# Jet Energy Scale Calibration using e⁺e⁻ →γZ process at the ILC
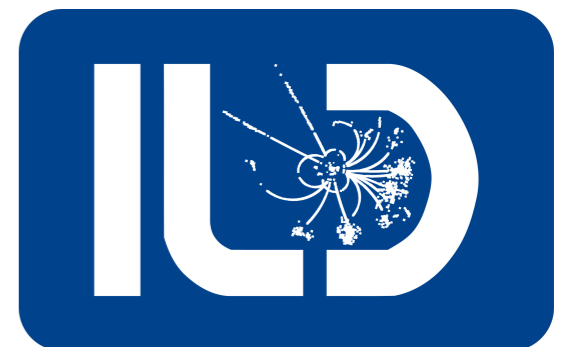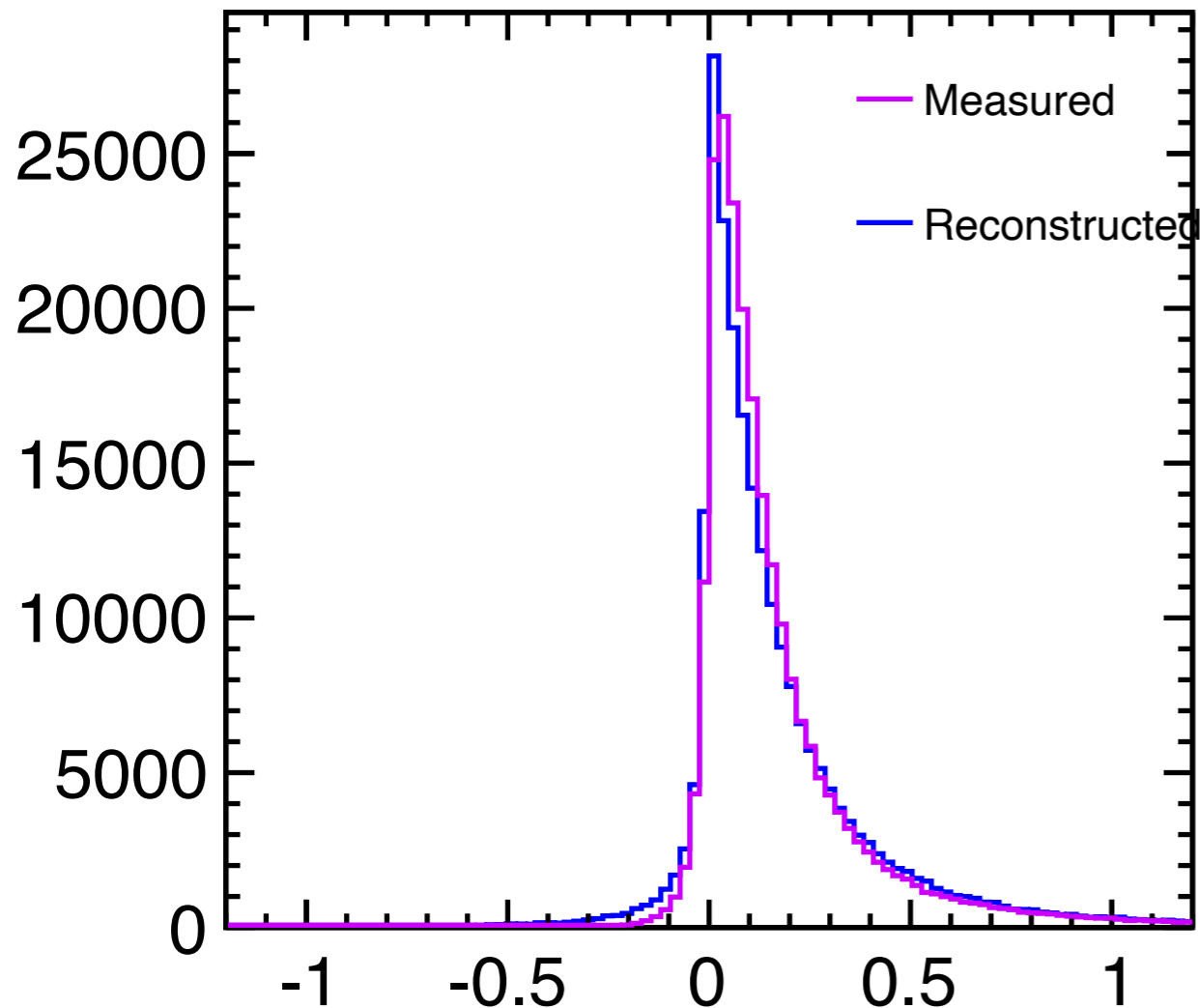
**Takahiro Mizuno**

