

Status of PFA Reconstruction in SiD

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Outline

- Define “current status”
- Datasets
- Tracking
- CPU performance
- Resolution
- Photons
- Summary

Define “current status”

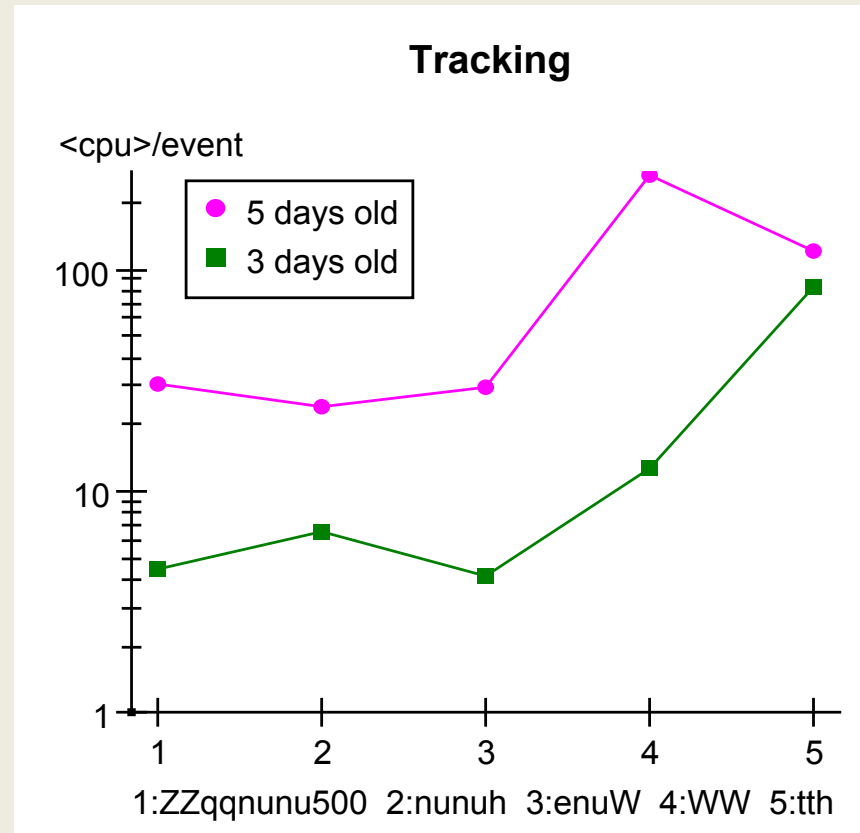
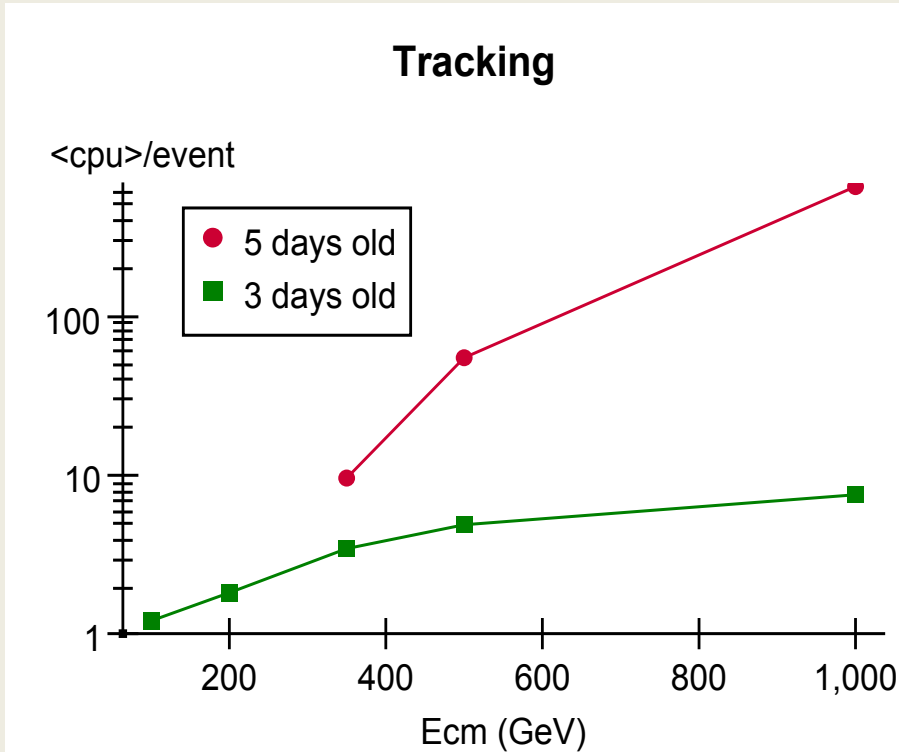
- Use cvs head of org.lcsim as of 3 days ago.
- For slicPandora, use build provided by jeremy, with parameter files in cvs.
- No additional tuning.
- Pretend we need to start production for the DBD today.
- May be useful in deciding allocation of very limited resources.

