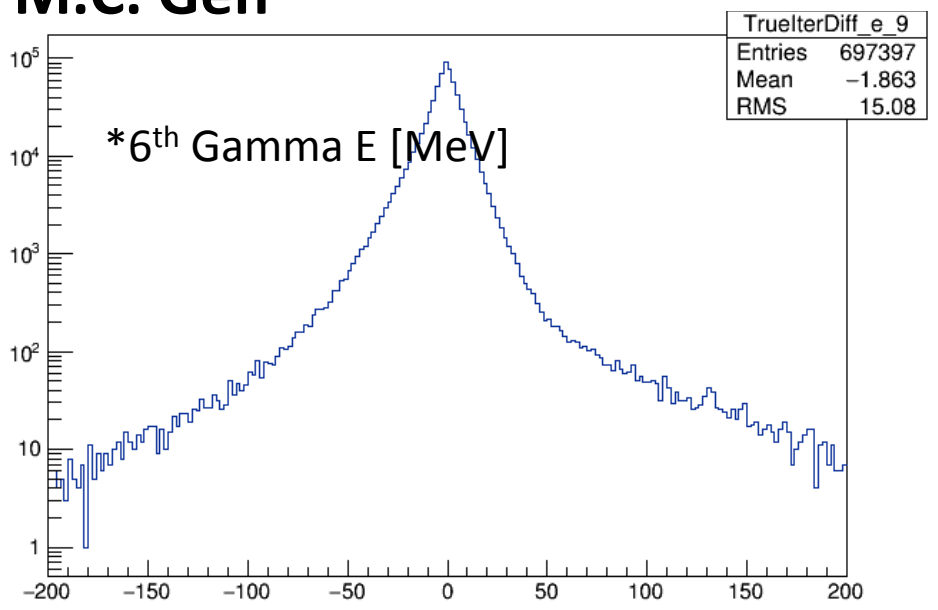
# Vertex Reconstruction



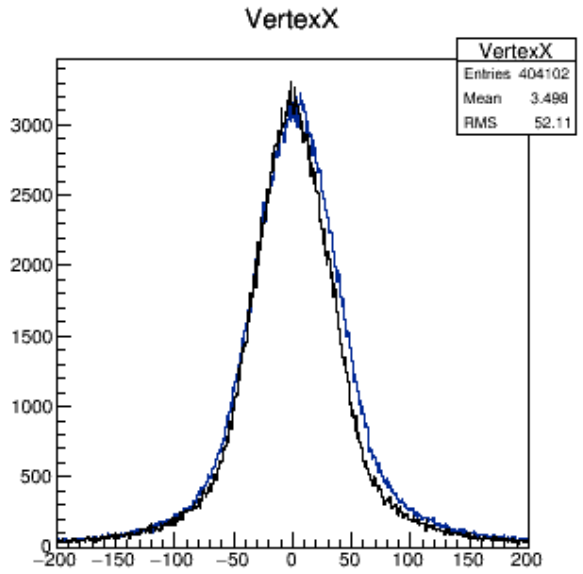

**M.C. Reco – M.C. Gen**

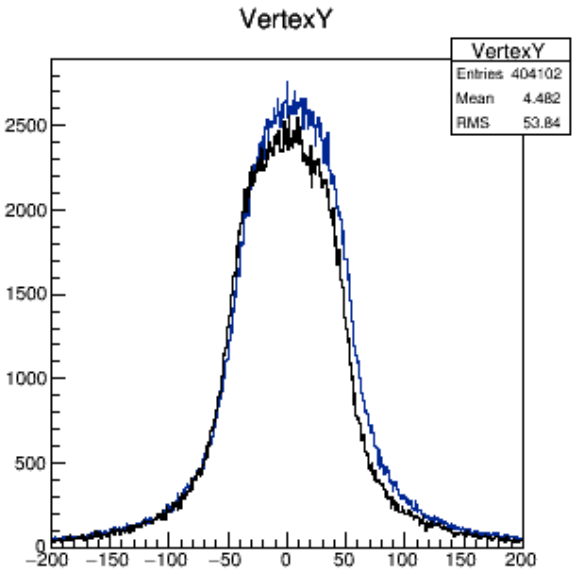


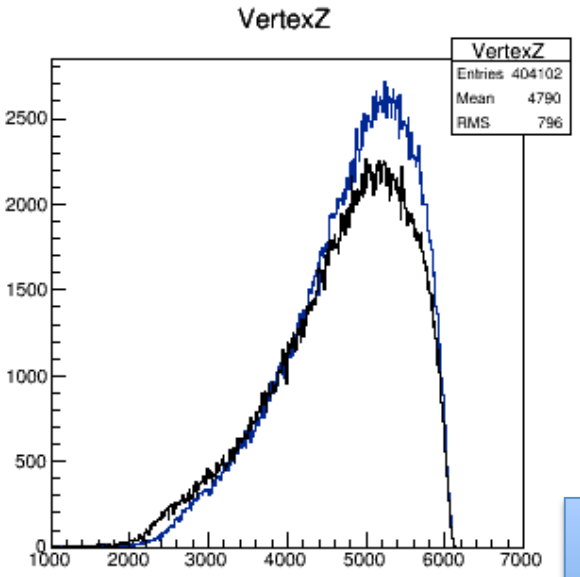