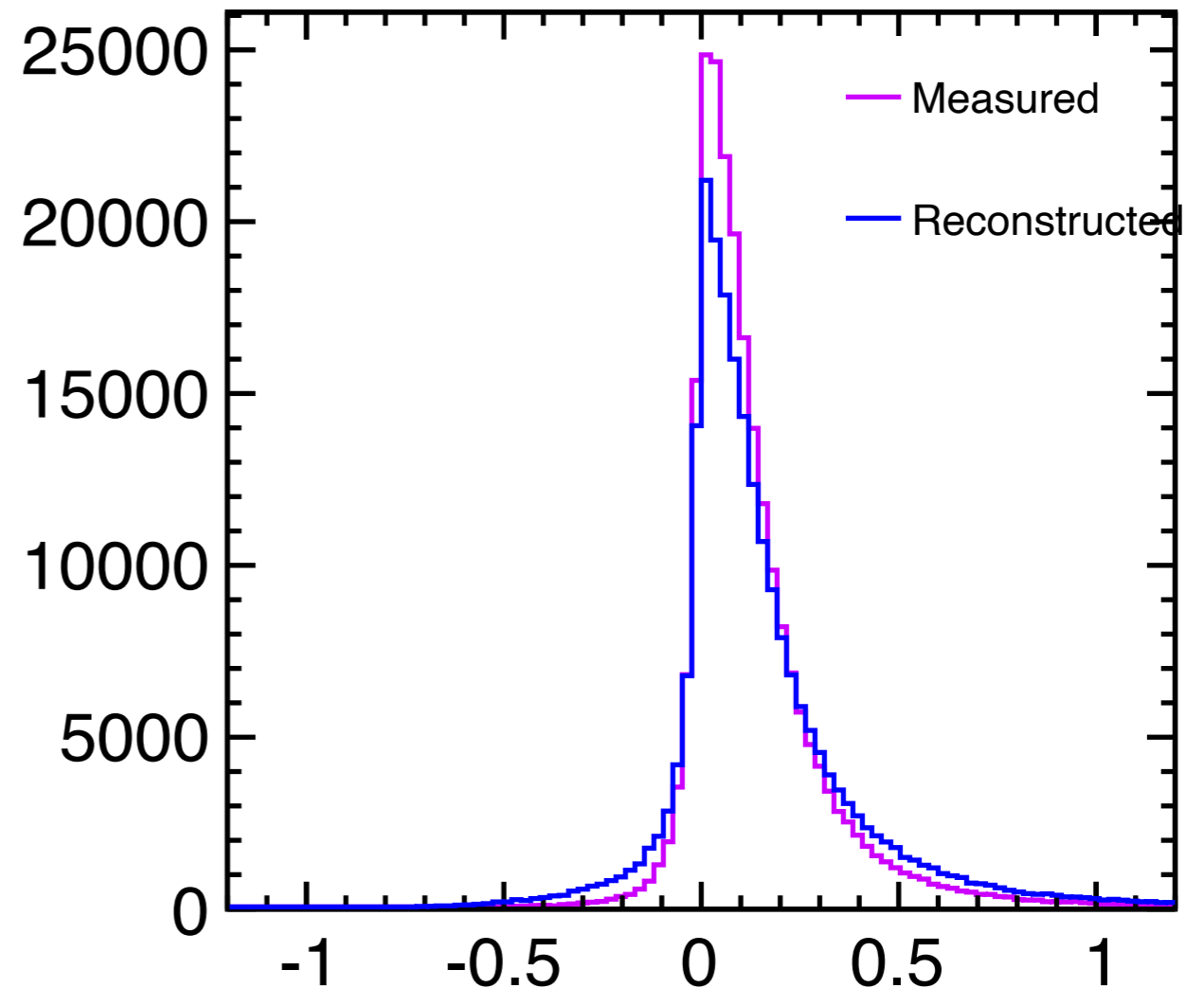**SOKENDAI**

# Contemporary Reconstruction Result

## Jet 1

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

## Jet 2

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



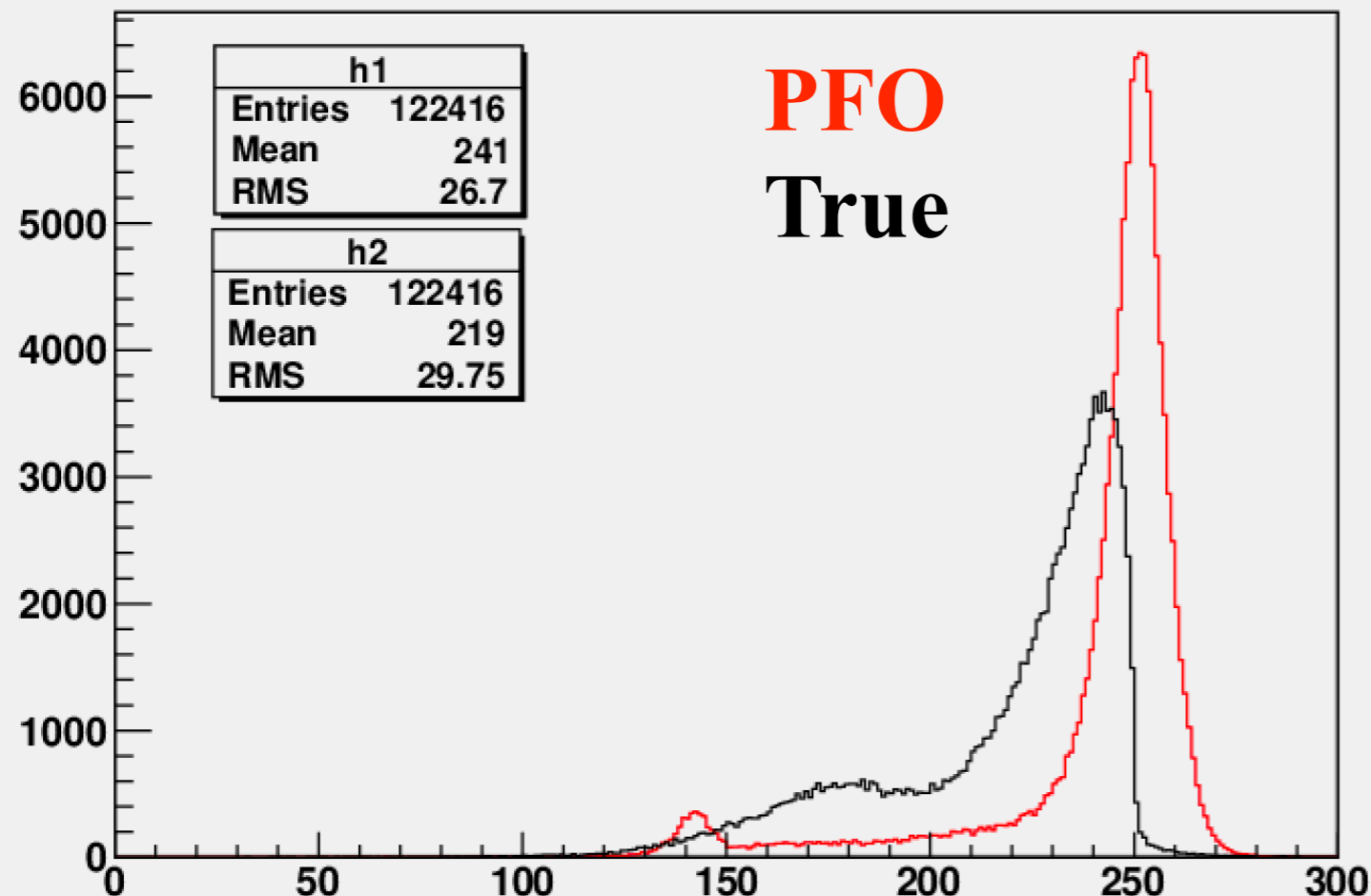**Below 2 points are modified in clustering True jet.**
1. **Take the all the particles with small weights onMCTruthLink**
2. **Add generator status = 2 particles**

# Contemporary Reconstruction Result

- In the jet energy reconstruction, "True jet" is defined as the jet clustered from MCTruthLinked particles to the jet particles in PFO.
- In some events, True jet energy is underestimated.