Datasets

- **Diagnostic data sets:** qq events at fixed E_{cm} , $q=\{uds\}$, no beam/brem, $E_{cm}=\{100,200,350,500,1000\}$: ZZ-
>qqnunu at $E_{cm}=500$ GeV
- **Benchmark data sets:** $E_{cm} = 1000$ GeV: vvh, tth, WW-
>qqev, WW->qqqq.
- Simulate with SLIC in sidloi3 detector
- Run lcsimTracking
- Run both UIPFA and slicPandora on tracking output
- Simple analysis on ReconstructedParticles

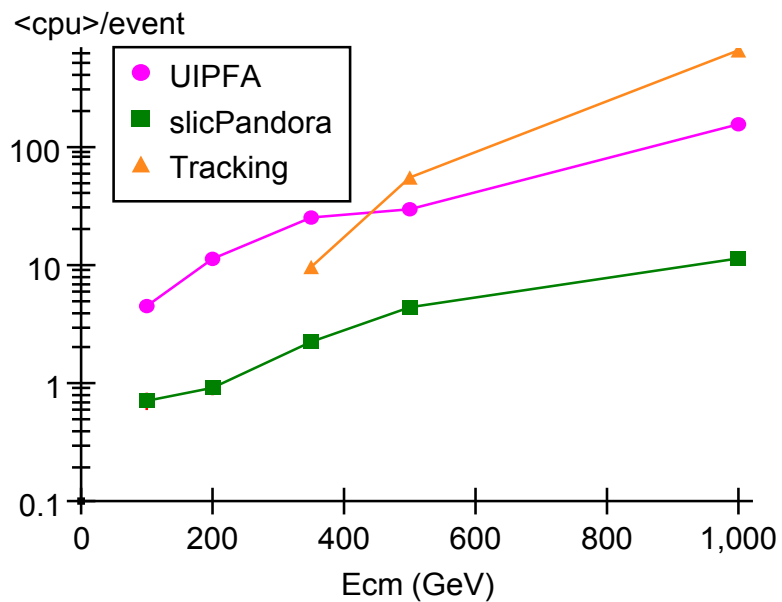
Tracking in sidloi3: cpu

- Problems (and fixes) presented by Rich.

