Status on e^+e^- -> γZ process
Jet Energy Calibration

Takahiro Mizuno

Recent Progress

Jet energy calibration using 250 GeV DBD sample

1 Consideration of cut to exclude the wrong photon choice events

2 Checking relative difference of reconstructed jet energy dependence on jet theta and energy

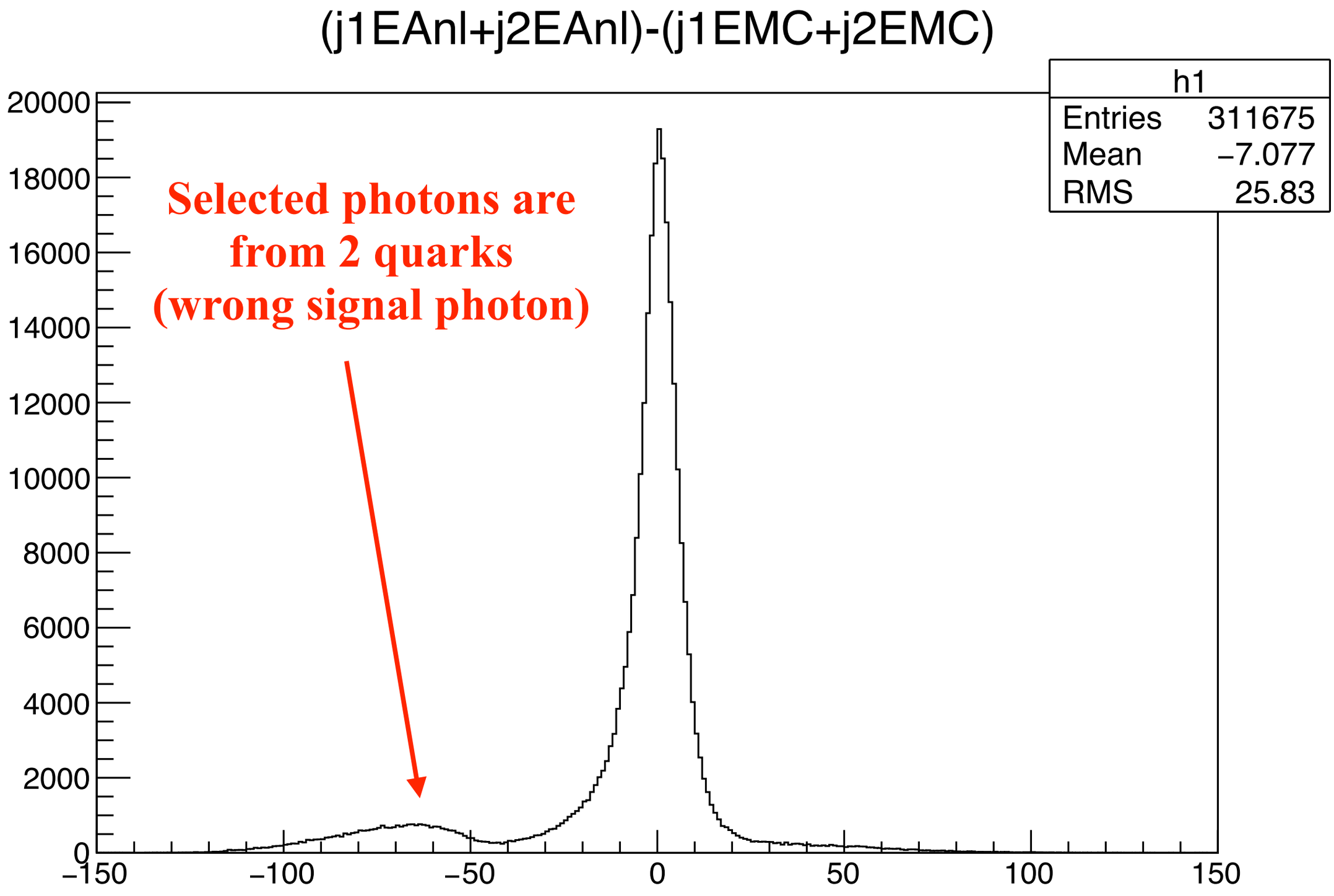
1. Realistic cut

Consideration of cut to exclude the wrong photon choice events

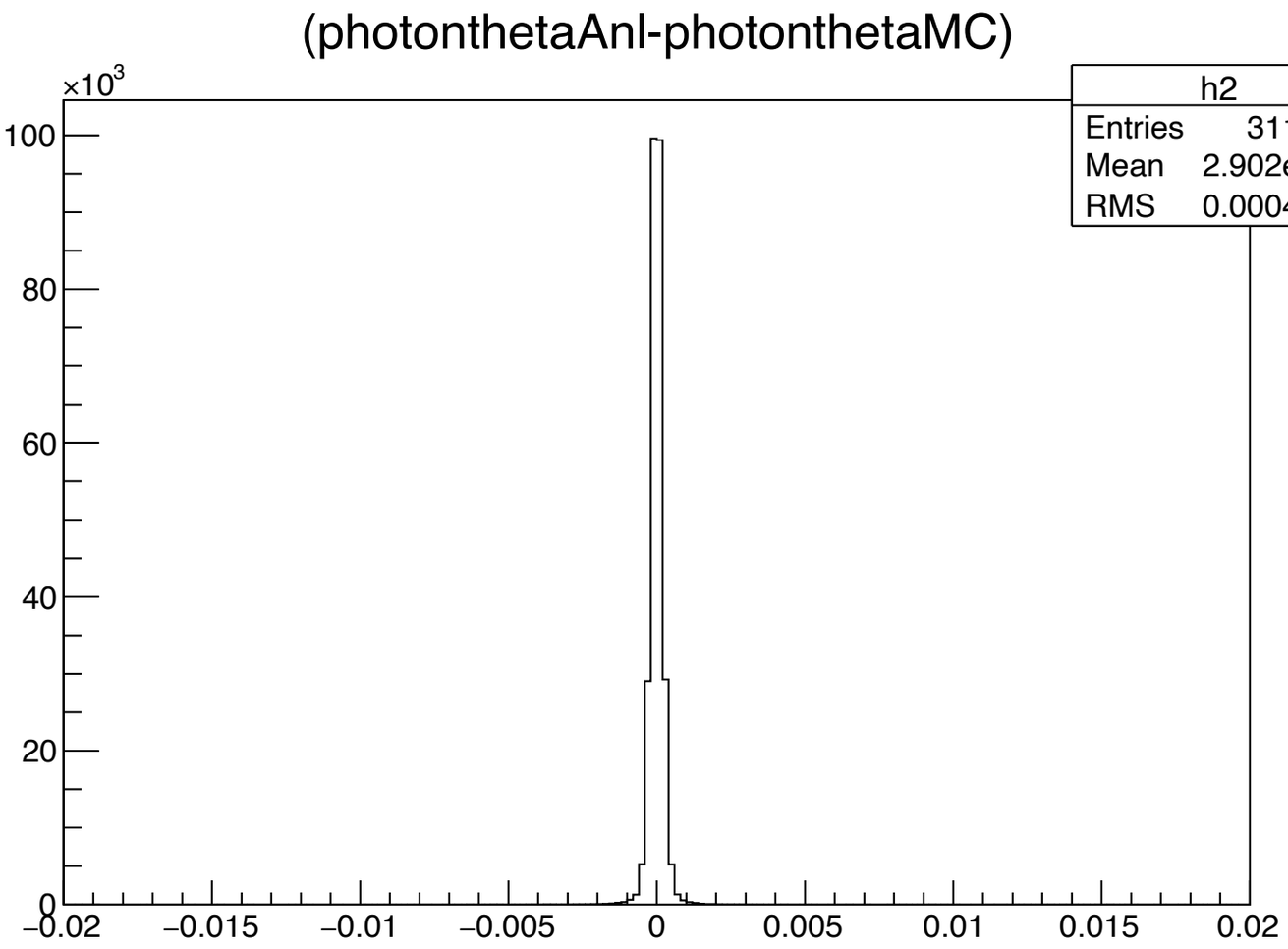
Full simulation to reconstruct the jet energies
-> Comparison between reconstructed and MCTruth information for the jets is checked.
-> It turned out that signal photon selection is failed in (38122 events) / 311675.