**Total energy of jet and signal photon in ud jets**

j1EAnl+j2EAnl+photonEAnl {nPhoton>0. && M3sol>0.&&( pdg0==1 || pdg0==2)}

**PFO**
**True**

| h1 | |
|---|---|
| Entries | 122416 |
| Mean | 241 |
| RMS | 26.7 |

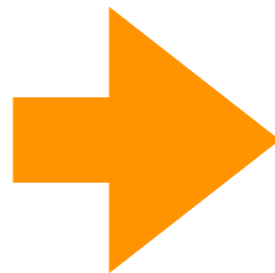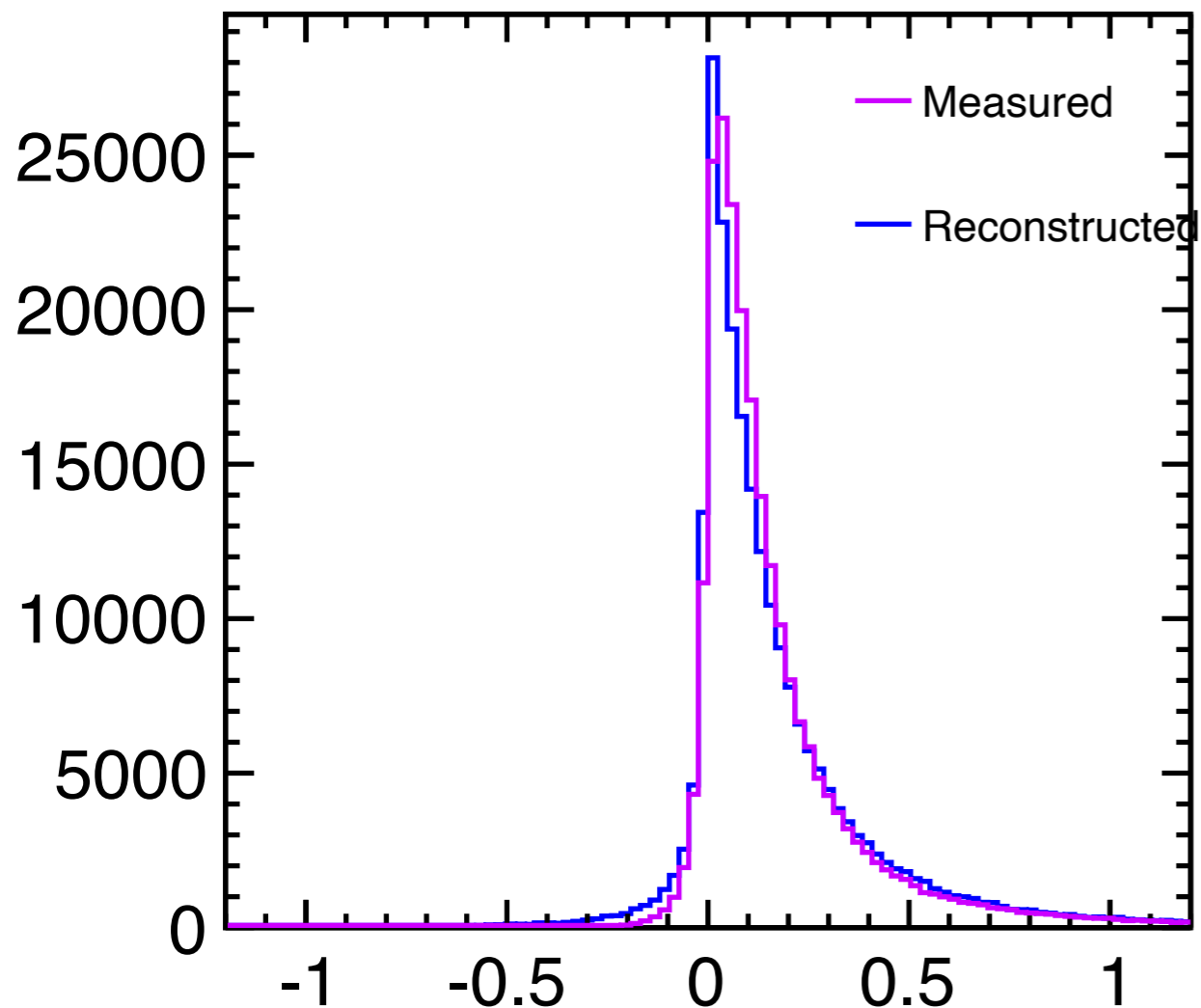| h2 | |
|---|---|
| Entries | 122416 |
| Mean | 219 |
| RMS | 29.75 |