**Blue : Data**
**Black : MCReco**

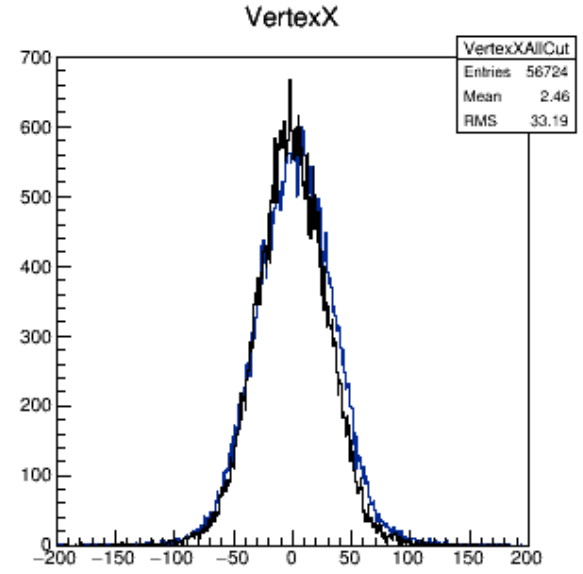
# Comparison

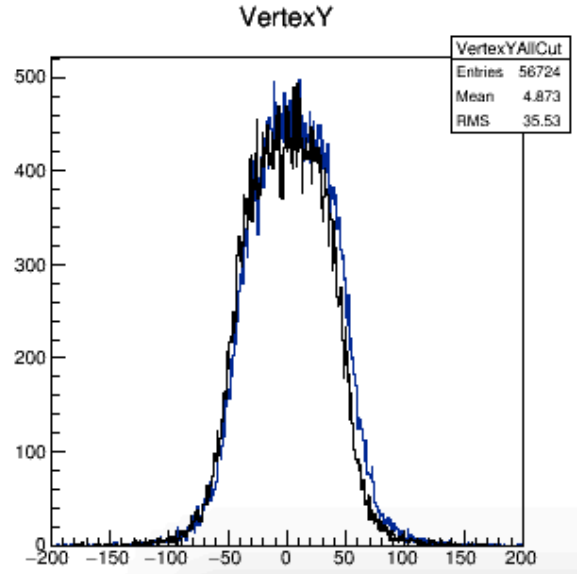


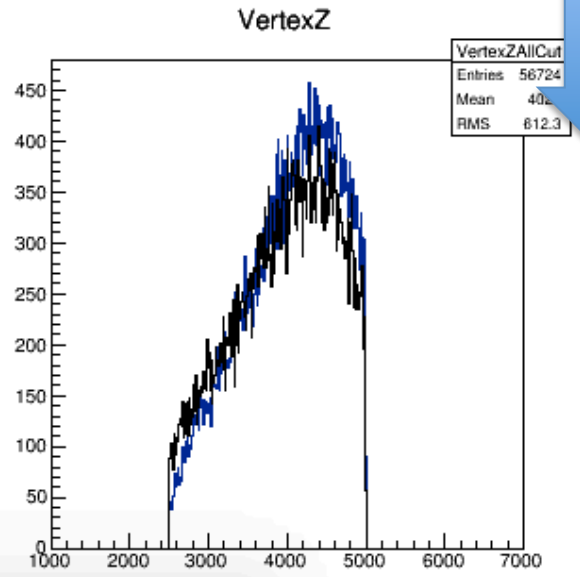