We need to consider the cut to exclude the wrong photon choice events
Not noly "MCcut" but also "Realistic cut"

1. Difference of the jet energy sum



1. Difference of the jet energy sum



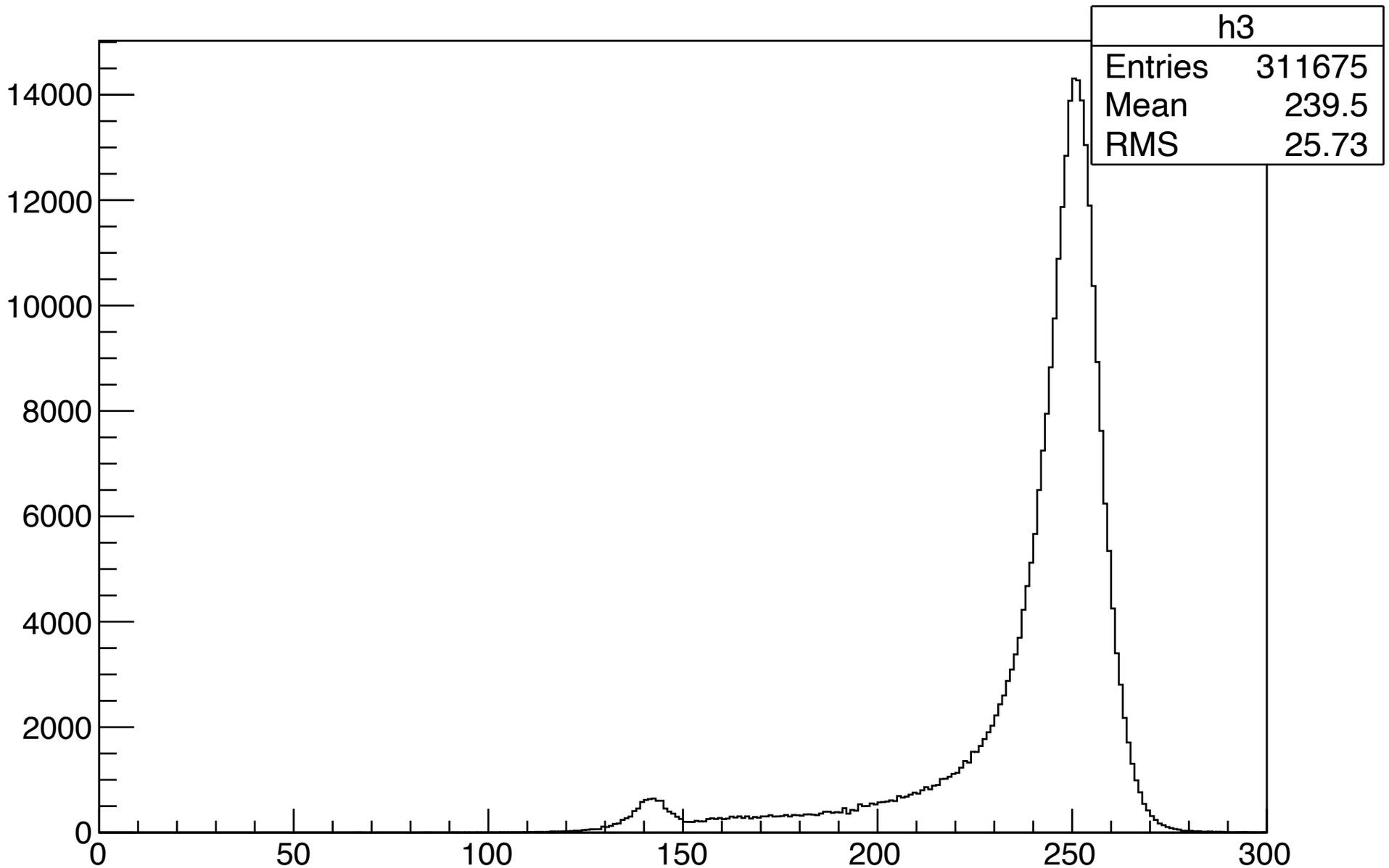
MCcut
“|θγPFO-θγMC| <0.01”
is applied for now.

“|θγPFO-θγMC| <0.01” events: 273553/311675 (87.8%)
“|θγPFO-θγMC| >0.01” events: 38122/311675 (12.2%)

What about the “Realistic cut”?

1. Realistic cut

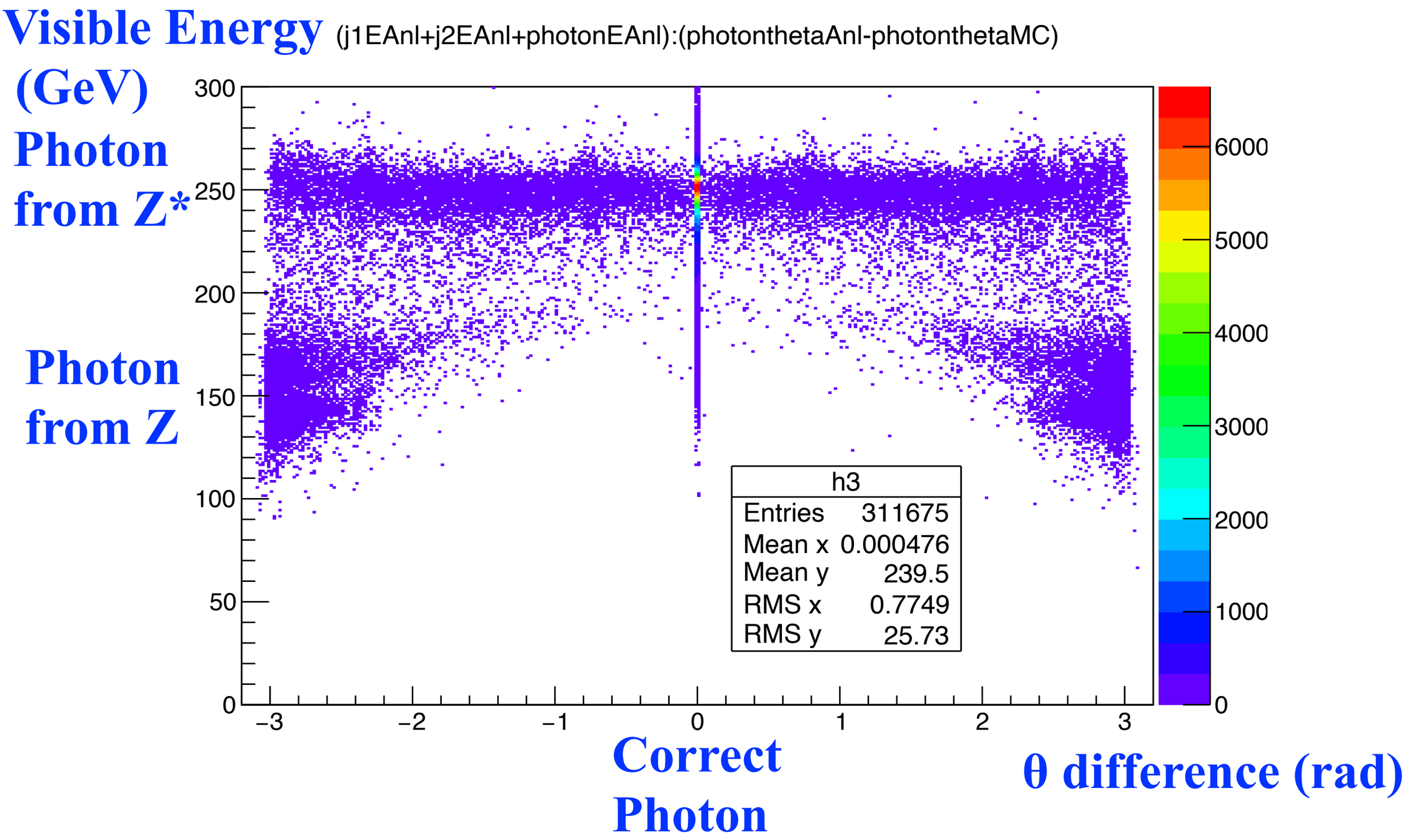
Distribution of "Visible Energy (=Ej1+Ej2+Eγ)"



Wrong photon events = Peak below Evis < 200?