- In some event, photon energy is 40.73 GeV (PFO) 24.73 GeV (True)

- This is caused by only taking the largest weight MCLinked particles.
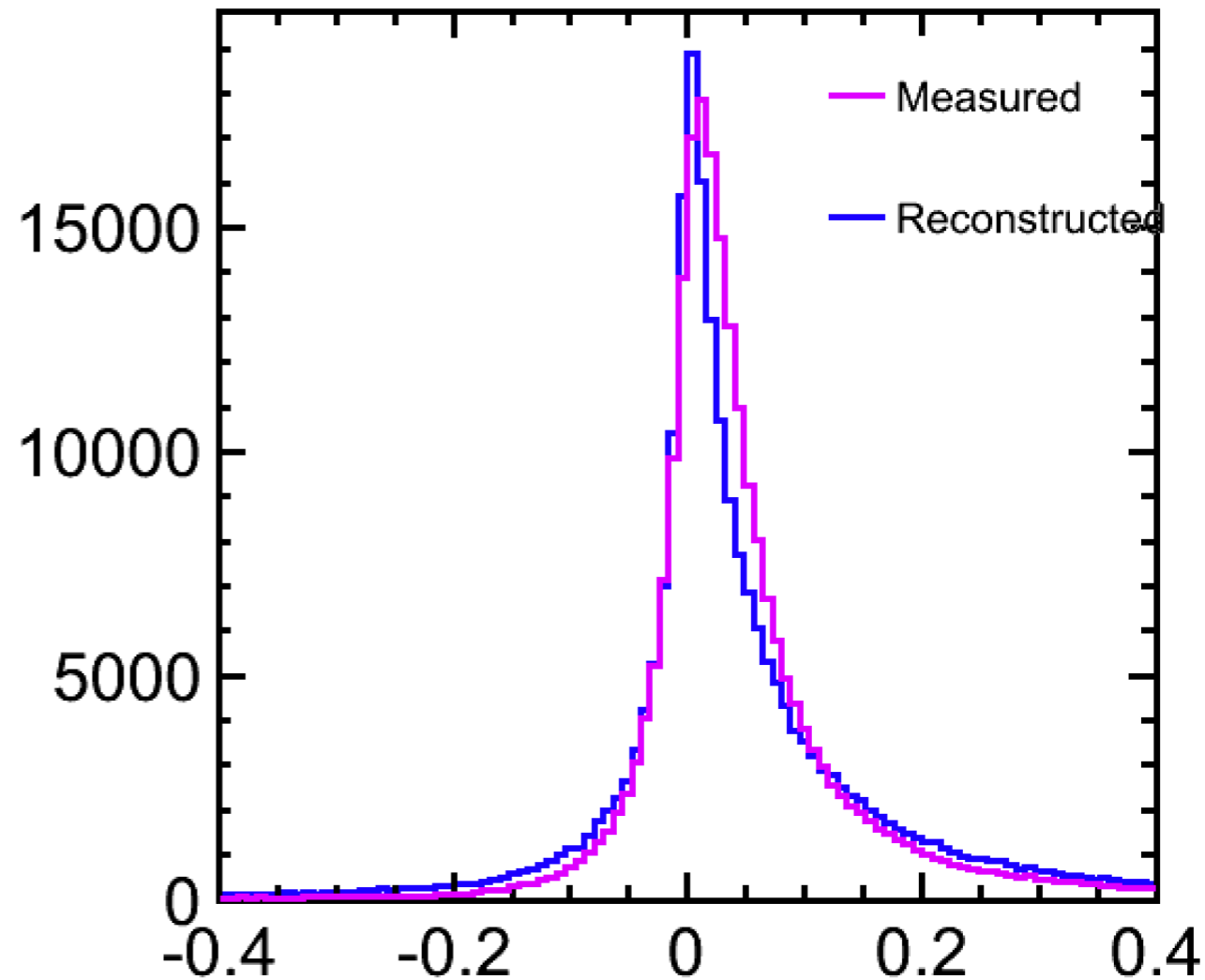
# Contemporary Reconstruction Result

