

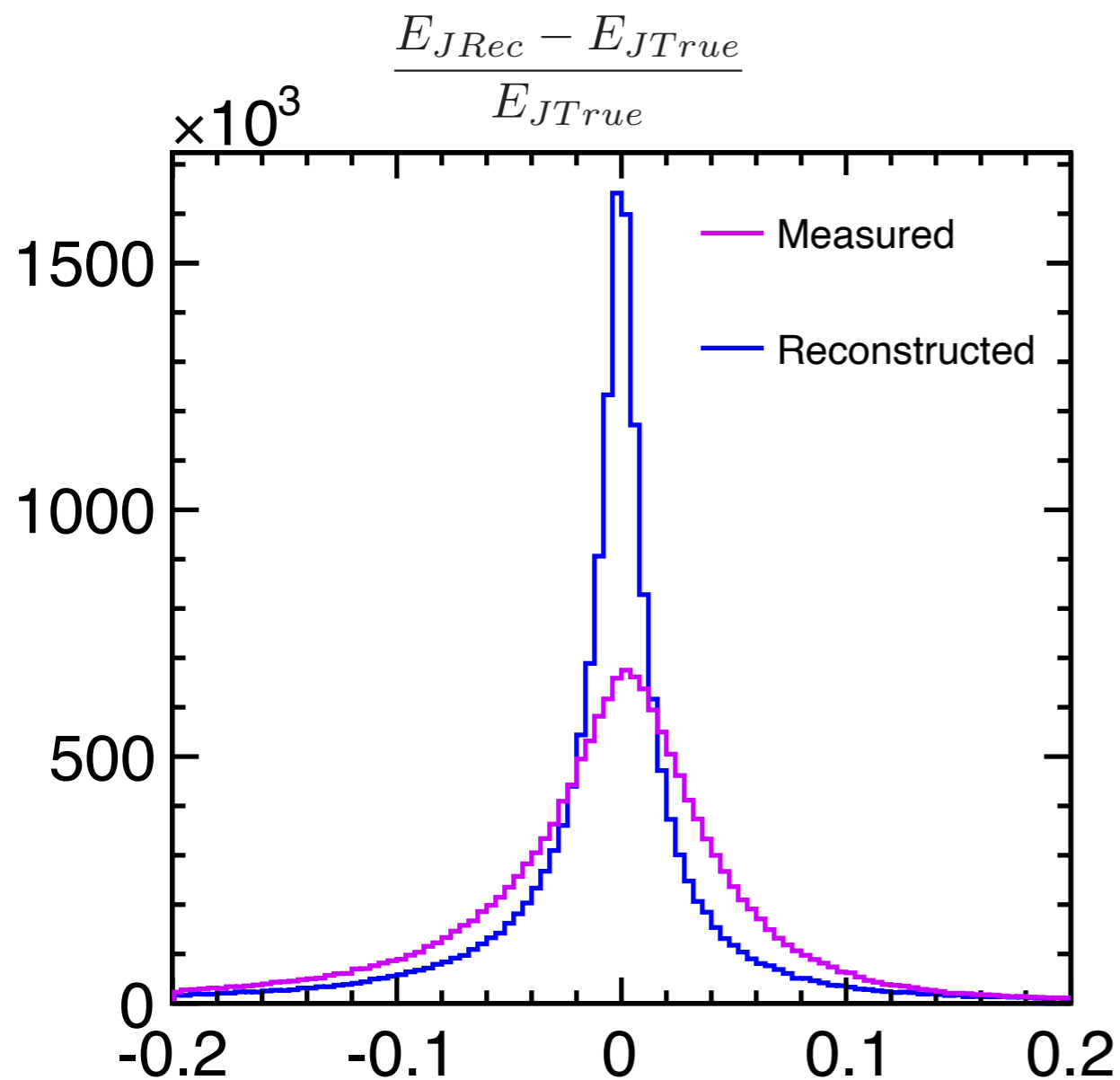
Jet energy calibration using $e^+e^- \rightarrow \gamma Z$ process at the ILC

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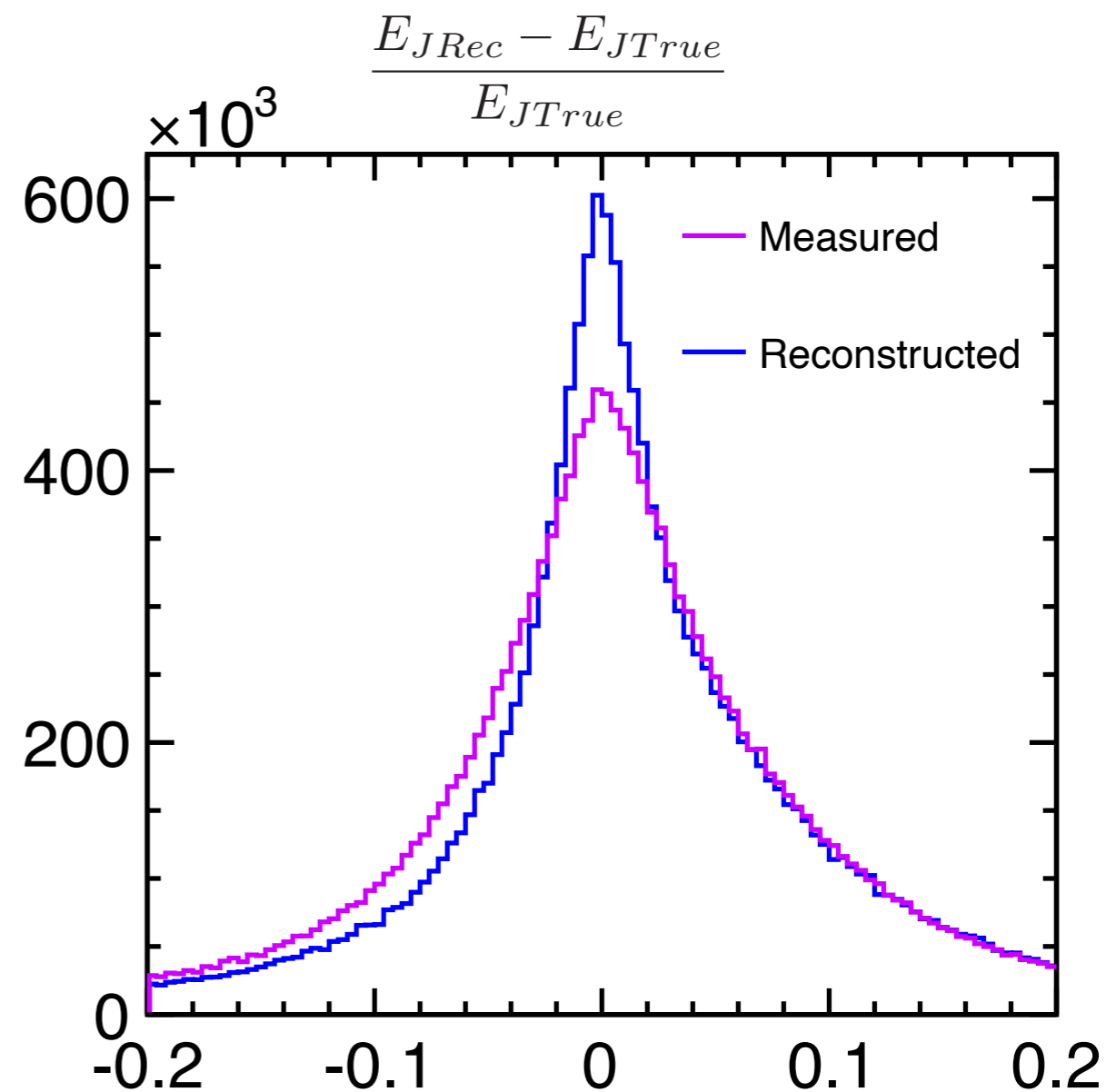