1. Realistic cut

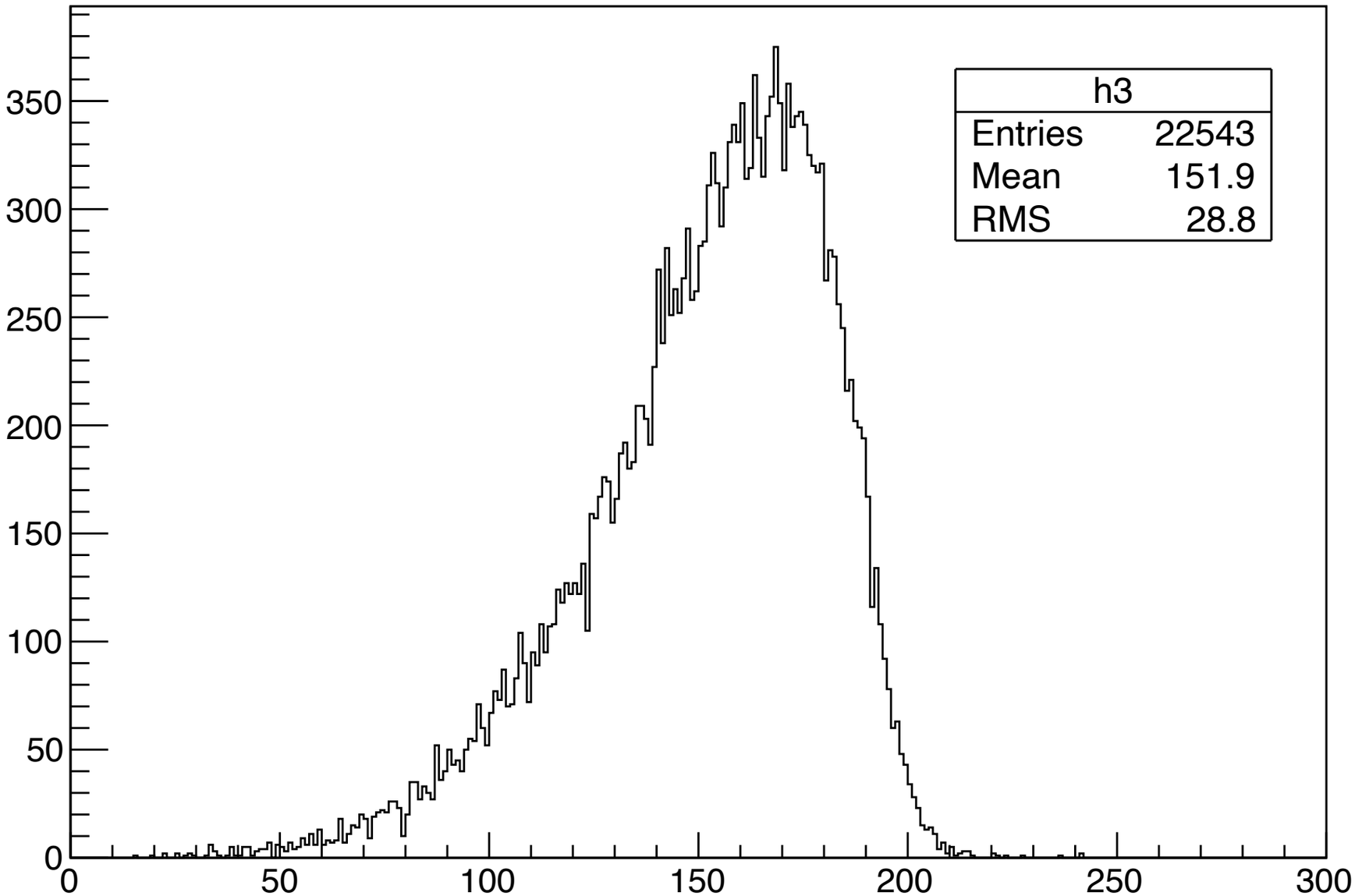
Visible Energy (=Ej1+Ej2+Eγ) vs. θ difference



1. Realistic cut

Mz (GeV)

“Visible Energy>200 && wrong photon”



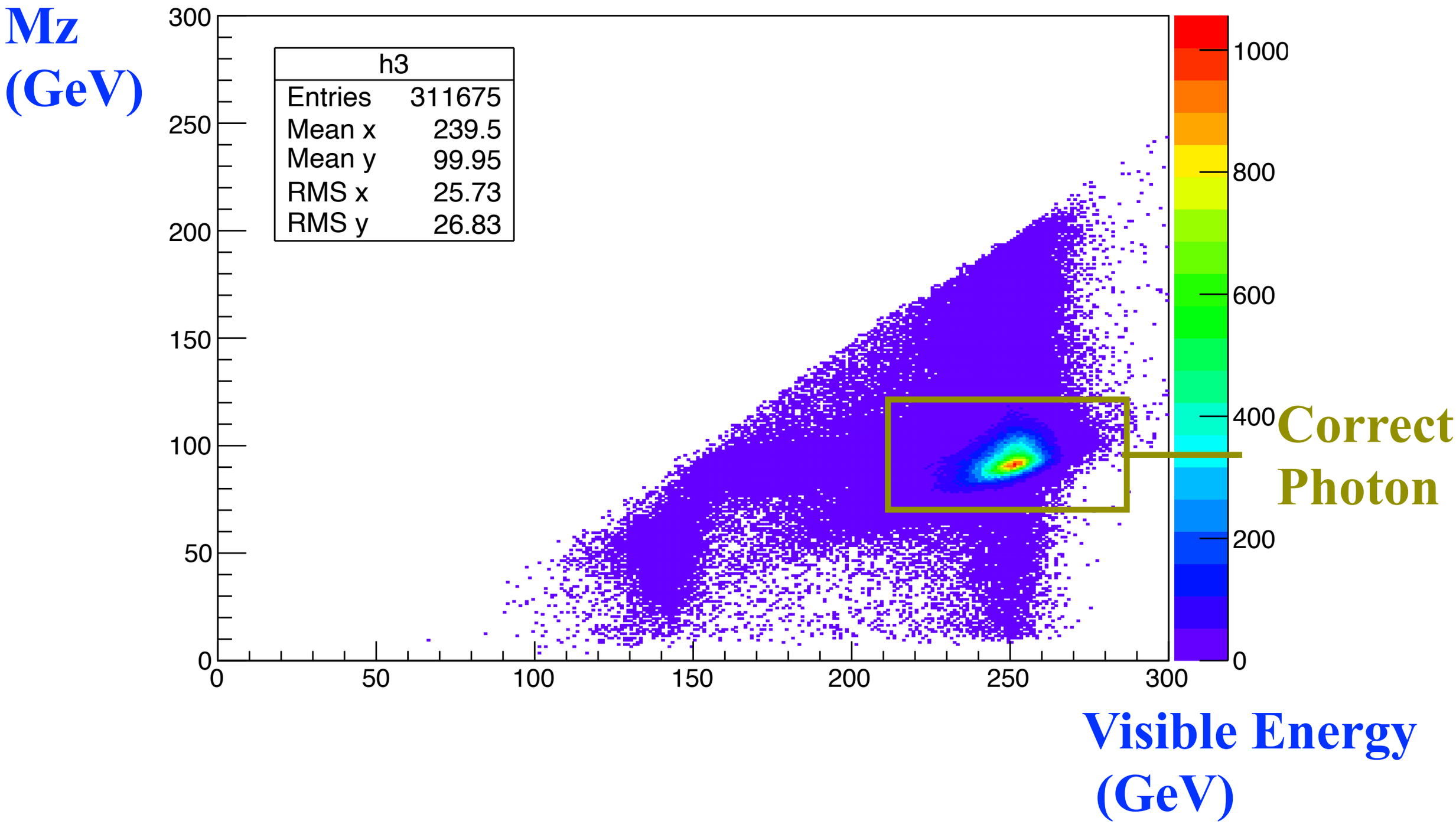
FSR from Z

ISR added to Z

Mz (GeV)