**Jet 1**

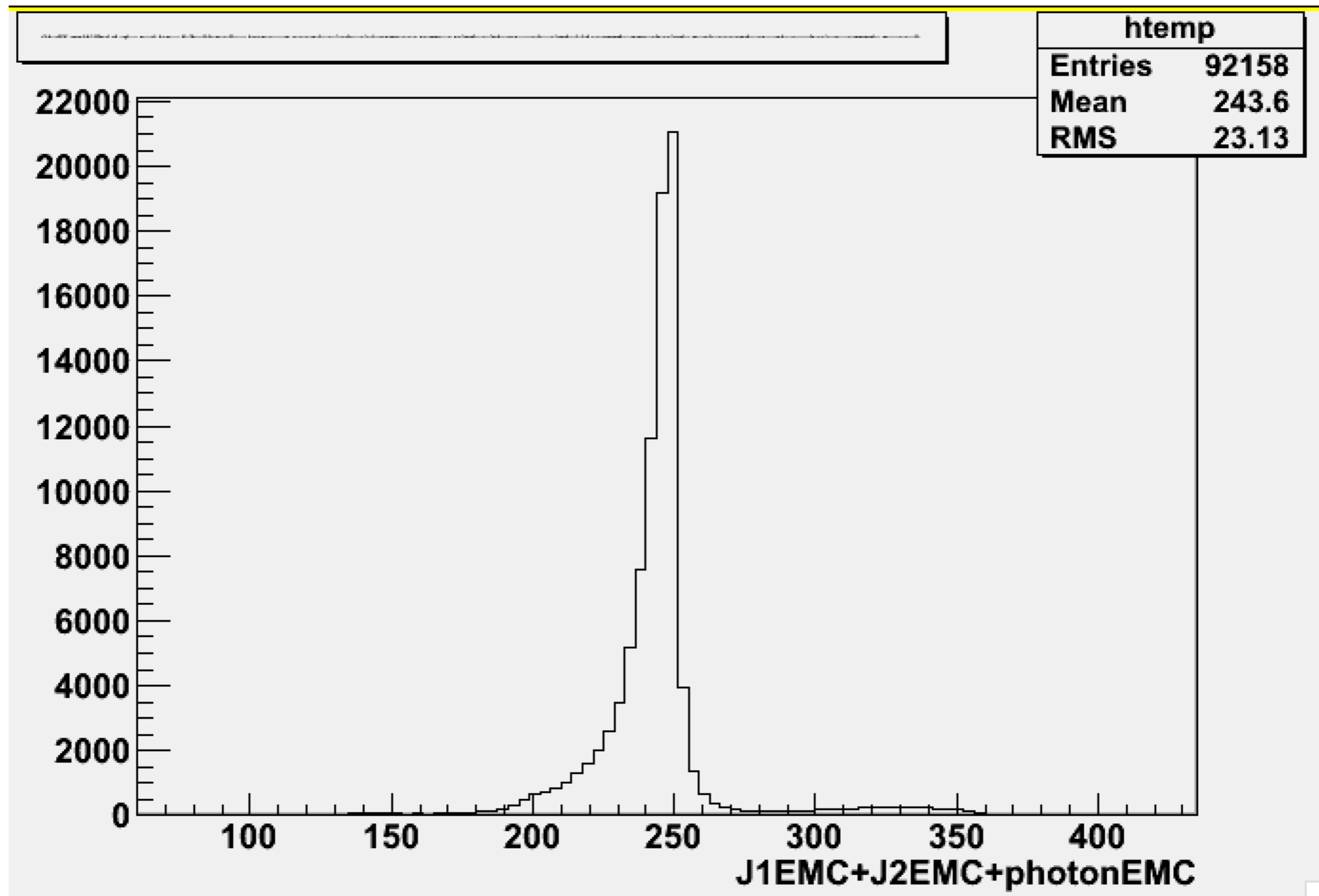$$\frac{E_{JRec} - E_{JTrue}}{E_{JTrue}}$$