Jet Energy Reconstruction Result

Jet 1



Jet 2

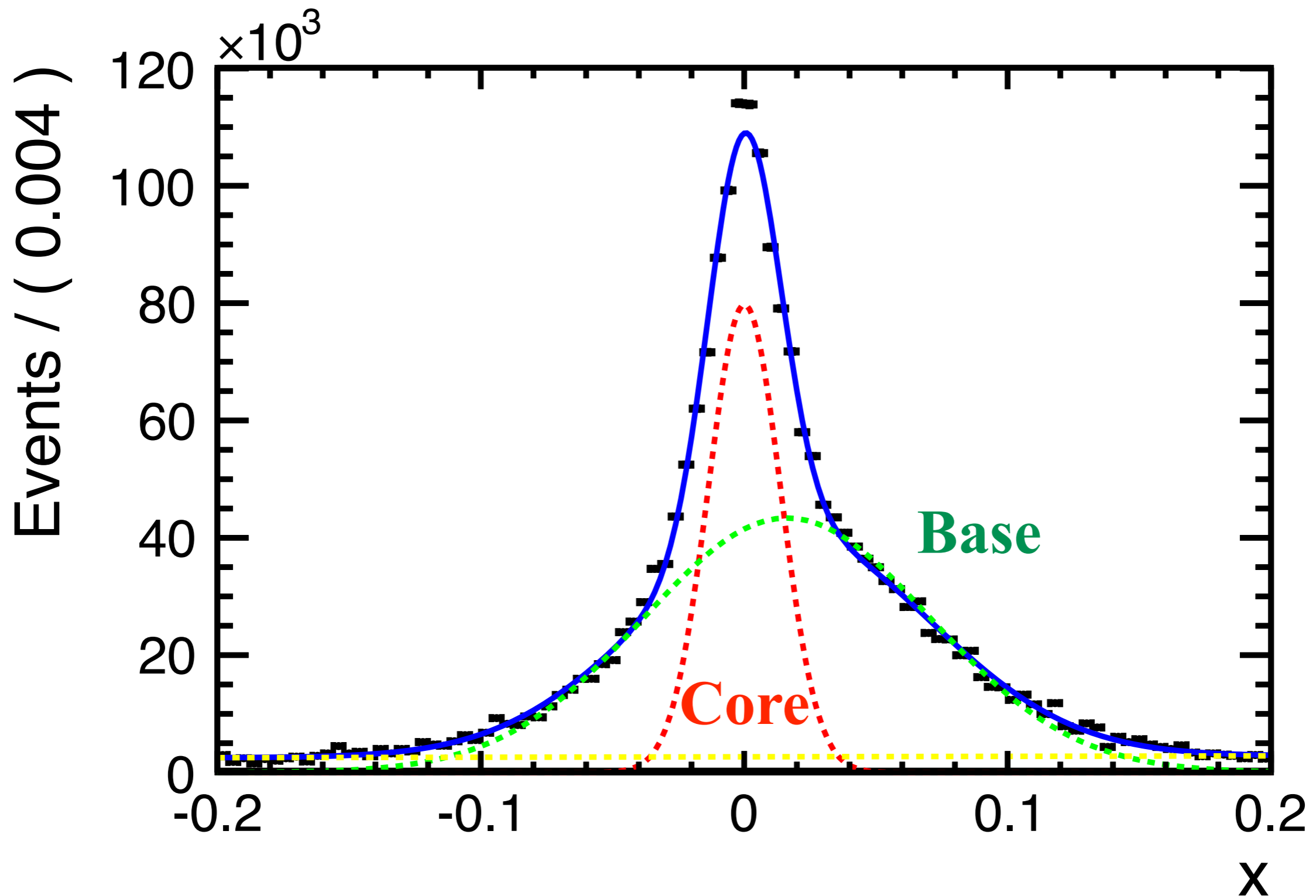


-> Check the **theta**, **energy**, and **flavor** dependence.

Fit the relative difference of reconstructed jet energy with

gaus+gaus+exponential

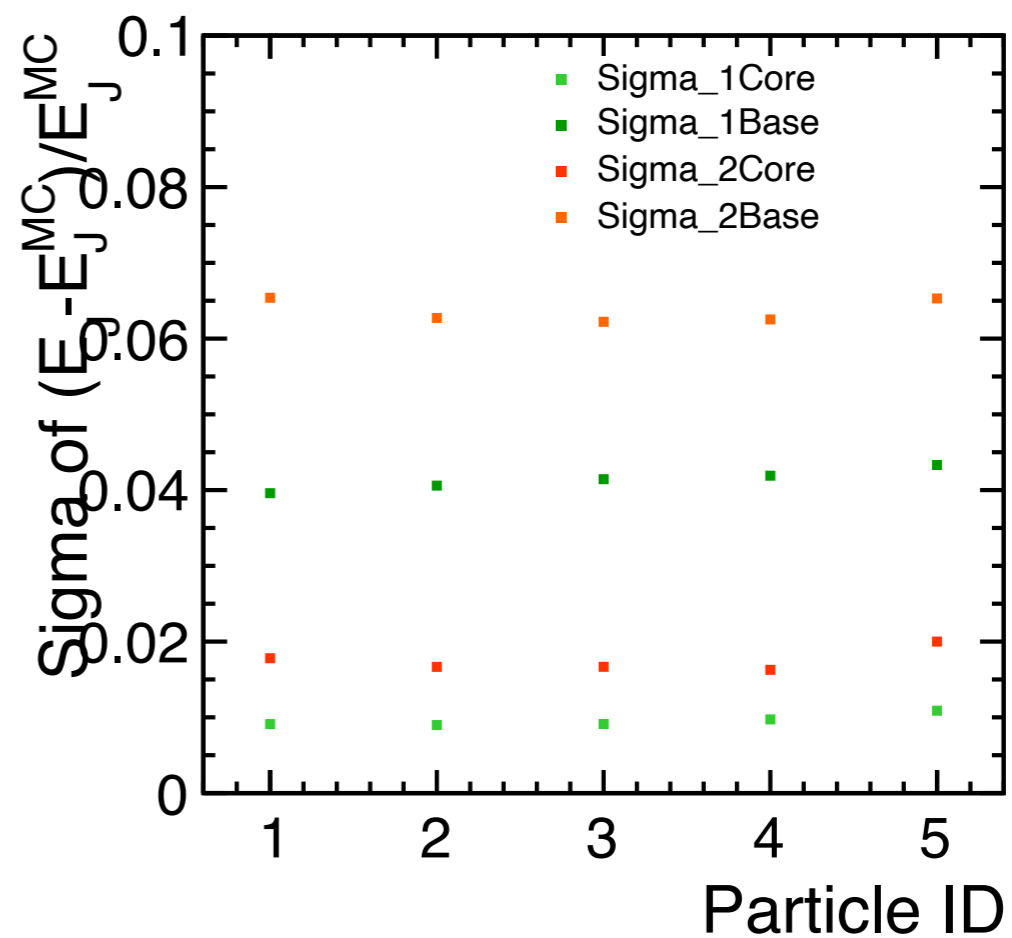
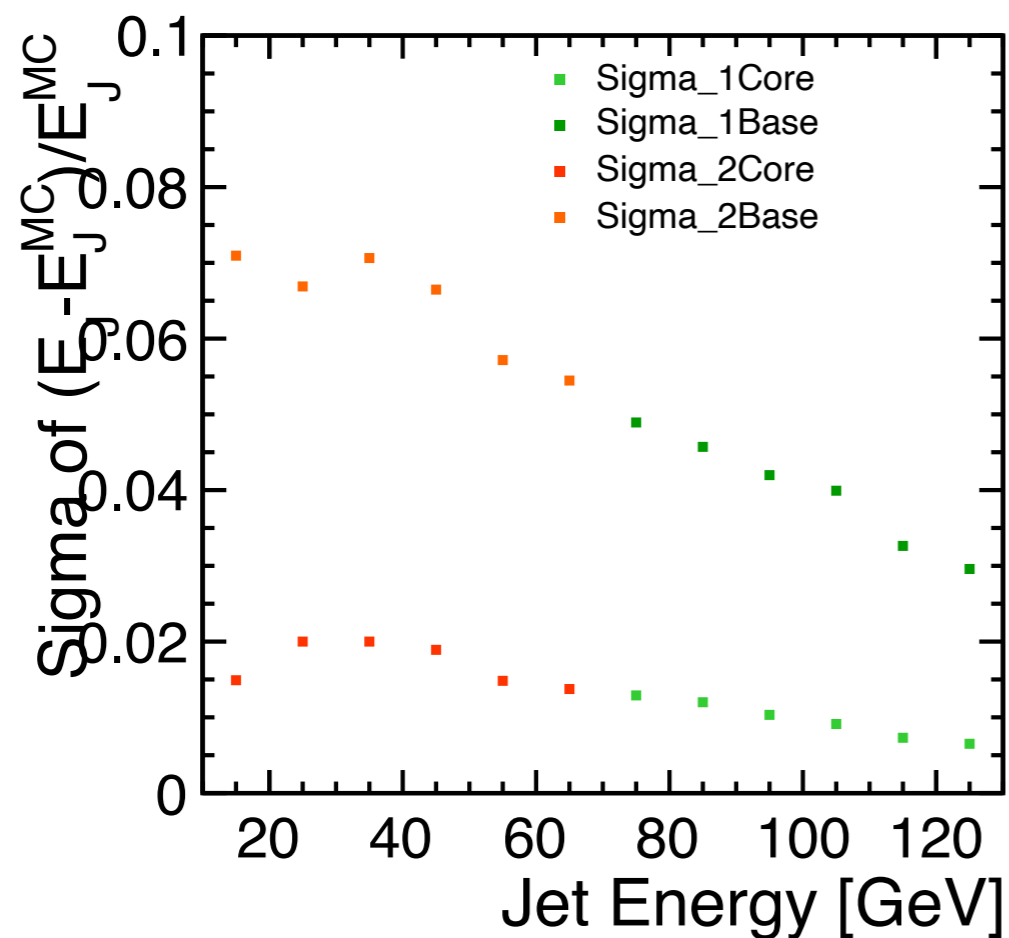
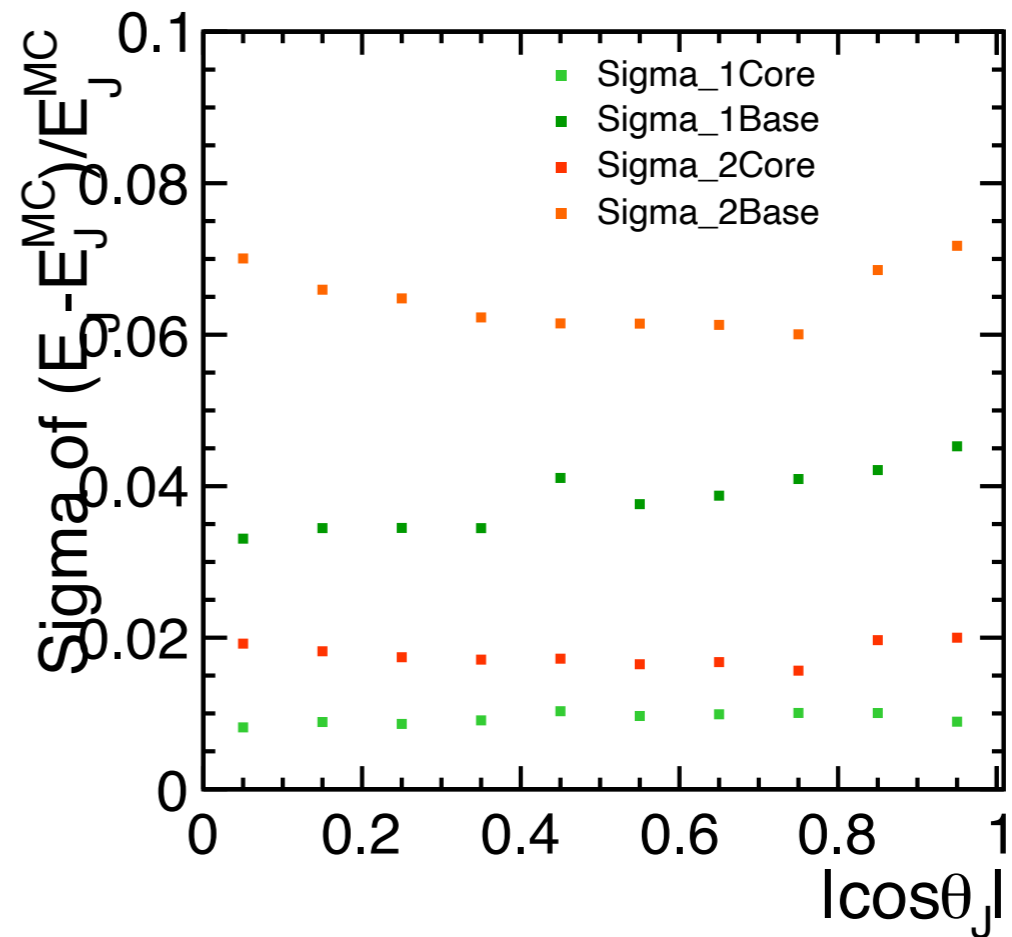
Gave up to set the Mean of the 2 Gaussians same.