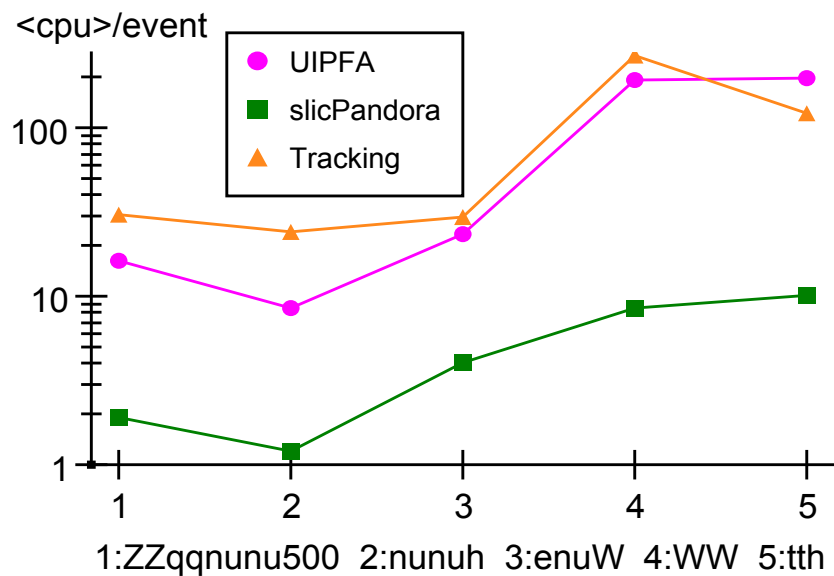


CPU Performance

Processing time: qq events in sidloi3



Processing time: sidloi3



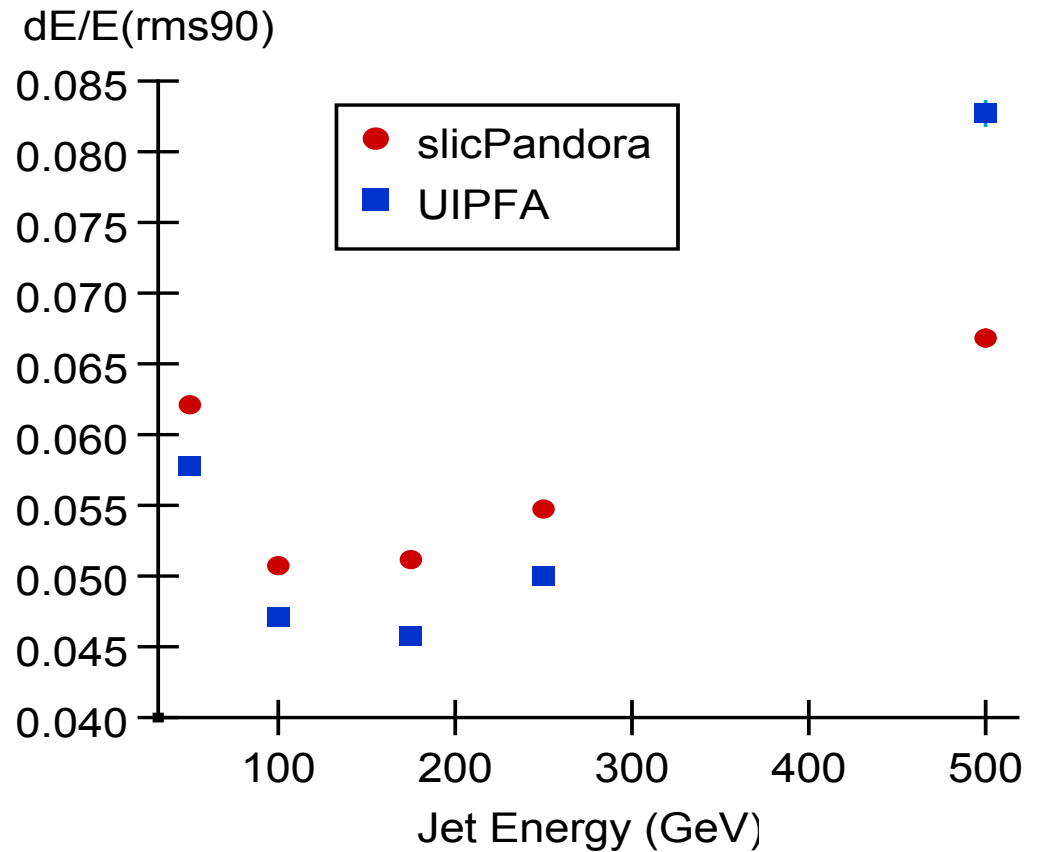
Jet energy resolution

Cut events with q
 $|\cos\theta| > 0.95$.

Plot sum of energy of all
ReconstructedParticles.