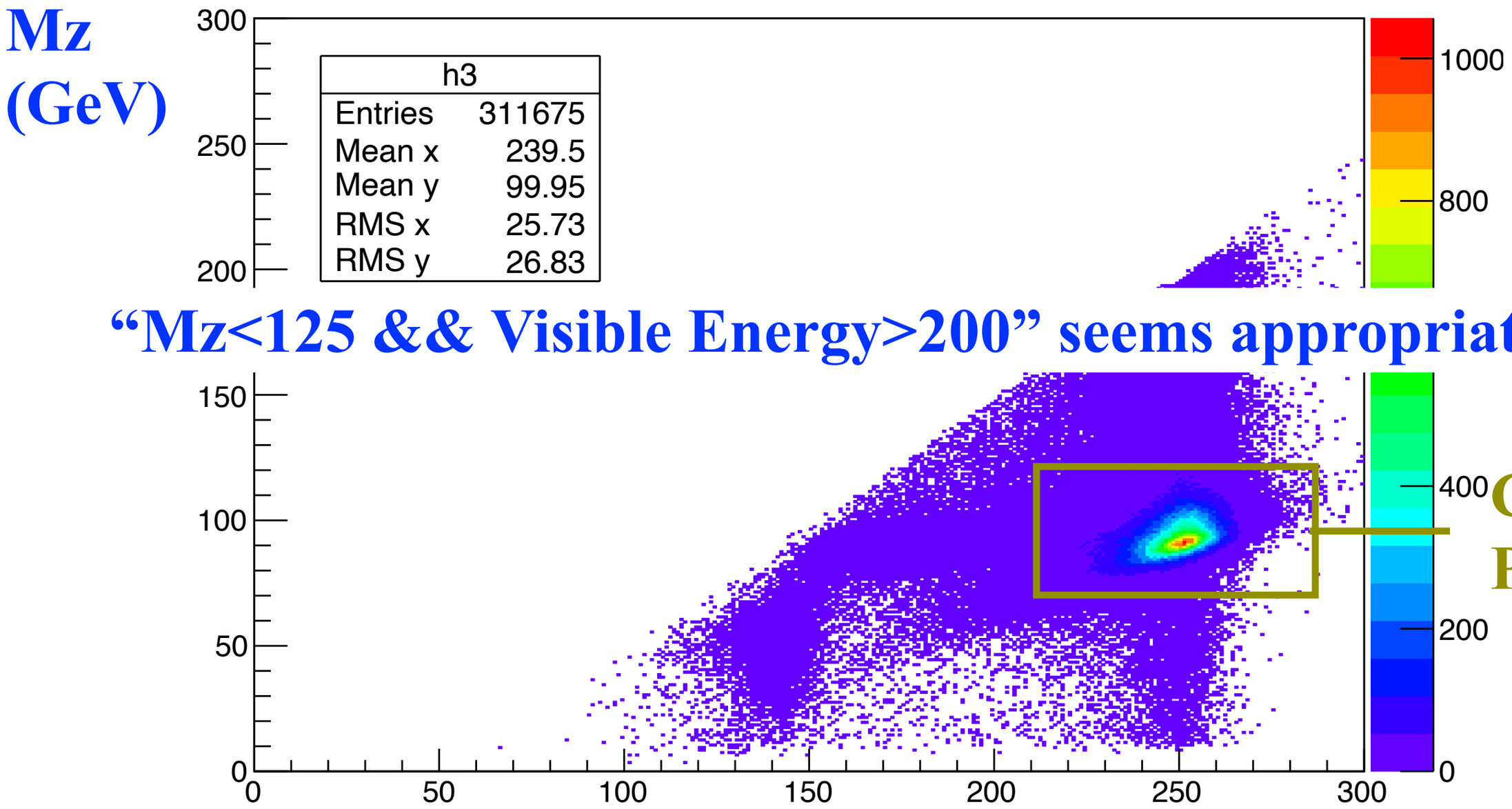
1. Realistic cut

Mz vs. Visible Energy (=Ej1+Ej2+Eγ)



1. Realistic cut

Mz vs. Visible Energy (=Ej1+Ej2+Eγ)

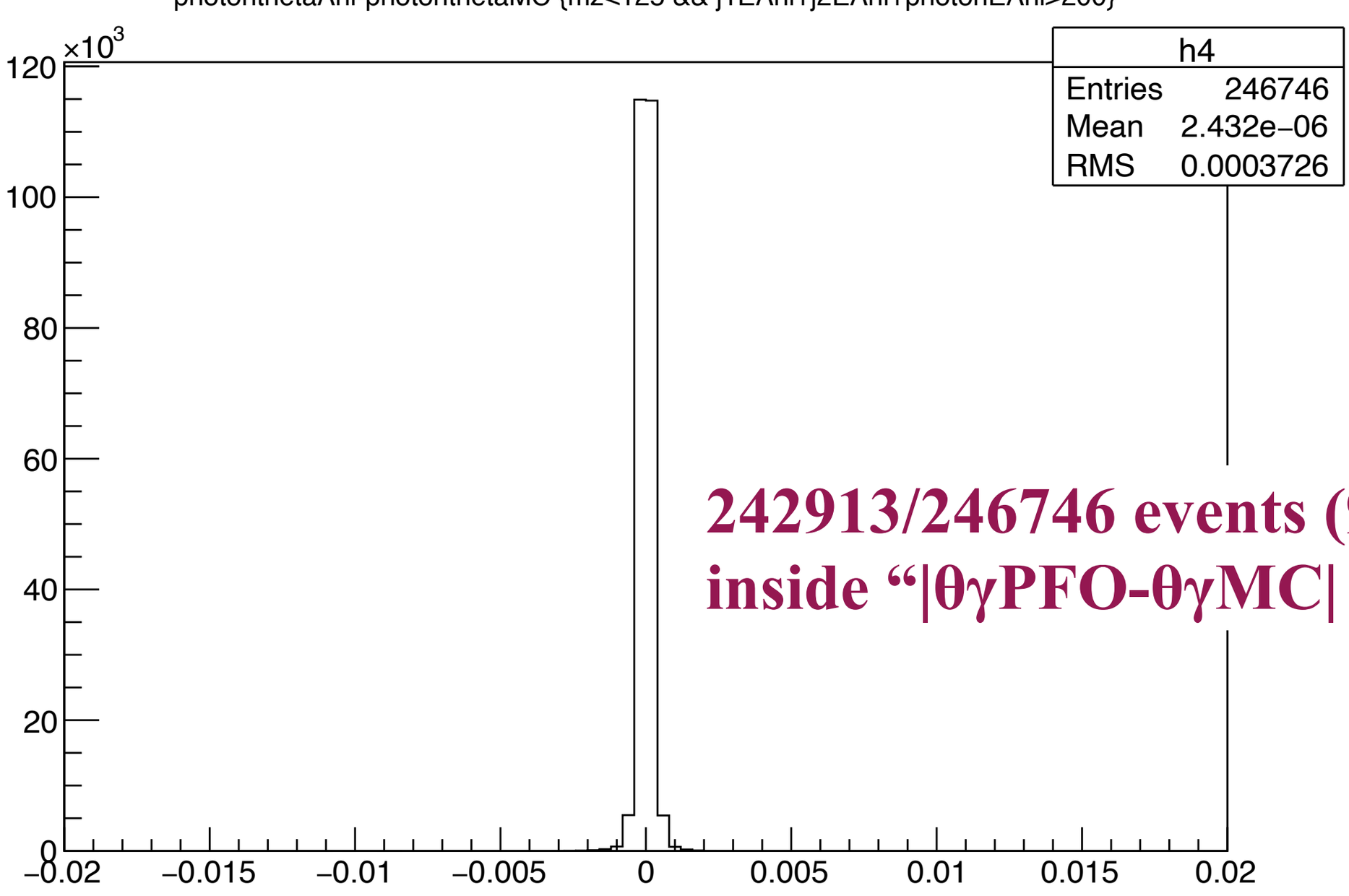


“Mz<125 && Visible Energy>200” seems appropriate.