Sigma Value

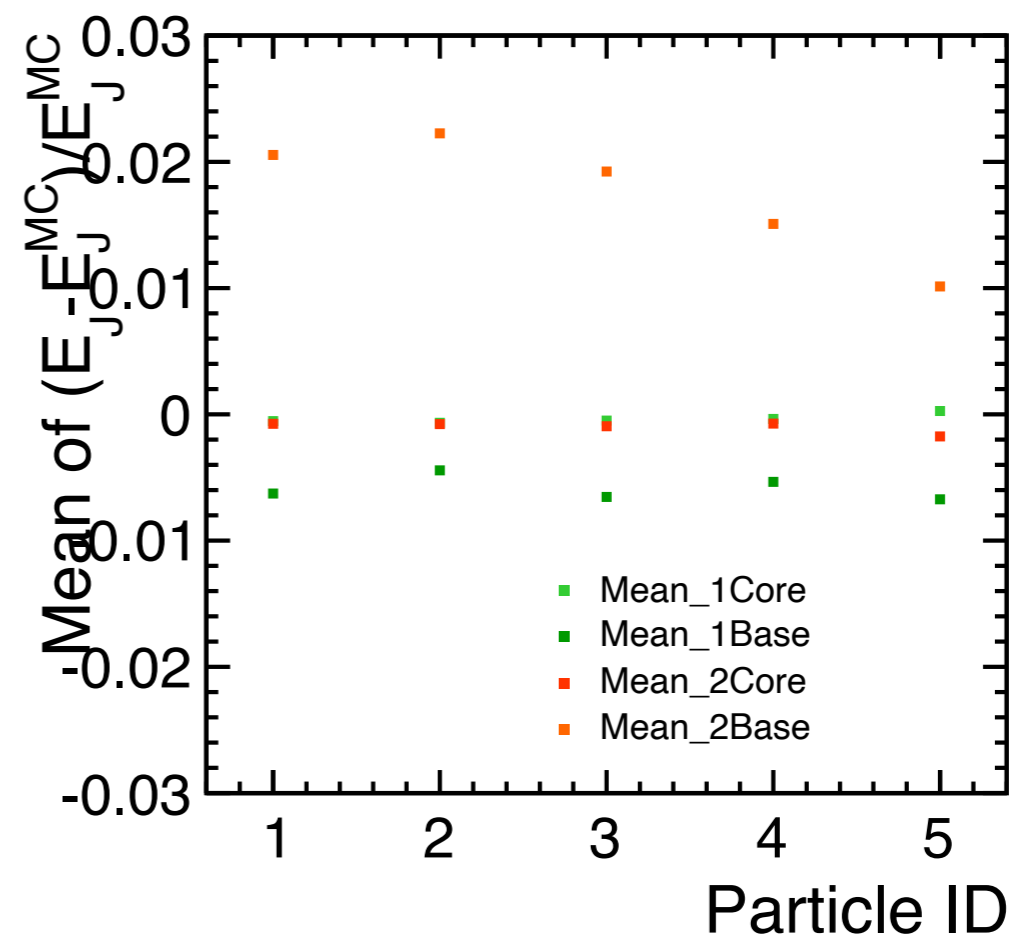
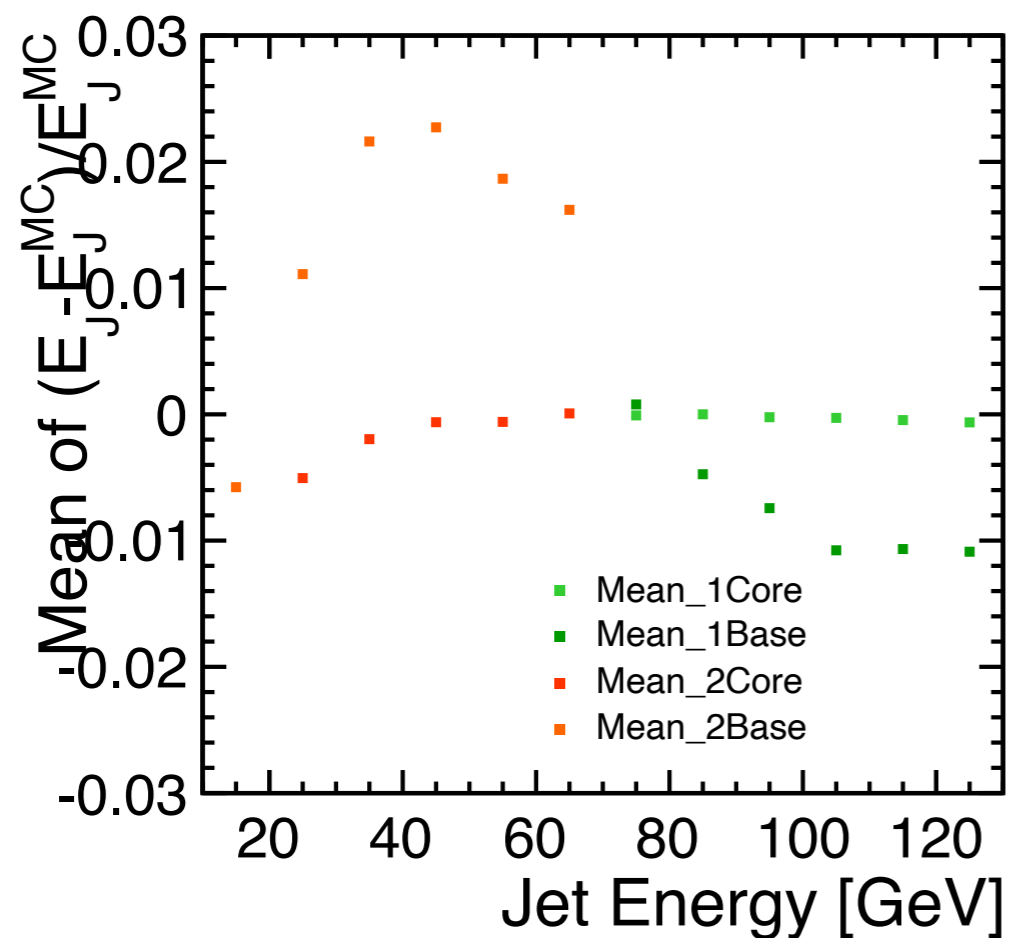
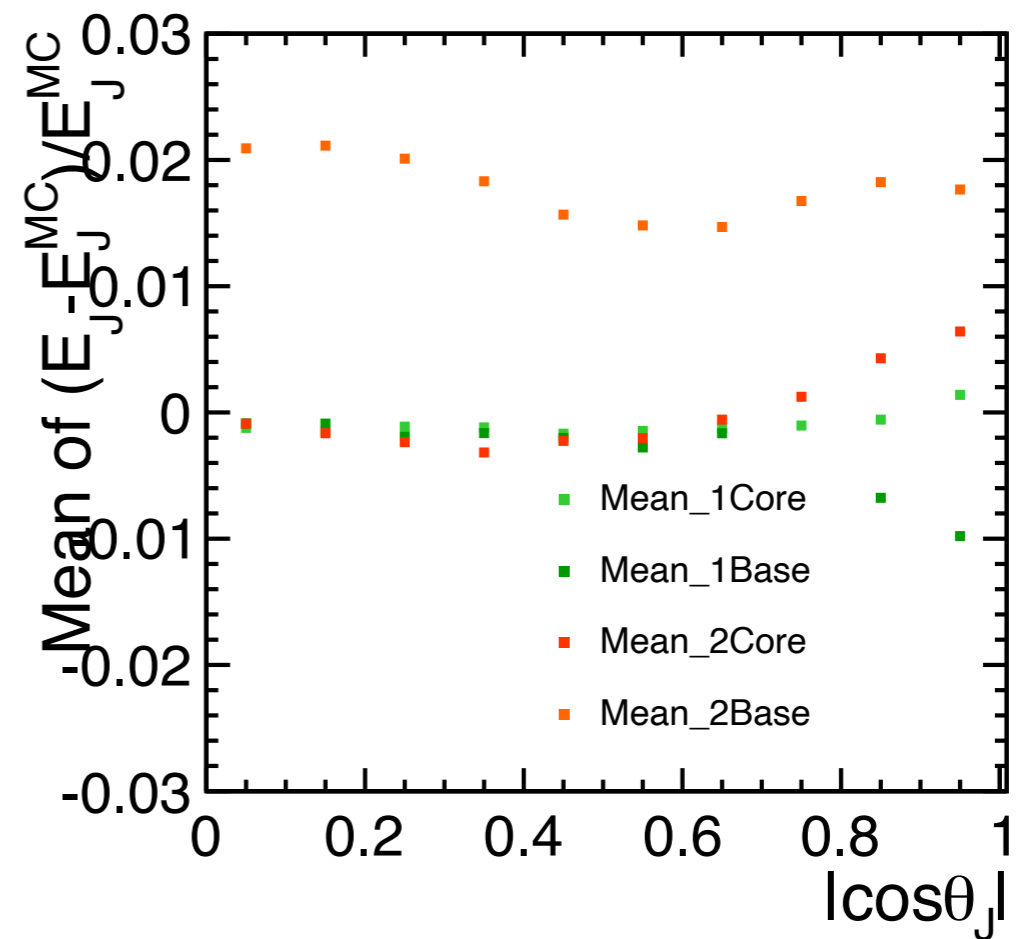
Particle ID := flavor of the seed of the jet