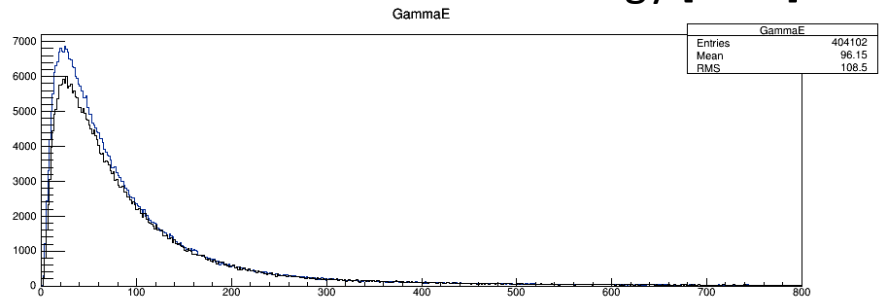

Kinematical Cut

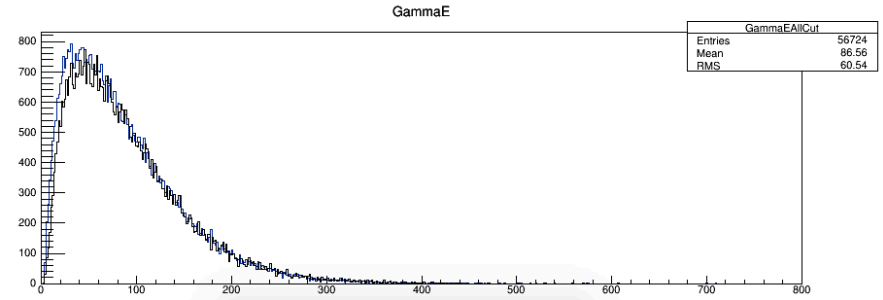


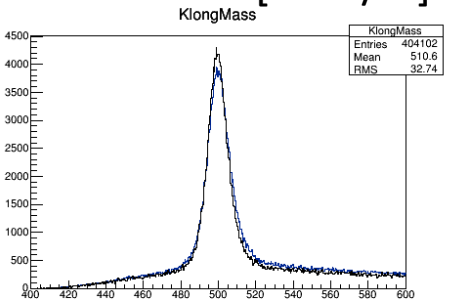



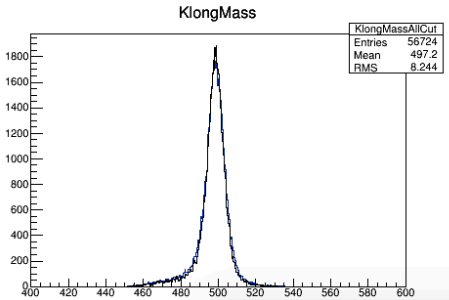
## $6^{th}$ Gamma Energy [MeV]