1. Realistic cut

“Mz<125 && Visible Energy>200” is appropriate.

θ difference (rad)



242913/246746 events (98.4%) inside “|θγPFO-θγMC| <0.01”

1. Conclusion

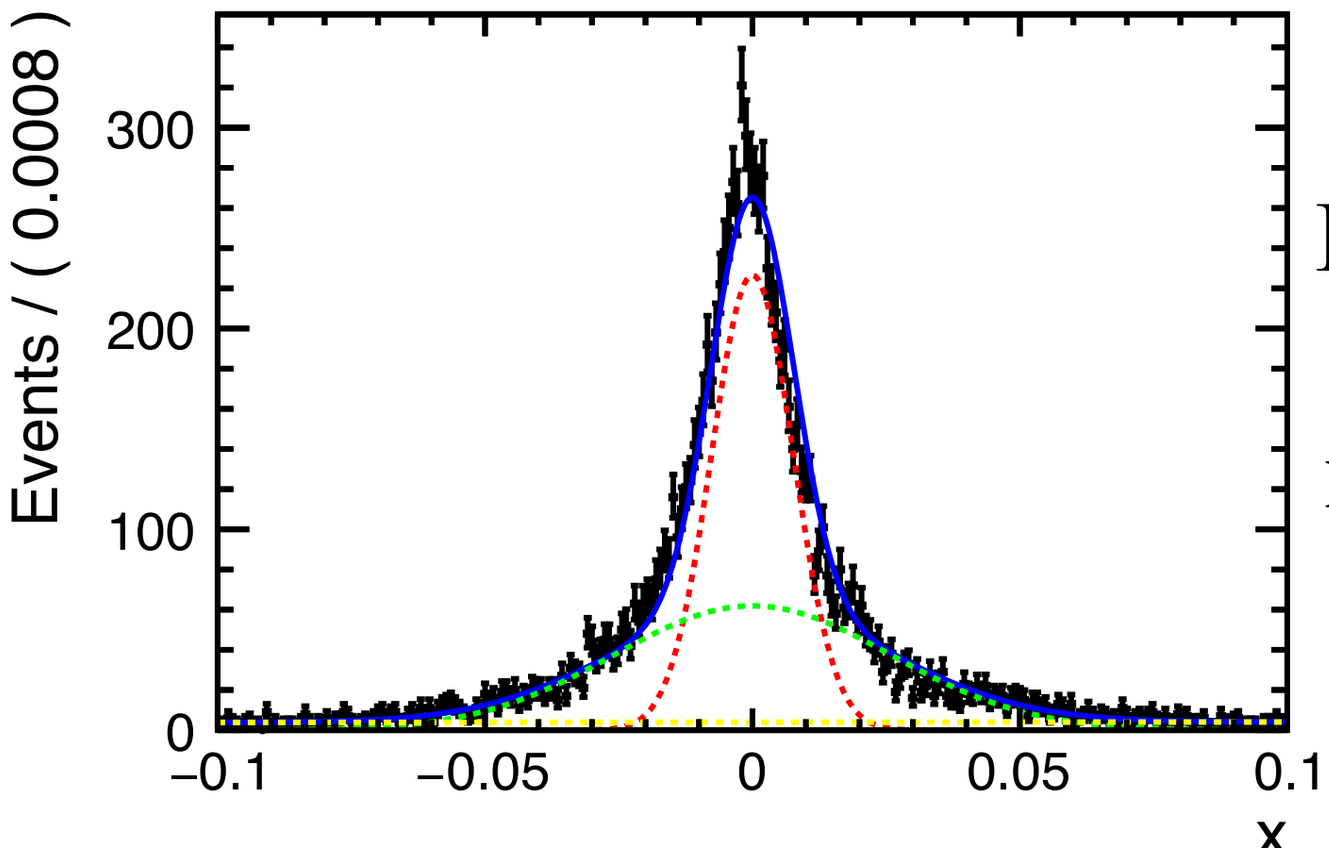
Use cut "Mz<125 && Visible Energy>200"
242913/246746 are correct.

	MC Level Cut	Realistic Cut
In all case	"Method 3 has answer" "$\|\theta\gamma PFO-\theta\gamma MC\| <0.01$"	"Method 3 has answer" "Mz<125 && Visible Energy>200"
To narrow the phase space	"$\theta_{J1}MC<\ldots$" "$E_{J1}MC<\ldots$" …	"$\theta_{J1}Measured<\ldots$" "$E_{J1}Measured<\ldots$" …

Recent Progress

Jet energy calibration using 250 GeV DBD sample

2 **Checking relative difference of reconstructed jet energy dependence on jet theta and energy**

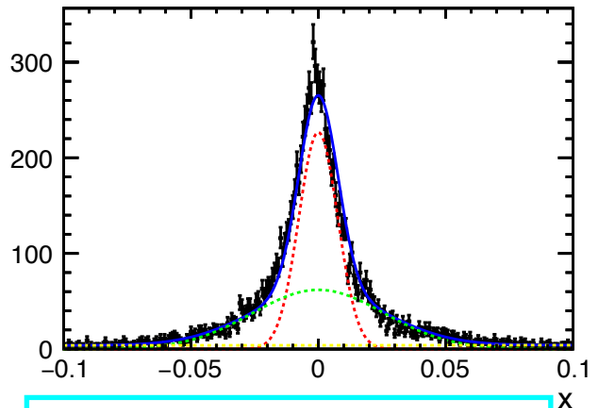


MC-Level Cut

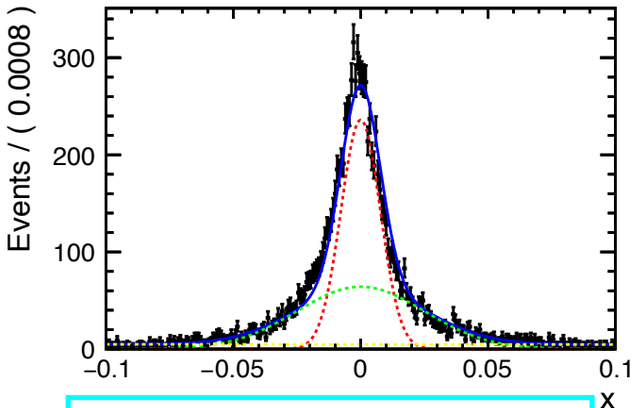
Fit the relative difference of reconstructed jet energy with gaus+gaus+linear func.