Dependent on energy



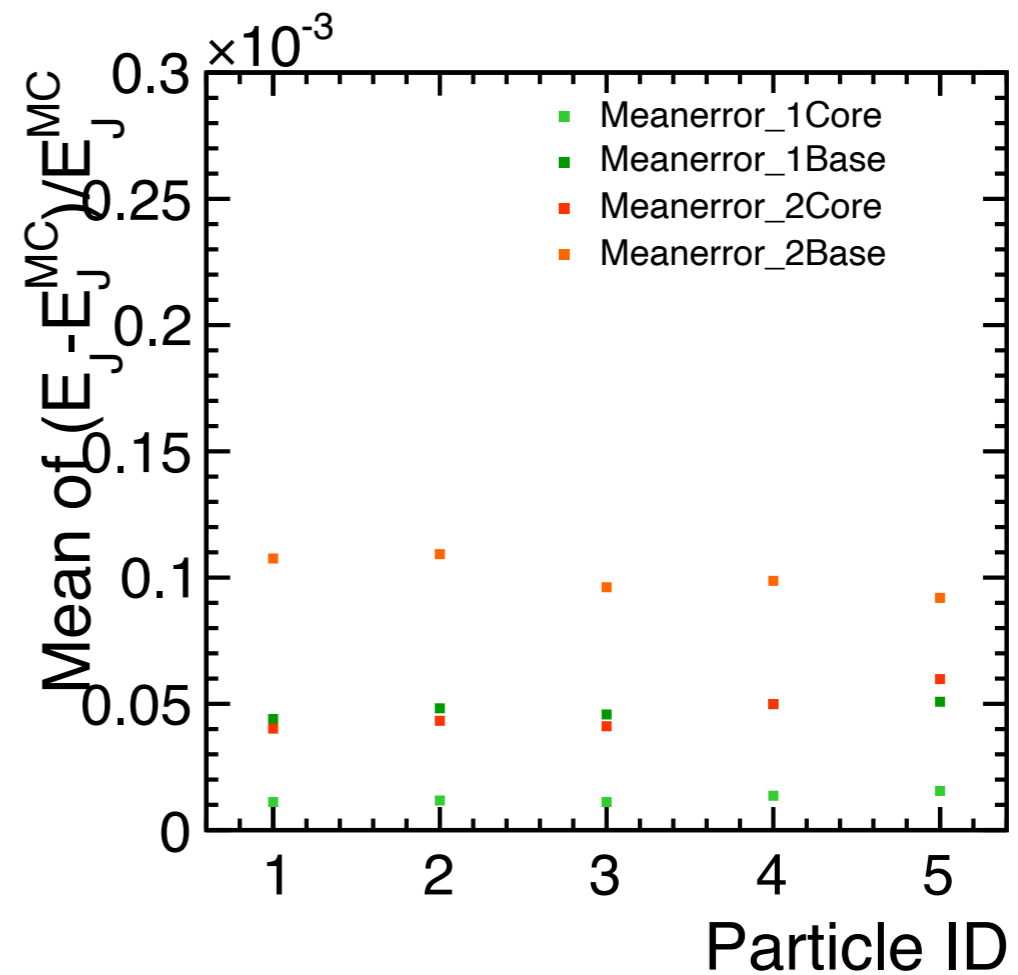
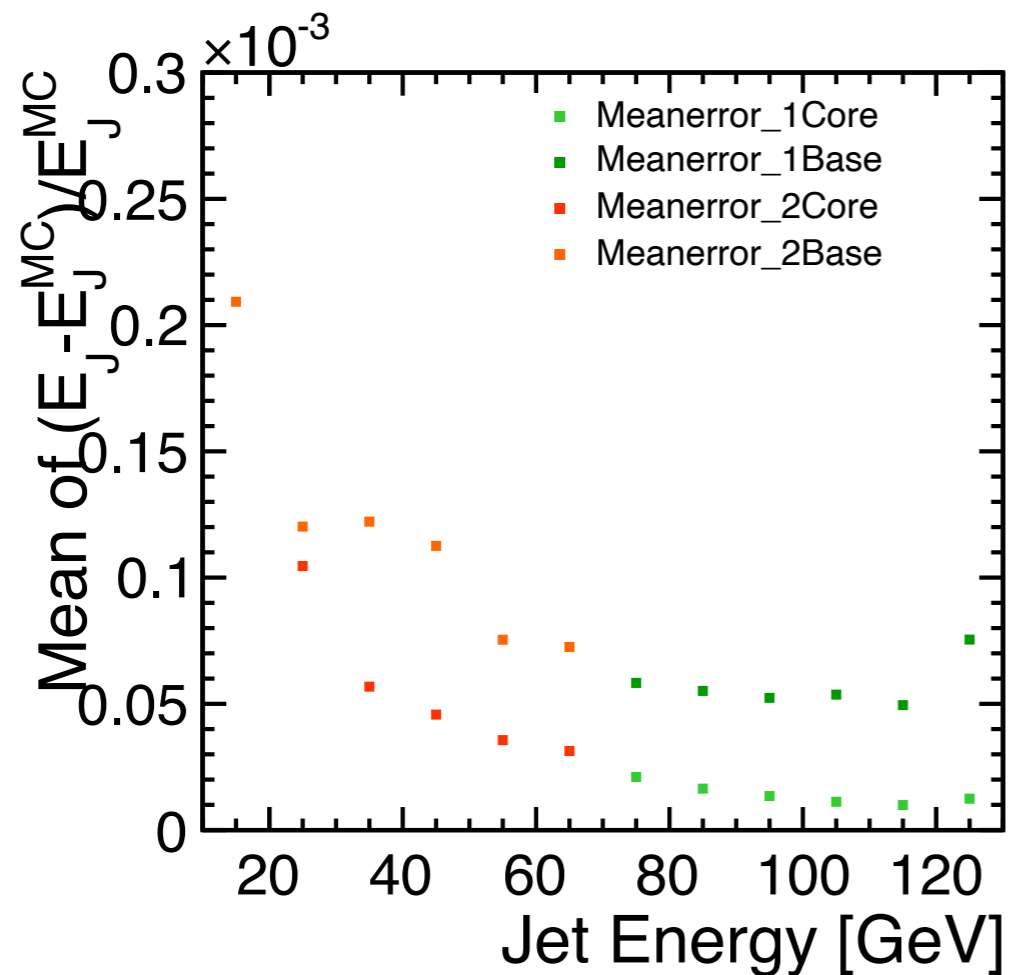
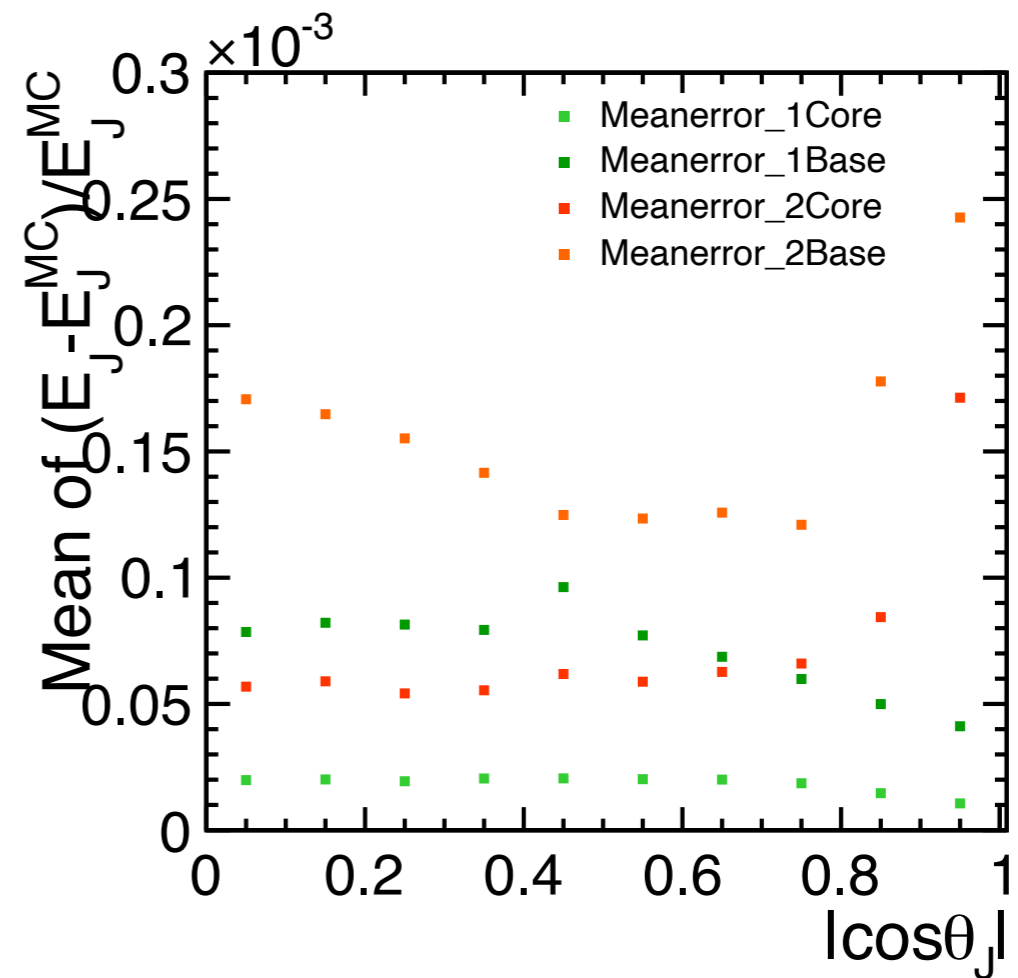
Mean Value