Use distribution
 $(\text{rms90}/\text{mean90}) * \sqrt{2}$

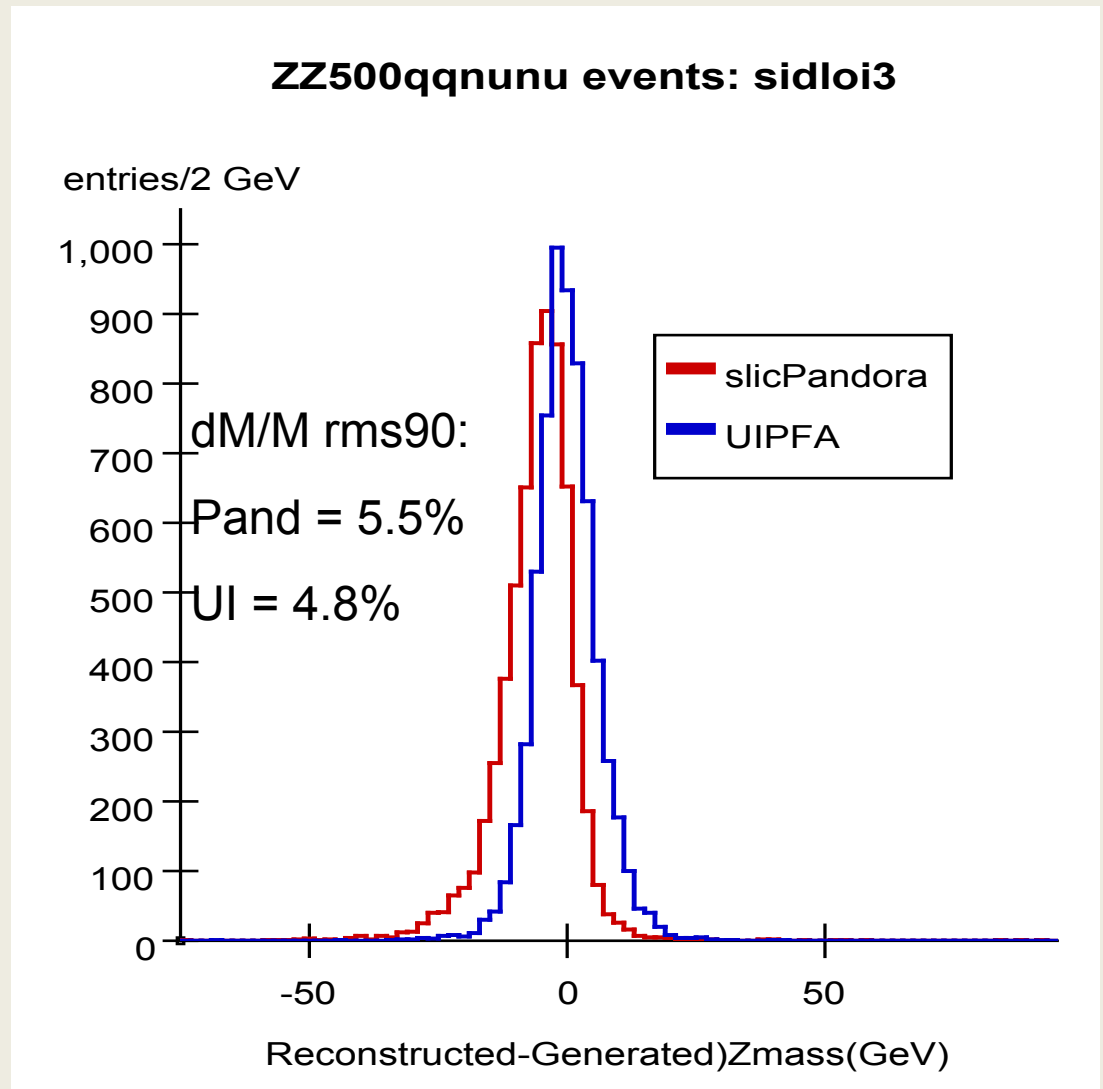
Jet Energy Resolution: slicPandora: $\cos < 0.95$