2.2. Method 3 Jet 1 energy resolution θ dependence

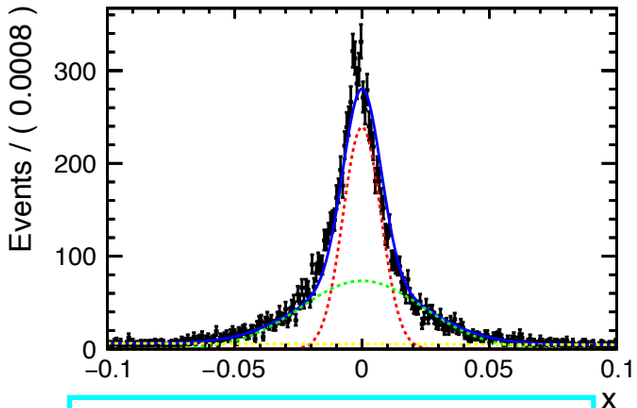
$0.0<|\cos\theta_{J1}|<0.1$



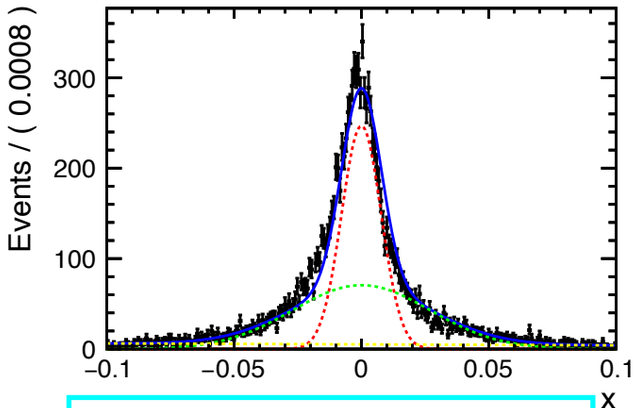
$0.1<|\cos\theta_{J1}|<0.2$



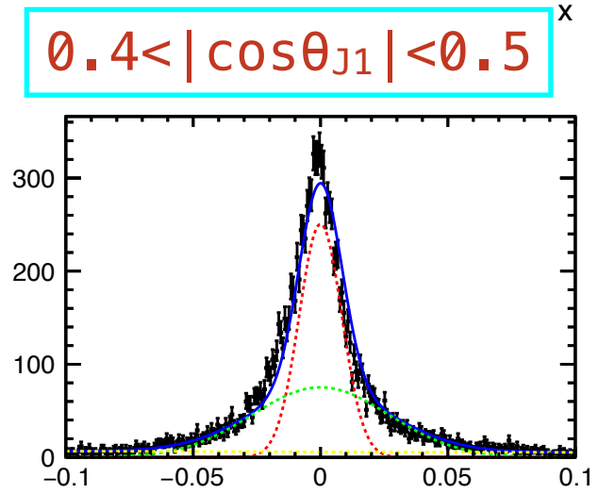
$0.2<|\cos\theta_{J1}|<0.3$



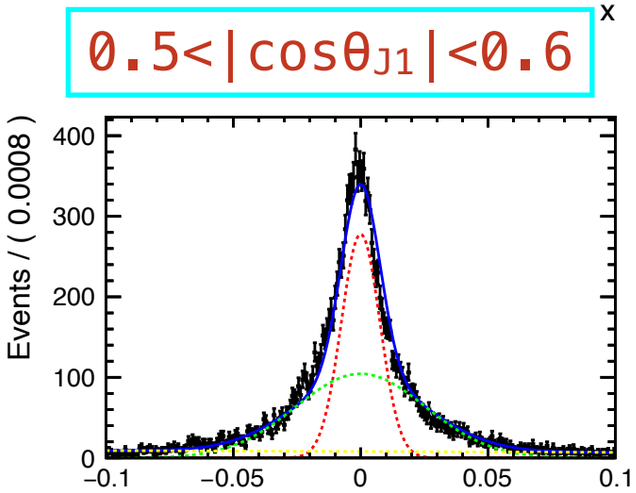
$0.3<|\cos\theta_{J1}|<0.4$



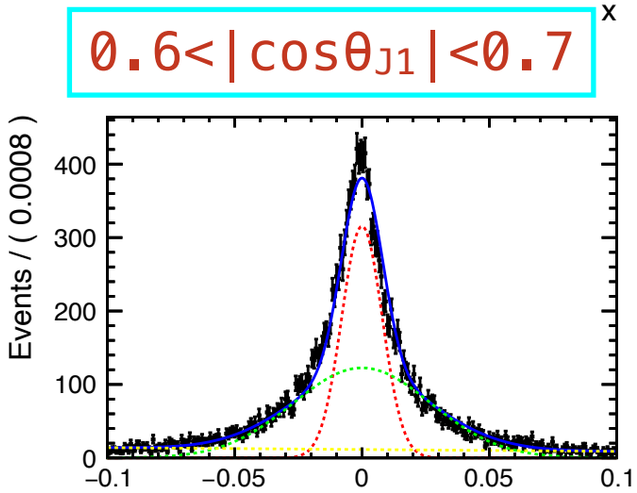
$0.4<|\cos\theta_{J1}|<0.5$