Dependent on theta, energy and flavor



Mean Error

Dependent on theta and energy



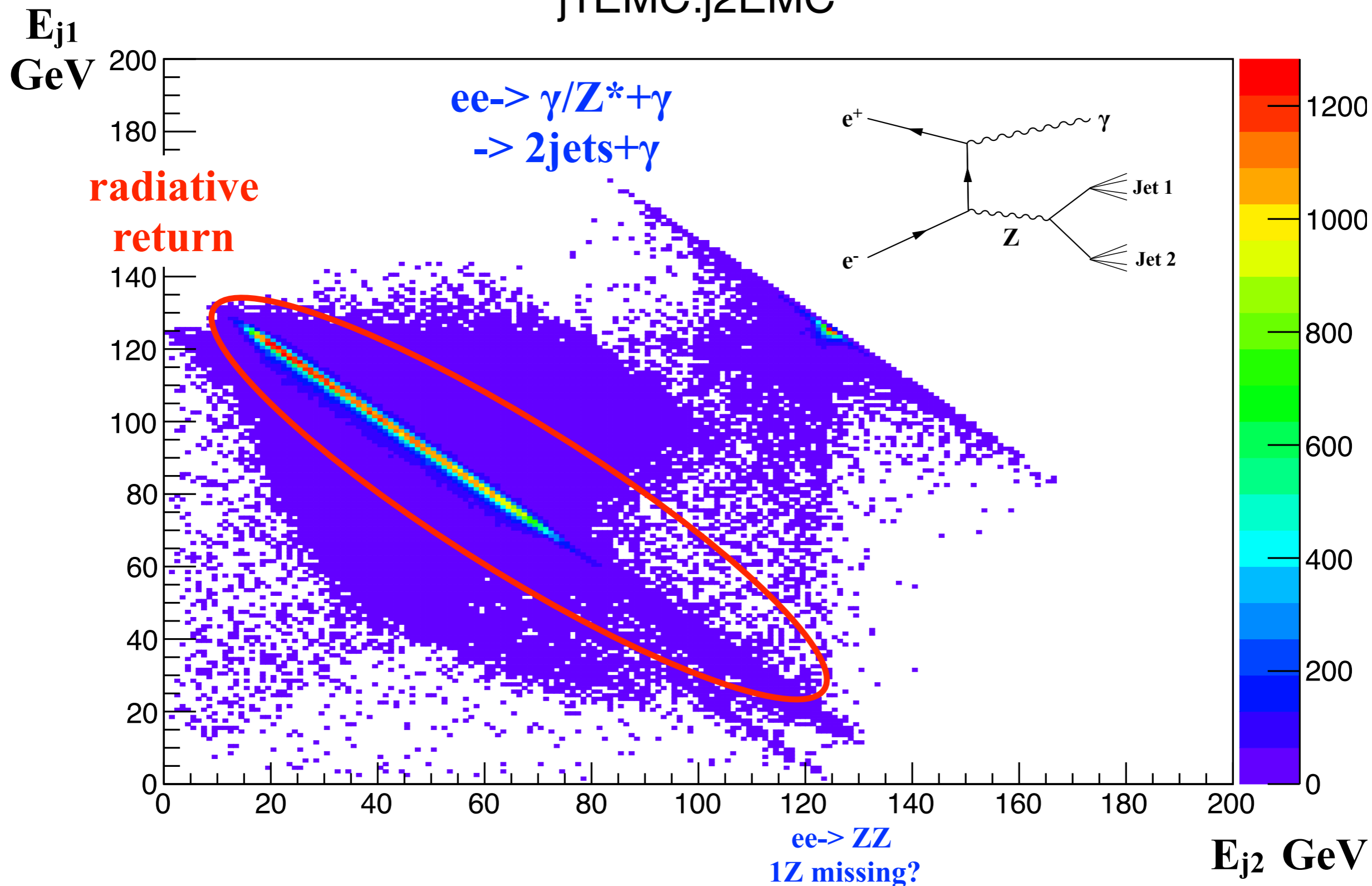
Next step

- Interpret and understand the meaning of today's result.
- Show the same plot using the PFO in the same way and estimate calibration uncertainty.