Mass resolution in ZZ500 events

Both q from Z $|\cos\theta| < .95$

Plot reconstructed event mass – generated Zmass



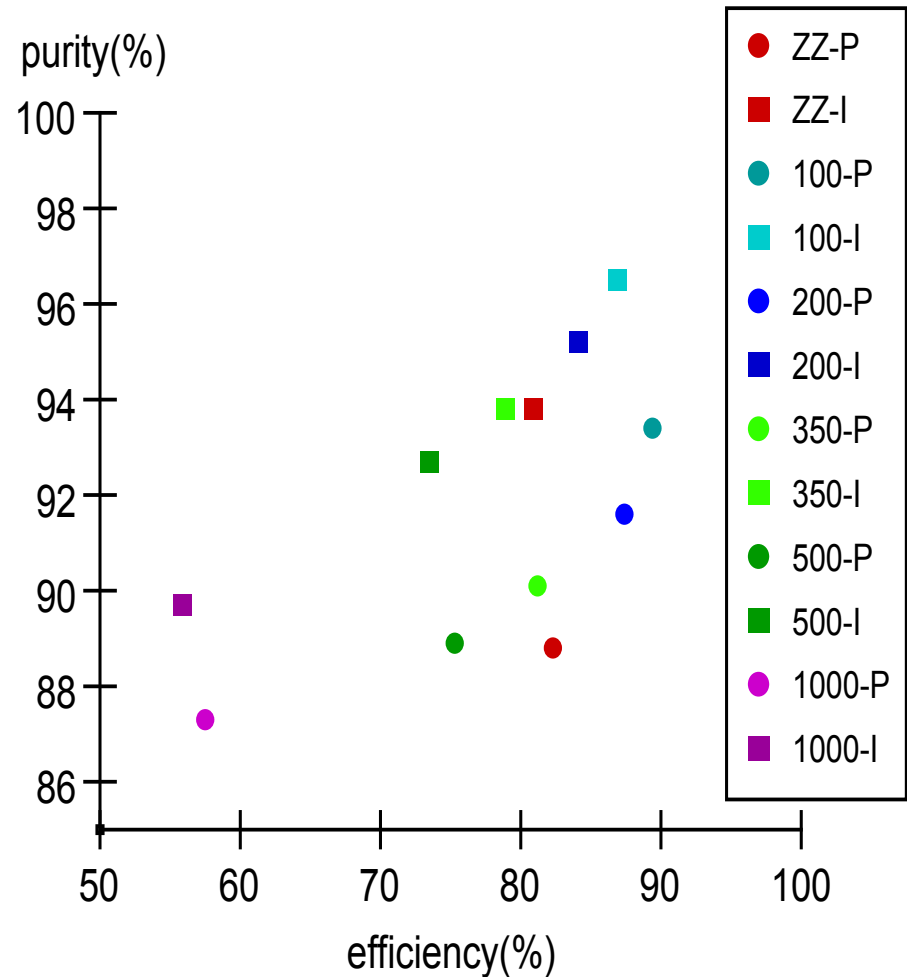
Photons

Definitions

Efficiency: $(\text{Total energy from reconstructed photons and electrons originating from photon or electron}) / (\text{Total energy in EM calorimeter originating from photon or electron})$

Purity: $(\text{Total energy from reconstructed photons and electrons originating from photon or electron}) / (\text{Total energy from reconstructed photons or electrons})$

Photon purity vs efficiency

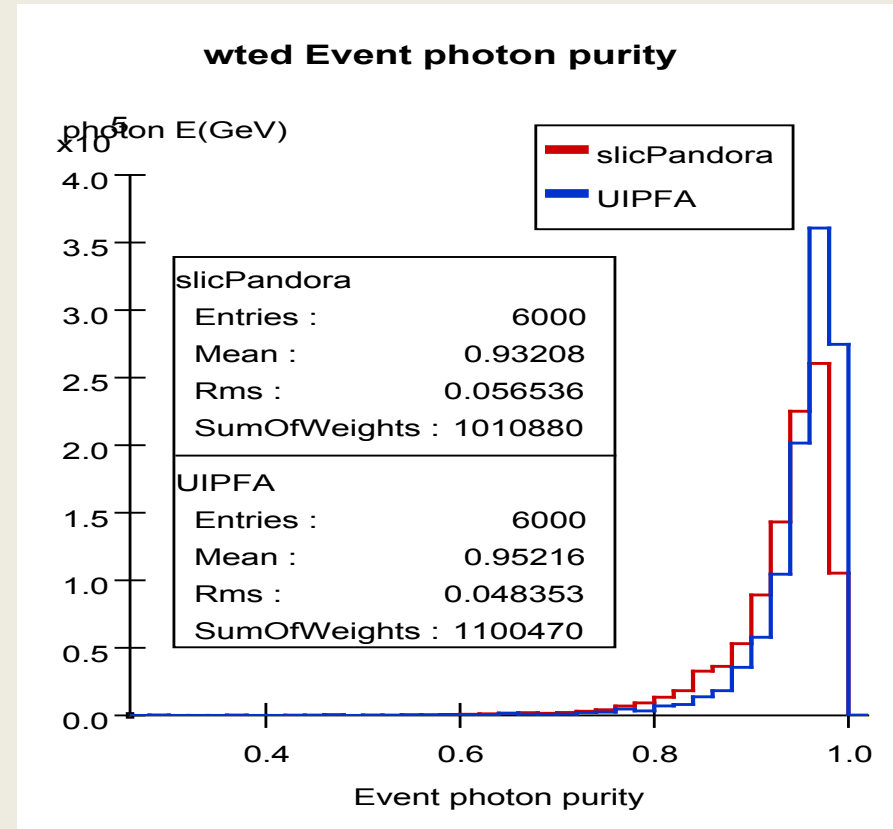
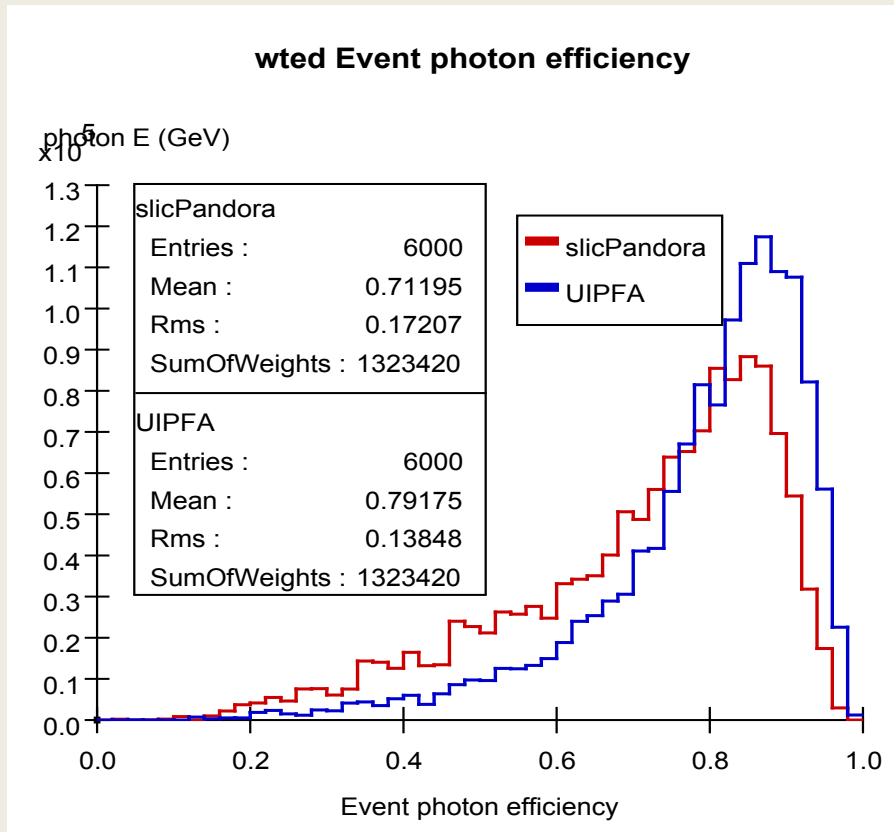