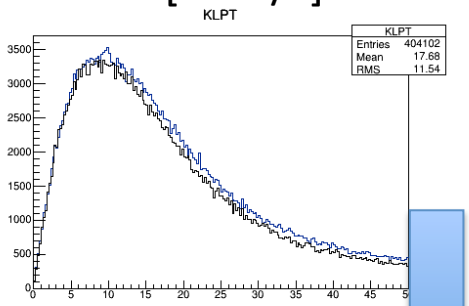



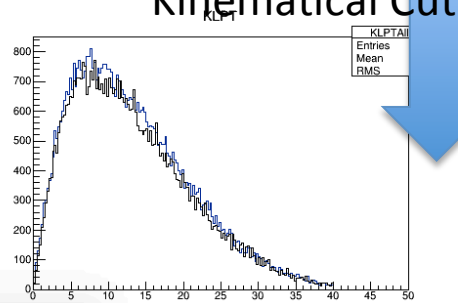

## KL Mass [MeV/$c^2$]




## KL Pt [MeV/c]

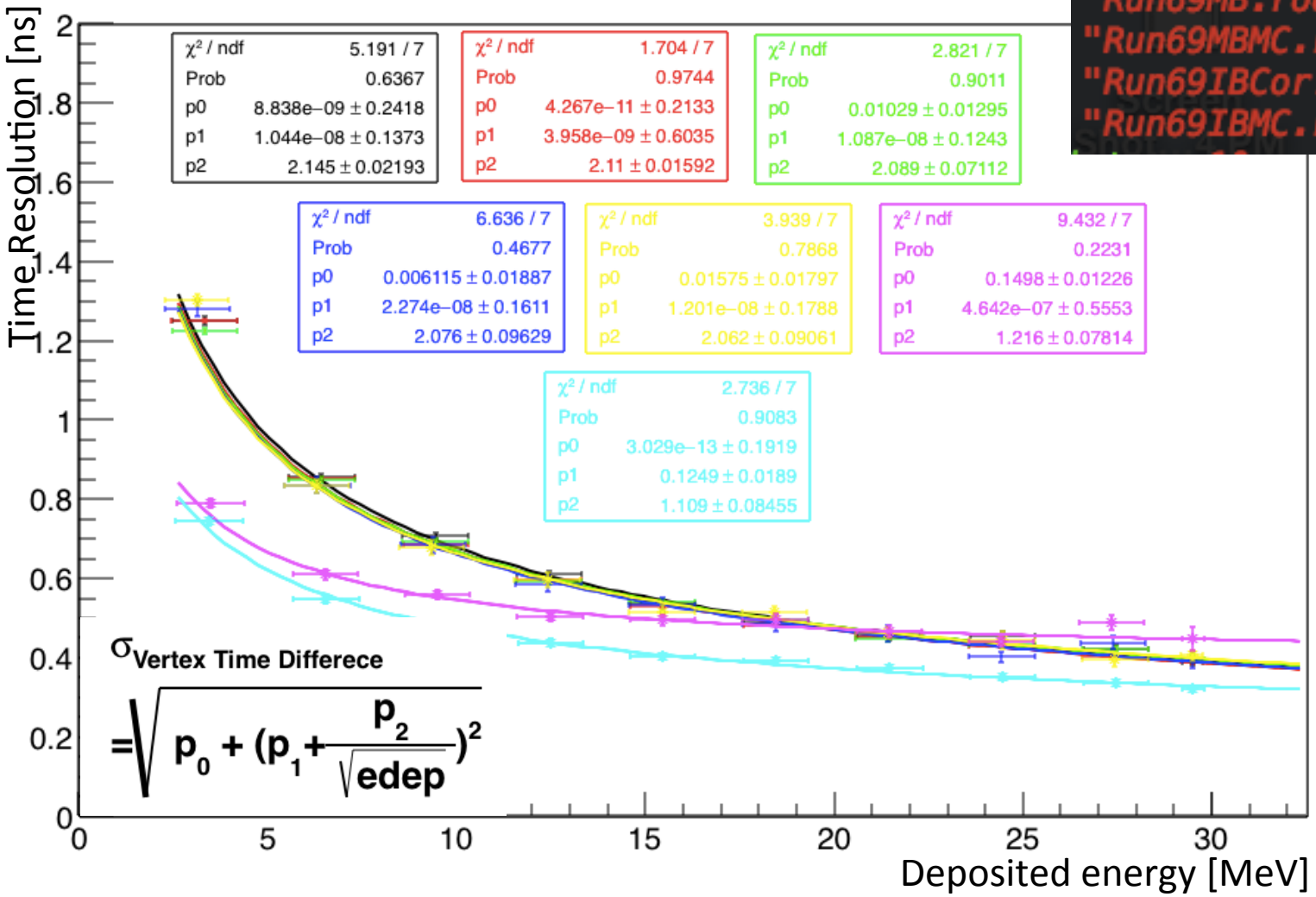



## Kinematical Cut

# Timing Resolution

```
"Run62MB.root",
"Run65MB.root",
"Run62MC.root",
"Run69MB.root",
"Run69MBMC.root",
"Run69IBCor.root",
"Run69IBMC.root"};
```