Backup

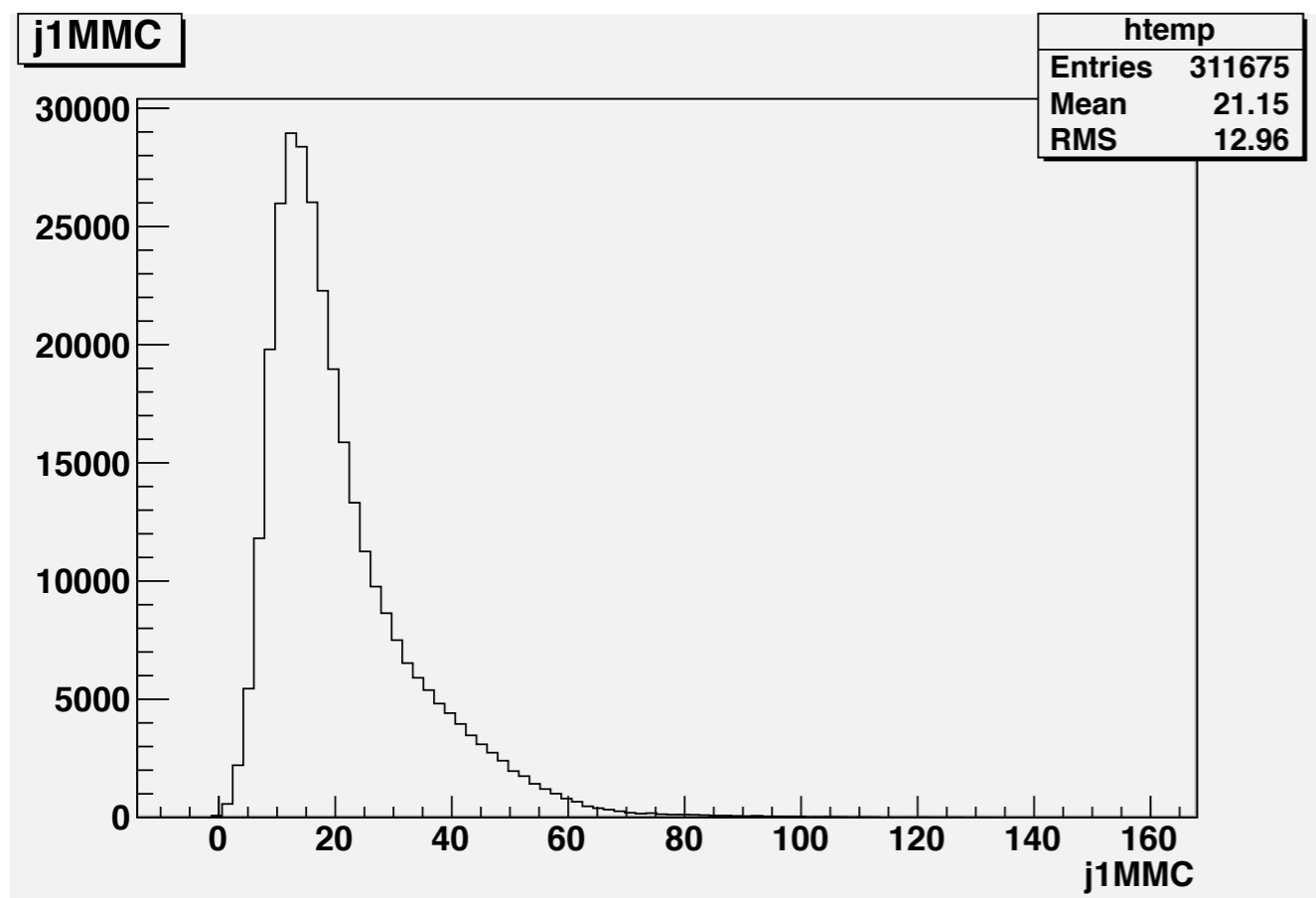
Jet energy distribution

j1EMC:j2EMC



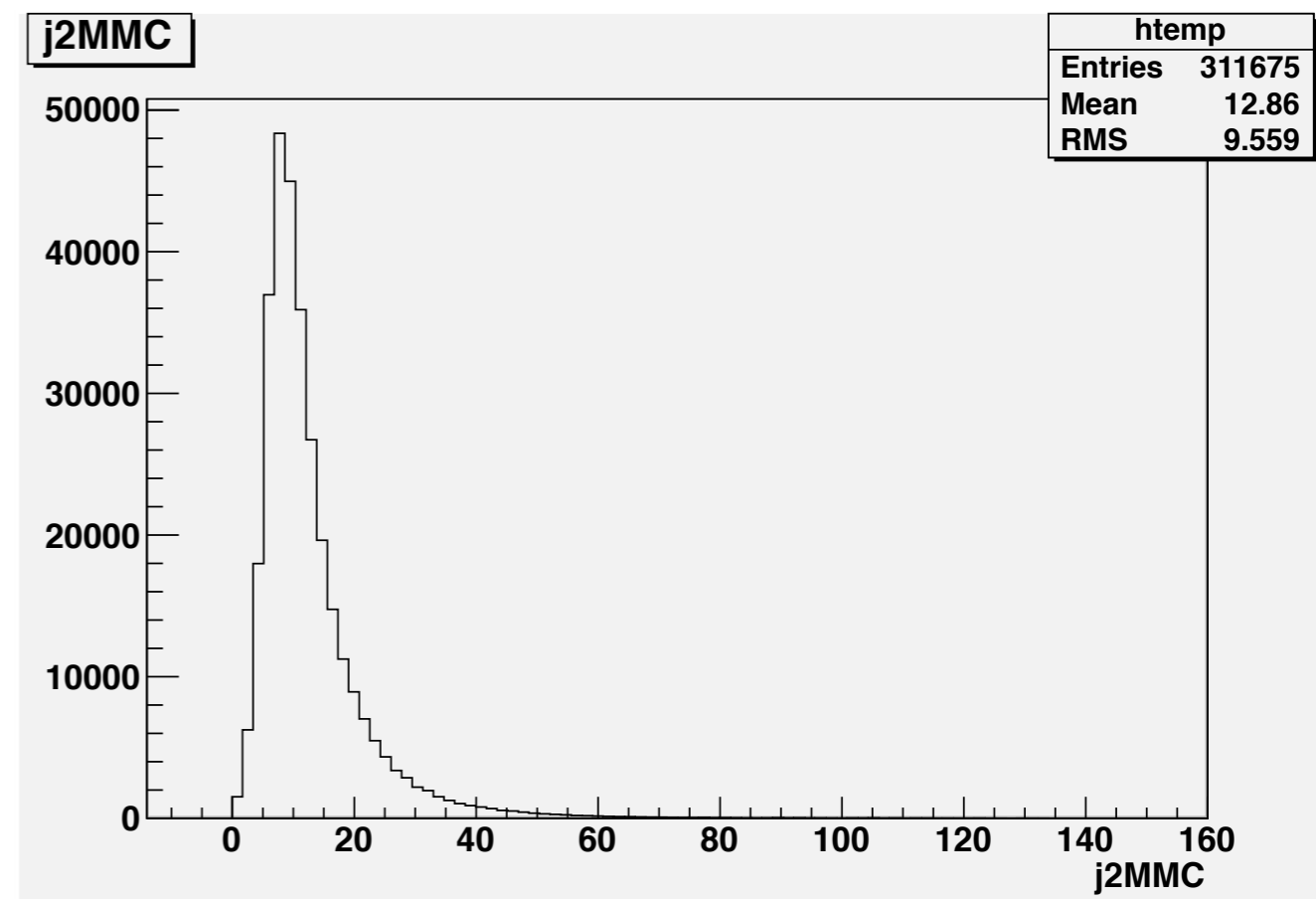
Jet mass distribution

Jet1



M_{Jet1} GeV

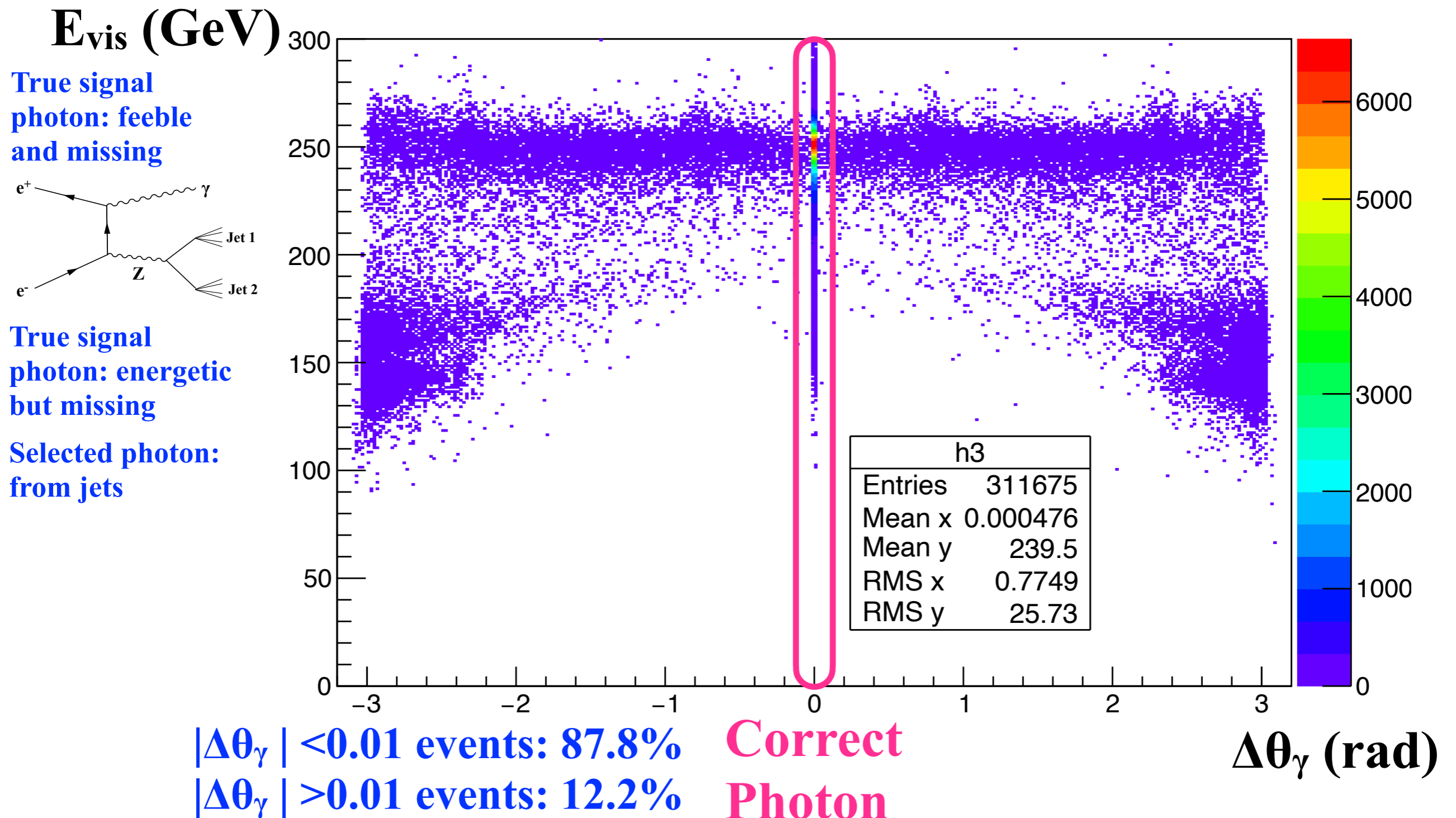
Jet2



M_{Jet2} GeV

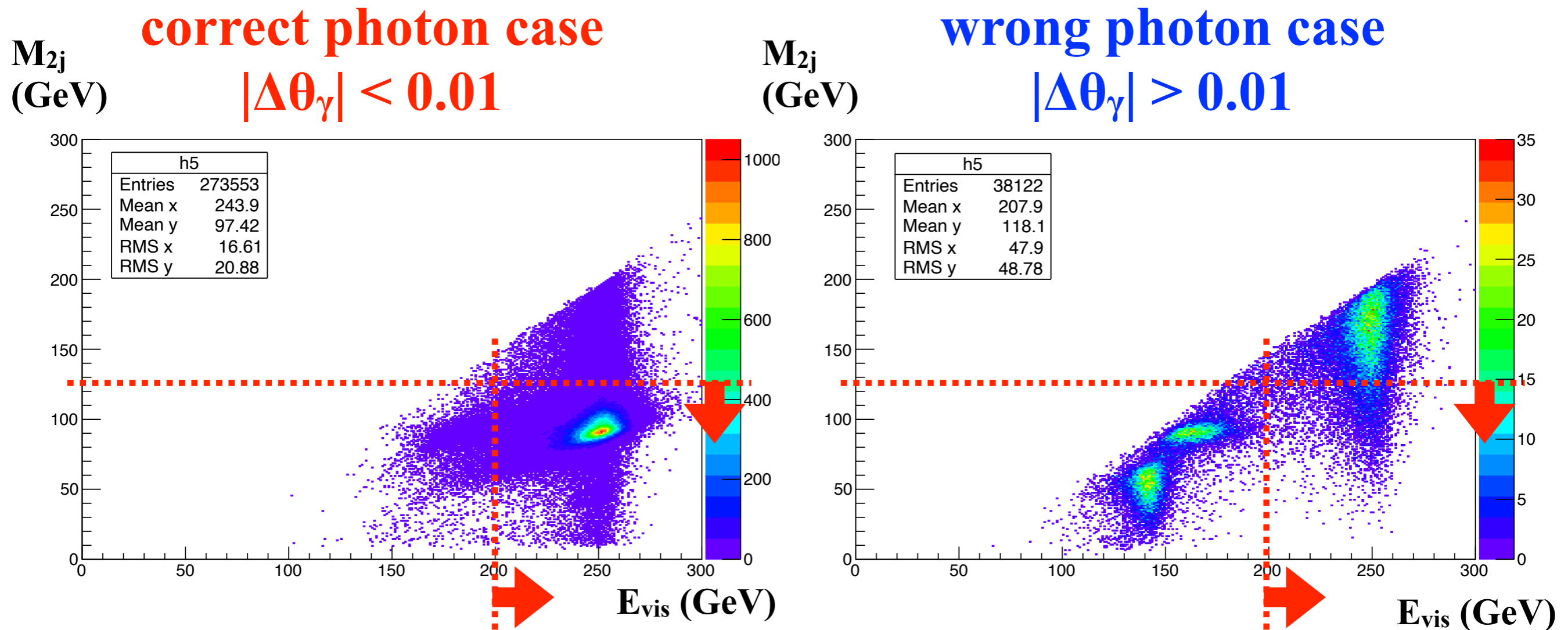