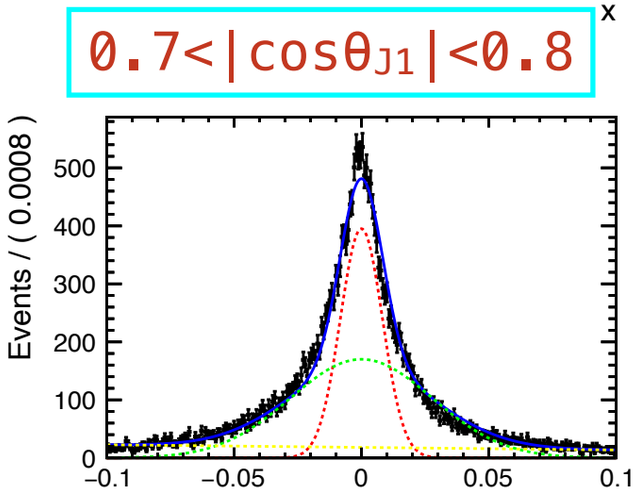
$0.5<|\cos\theta_{J1}|<0.6$



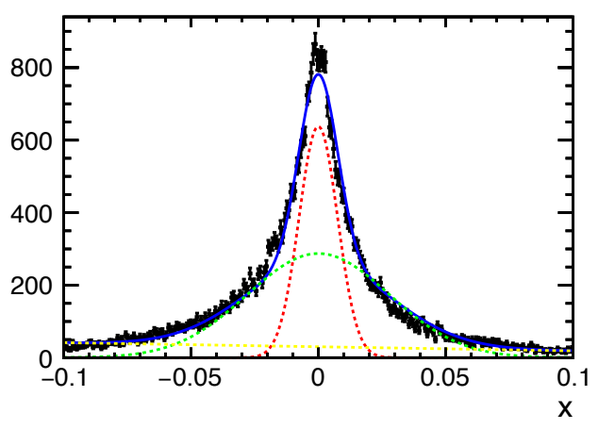
$0.6<|\cos\theta_{J1}|<0.7$



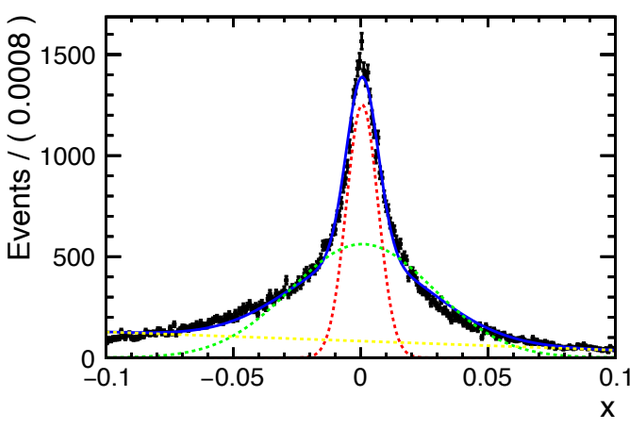
$0.7<|\cos\theta_{J1}|<0.8$



$0.8<|\cos\theta_{J1}|<0.9$



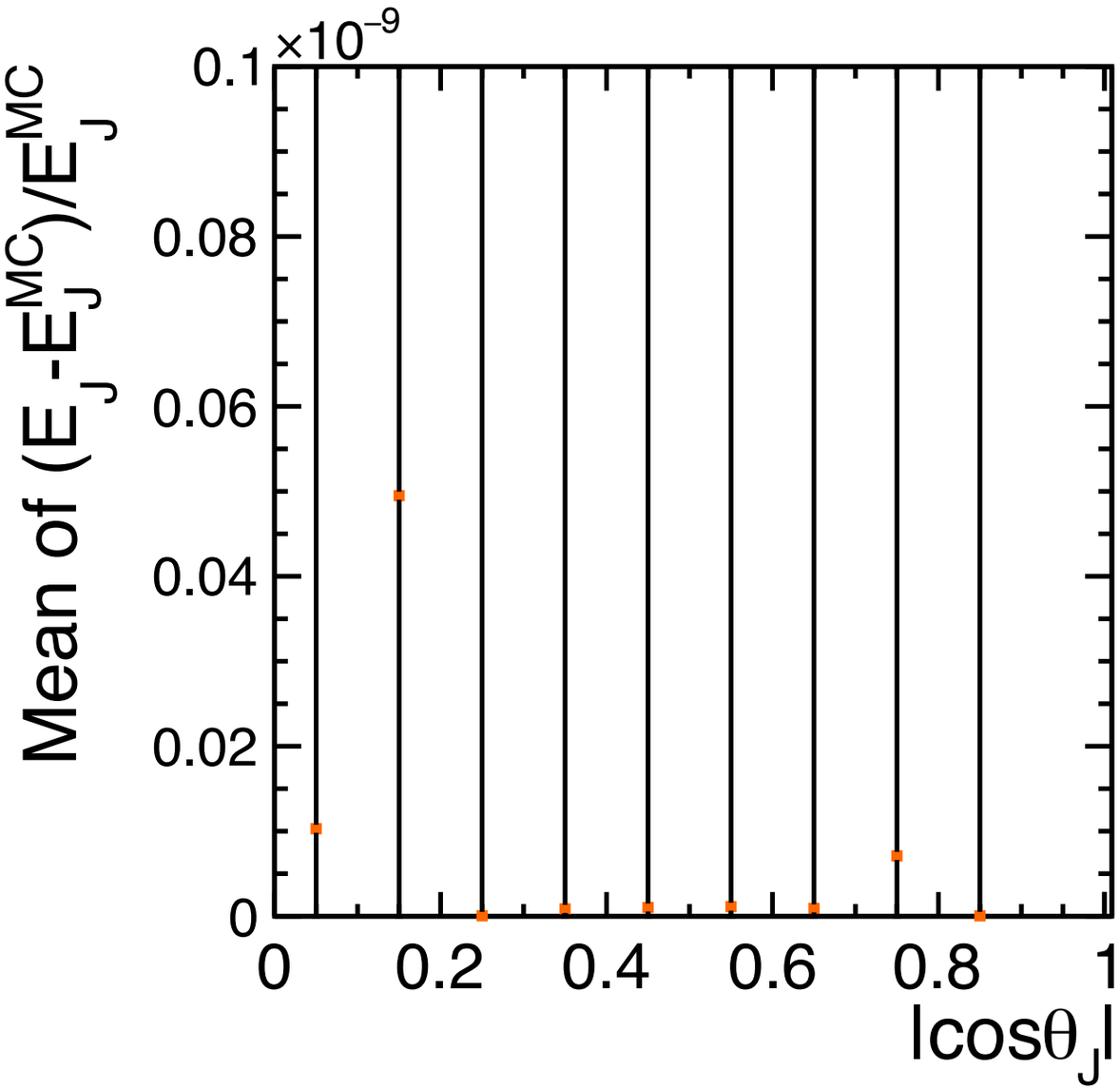
$0.9<|\cos\theta_{J1}|<1.0$



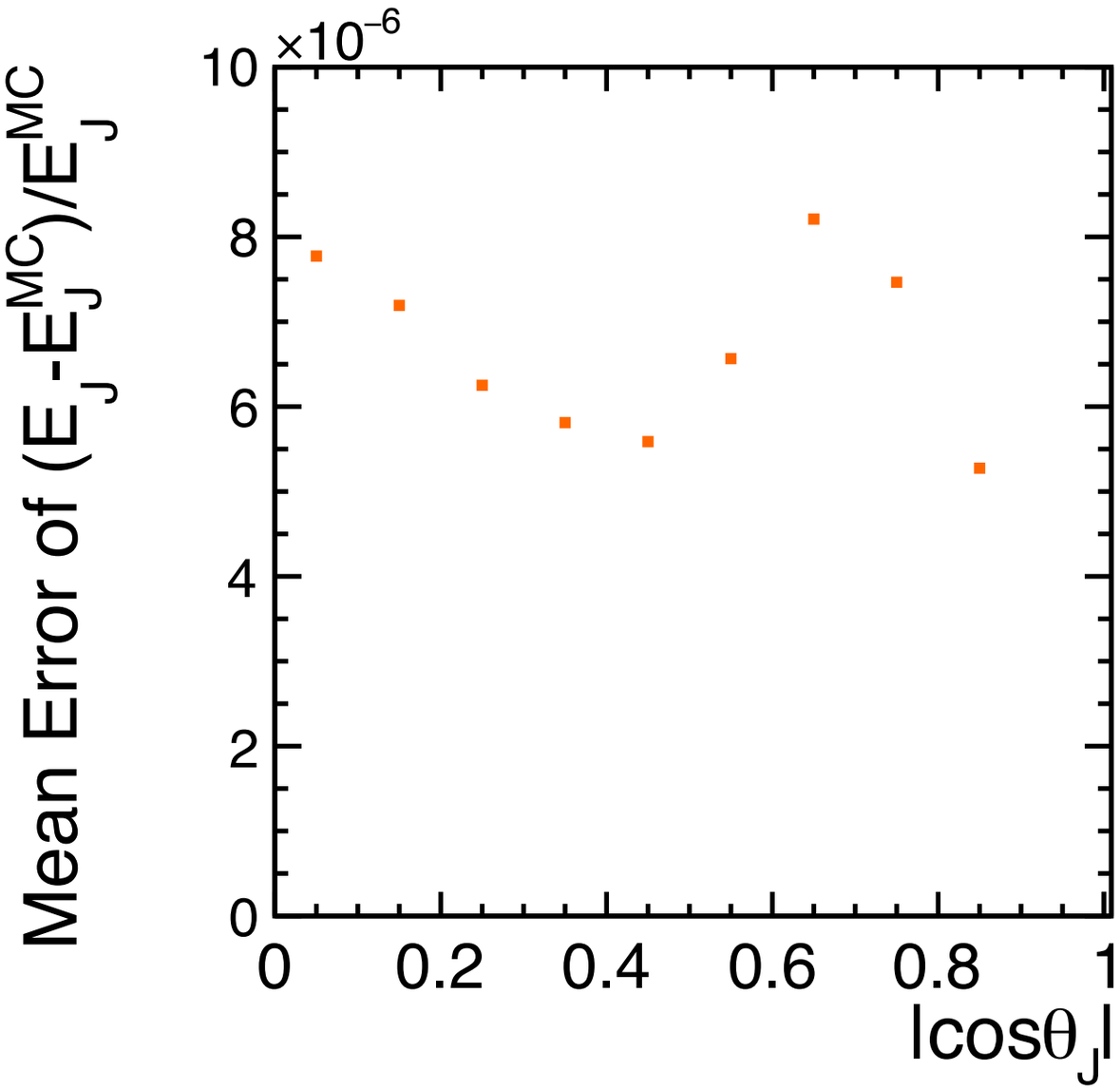
$$\frac{E_{JRec} - E_{JTrue}}{E_{JTrue}}$$