**Jet 1**

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



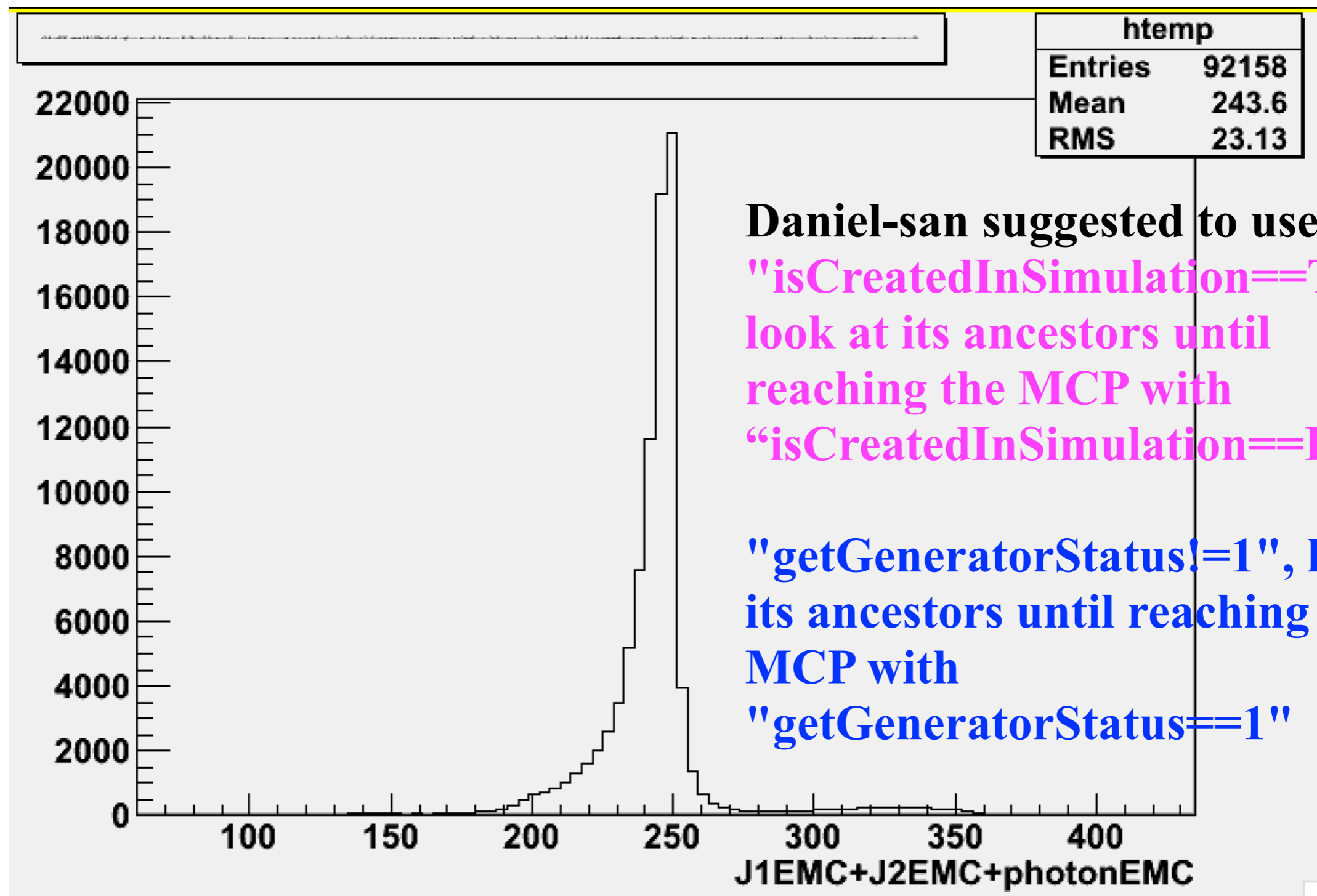**Improved but still overestimation in PFO (i.e. Measured)**

# Total (J1+J2+photon) MCLinked jet Energy in ud jet



**Although taking all weights in linking, wrong counting is seen.**

# Total (J1+J2+photon) MCLinked jet Energy in ud jet



Daniel-san suggested to use **"isCreatedInSimulation==True", look at its ancestors until reaching the MCP with "isCreatedInSimulation==False"**

**"getGeneratorStatus!=1", look at its ancestors until reaching the MCP with "getGeneratorStatus==1"**

**Although taking all weights in linking, wrong counting is seen.**