Correct photon selection

$E_{\text{vis}} (=E_{j1}+E_{j2}+E_{\gamma})$ vs. $\Delta\theta_{\gamma} = \theta_{\gamma}(\text{meas}) - \theta_{\gamma}(\text{MC})$



Correct photon selection cut 1

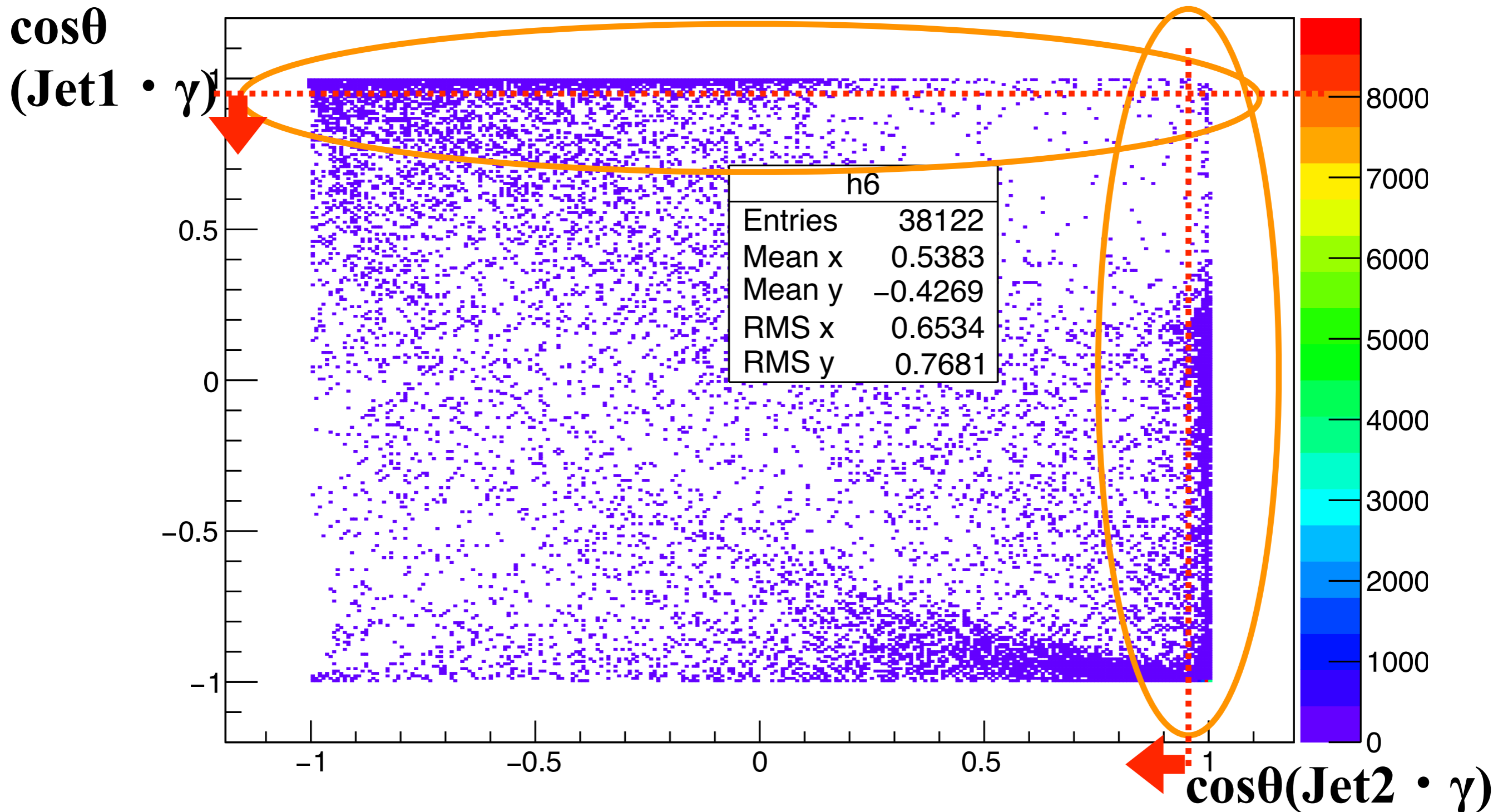
M_{2j} vs. E_{vis} ($=E_{j1}+E_{j2}+E_{\gamma}$)