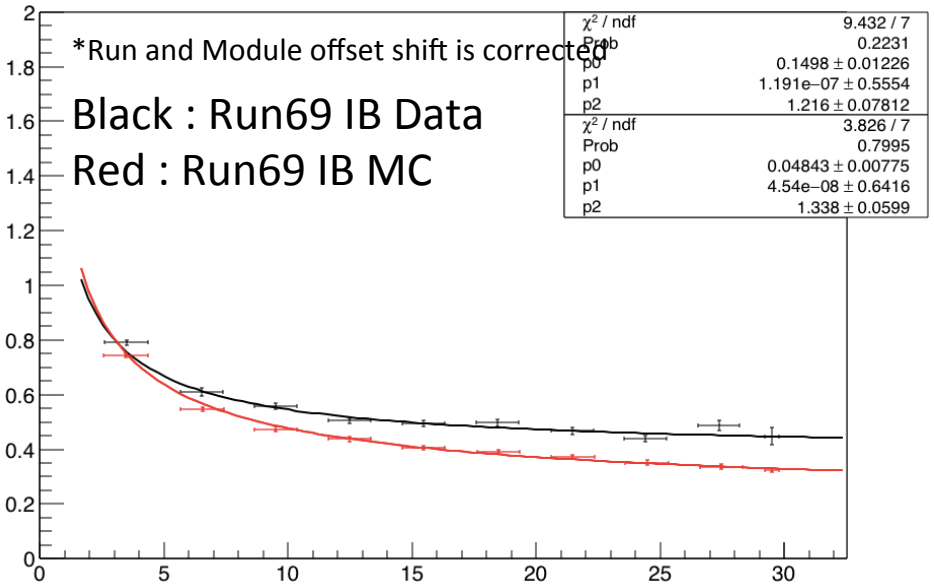



P0 : Factor from CsI

P1 : barrel resolution term independent of energy deposit

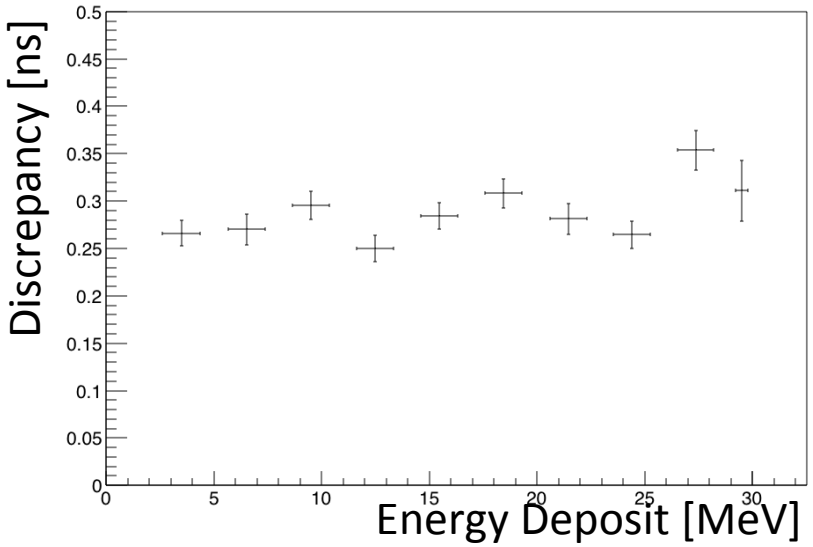
P2 : barrel resolution term dependent on energy deposit

# Discrepancy between M.C. and data




Assumption

$$\sigma_{Data} = \sqrt{\sigma^2_{MC} + \sigma^2_{Discrepancy}}$$




- Candidates of discrepancy(?)
  - Instability of 500MHz FADC