2.2. Method 3 Jet 1 energy resolution θ dependence

Mean of $\frac{E_{JRec} - E_{JTrue}}{E_{JTrue}}$

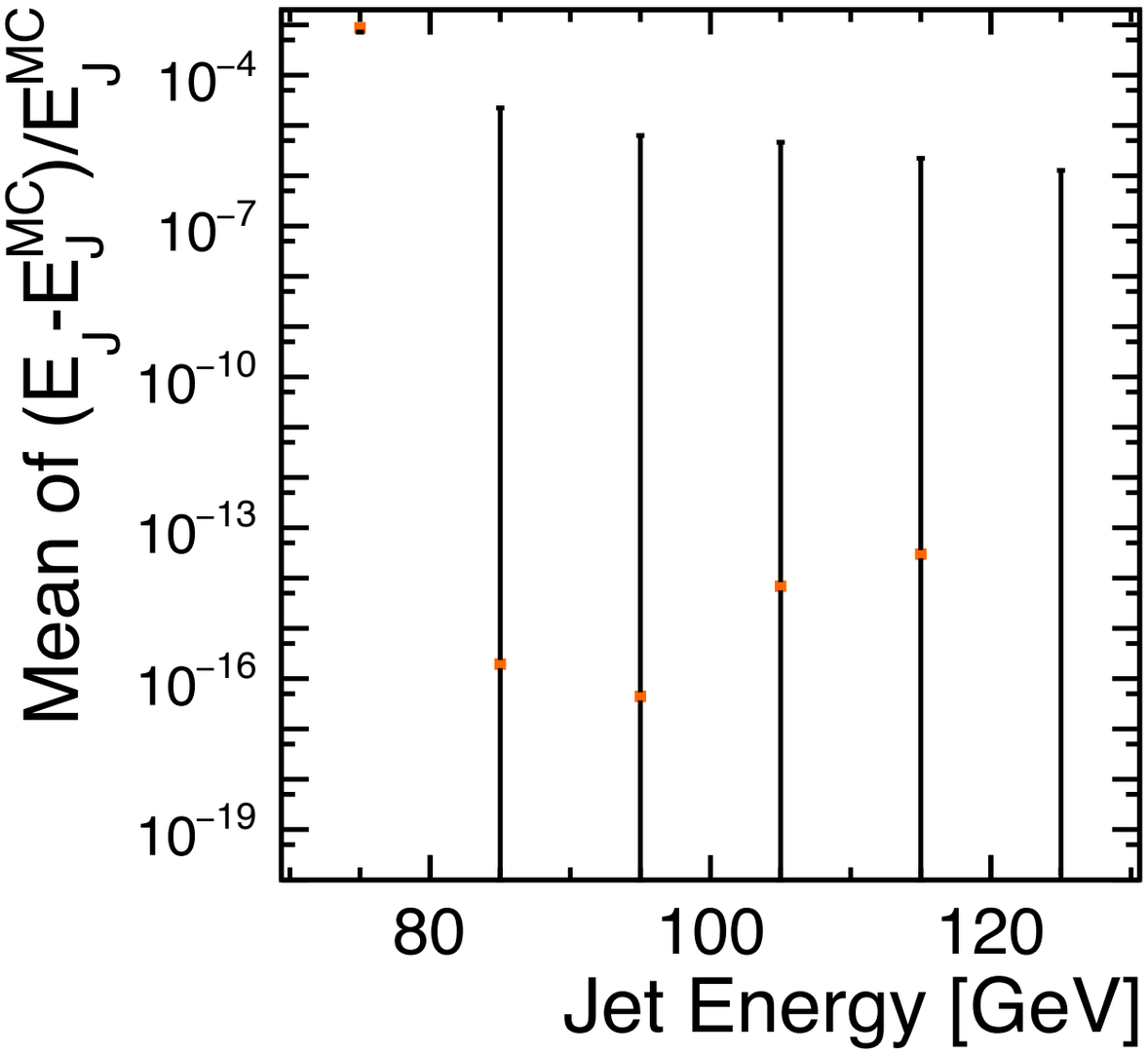


Error of mean

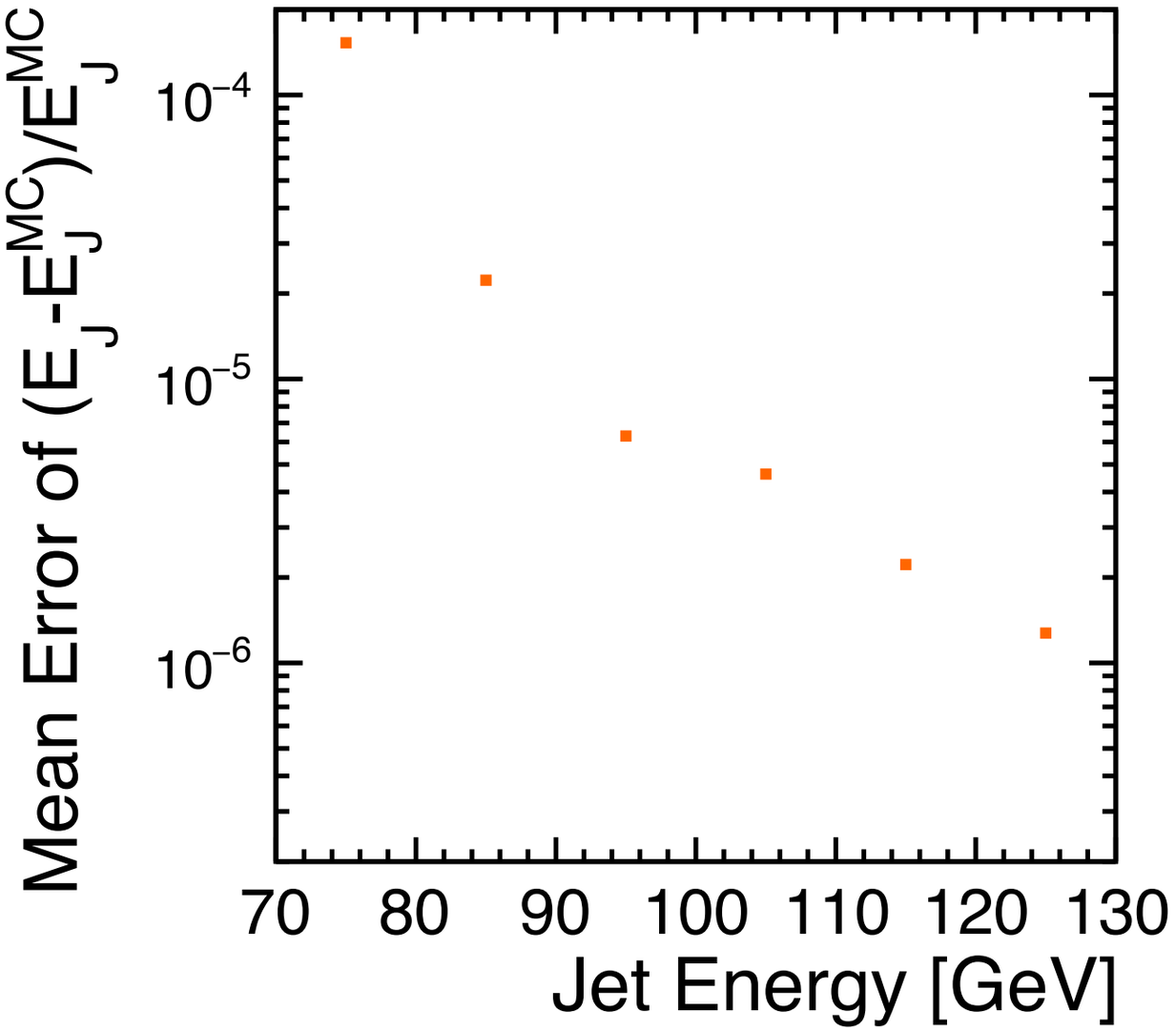


2.2. Method 3 Jet 1 energy resolution E dependence

Mean of $\frac{E_{JRec} - E_{JTrue}}{E_{JTrue}}$



Error of mean



Thank you for your attention!