Cut1: $M_{2j} < 125$ GeV && $E_{vis} > 200$ GeV

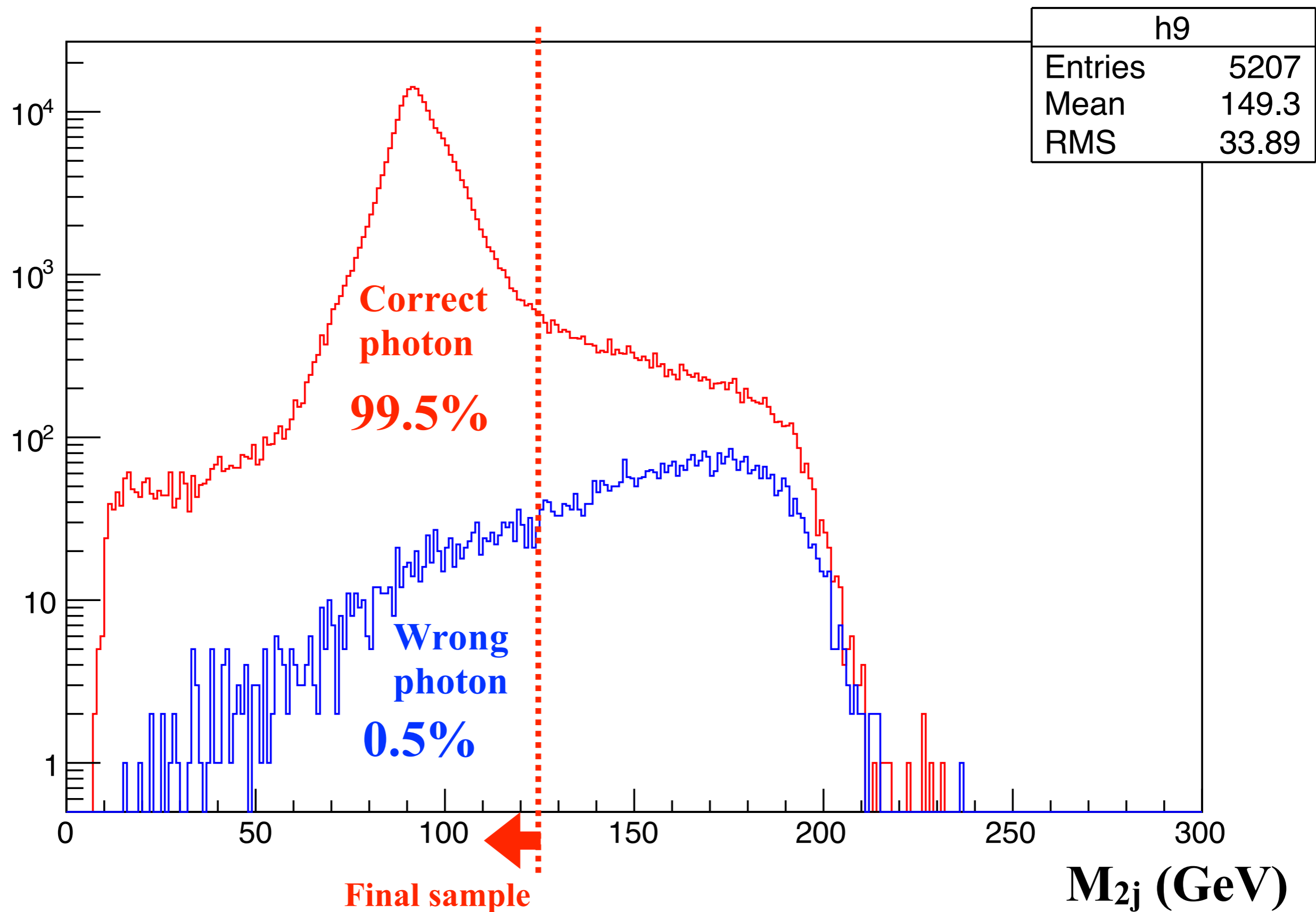
Correct photon selection cut 2

Wrong photons are near jet axes



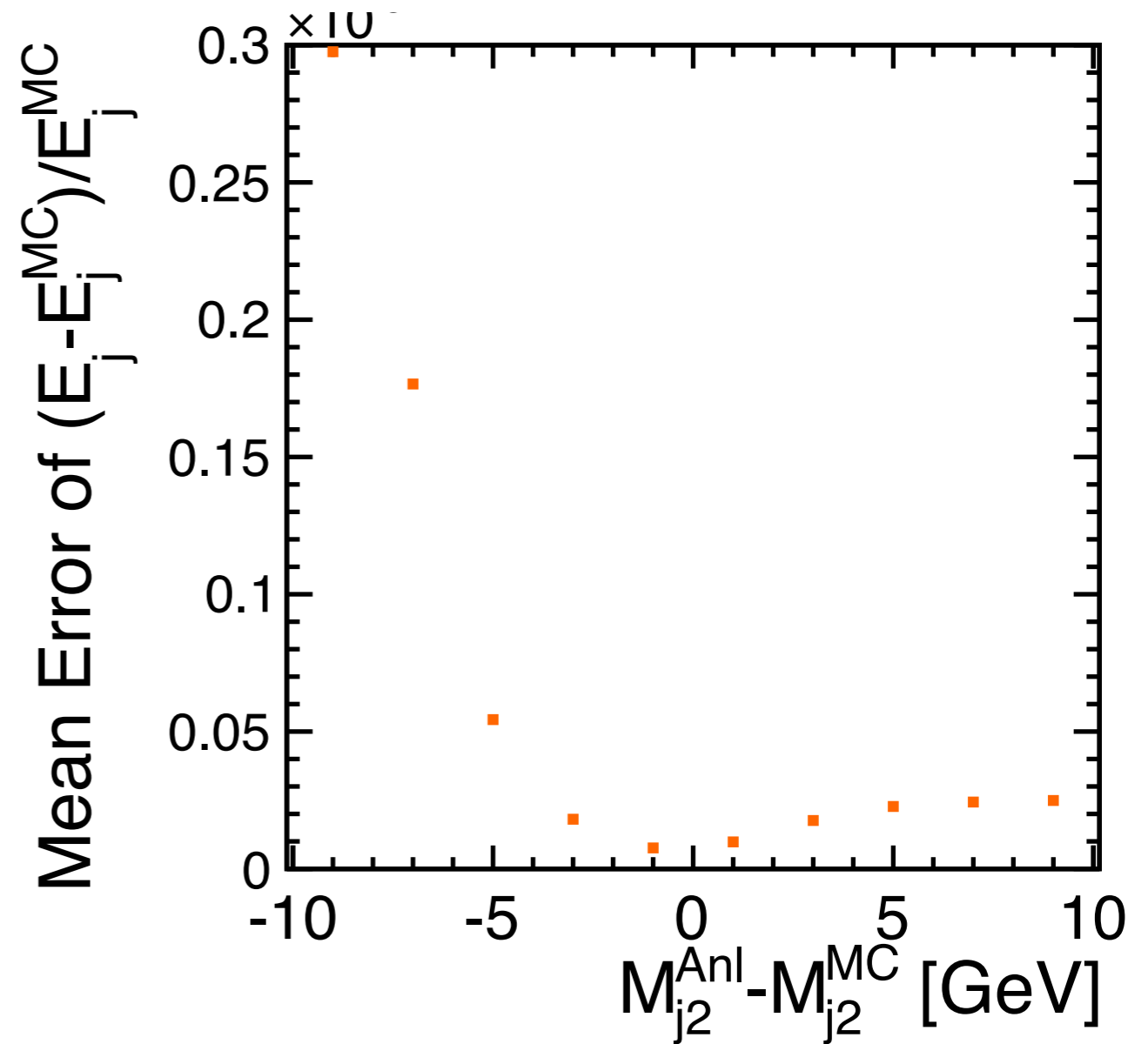
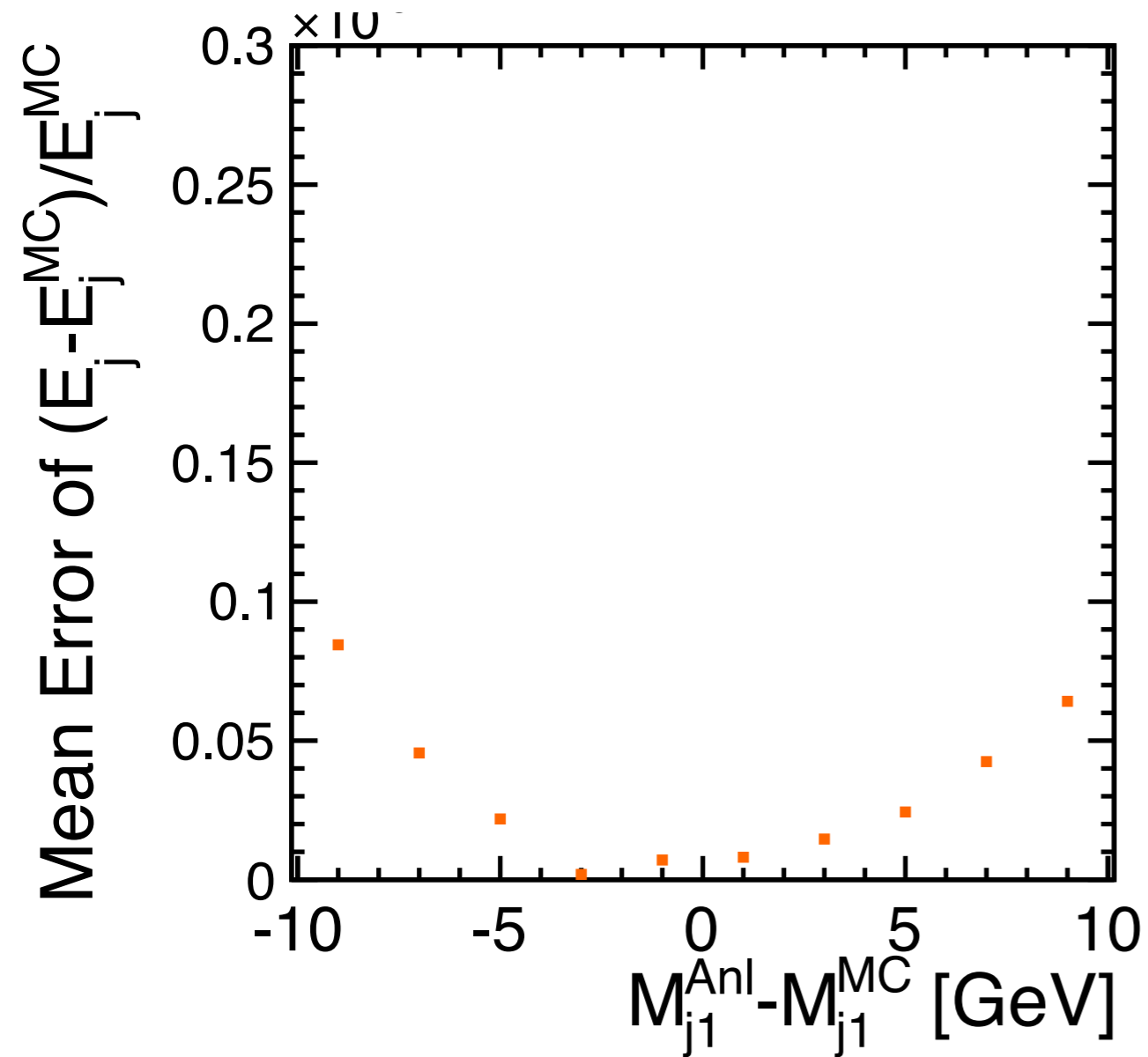
Cut2: $\cos\theta(\text{Jet1} \cdot \gamma) < 0.95$ && $\cos\theta(\text{Jet2} \cdot \gamma) < 0.95$

M_{2j} distribution after all but M_{2j} cut



Source (B): Error of the jet mass inputs¹⁵

Mean value of the fitting function for the Jet 1 $\frac{E_{JRec} - E_{JTrue}}{E_{JTrue}}$
as a function of the input jet mass deviation



Large dependence on both jet 1 mass and jet 2 mass inputs.

If $< 8 \times 10^{-4}$ accuracy is necessary, compensation to the reconstructed jet energy should be introduced.