Summary

- Introduction of more realistic detector -> 10% degradation in resolution.
- Major deficiencies in UIPFA are being addressed.
- Ability to run slicPandora on SiD detector will provide valuable insight into algorithm details.

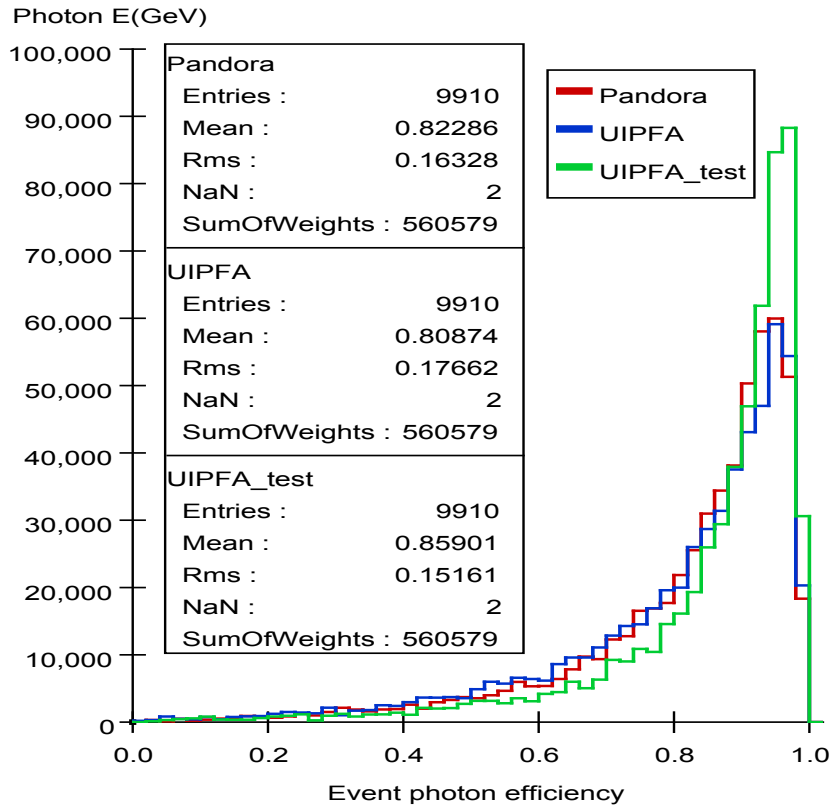
Backups

vvh (1000 GeV)

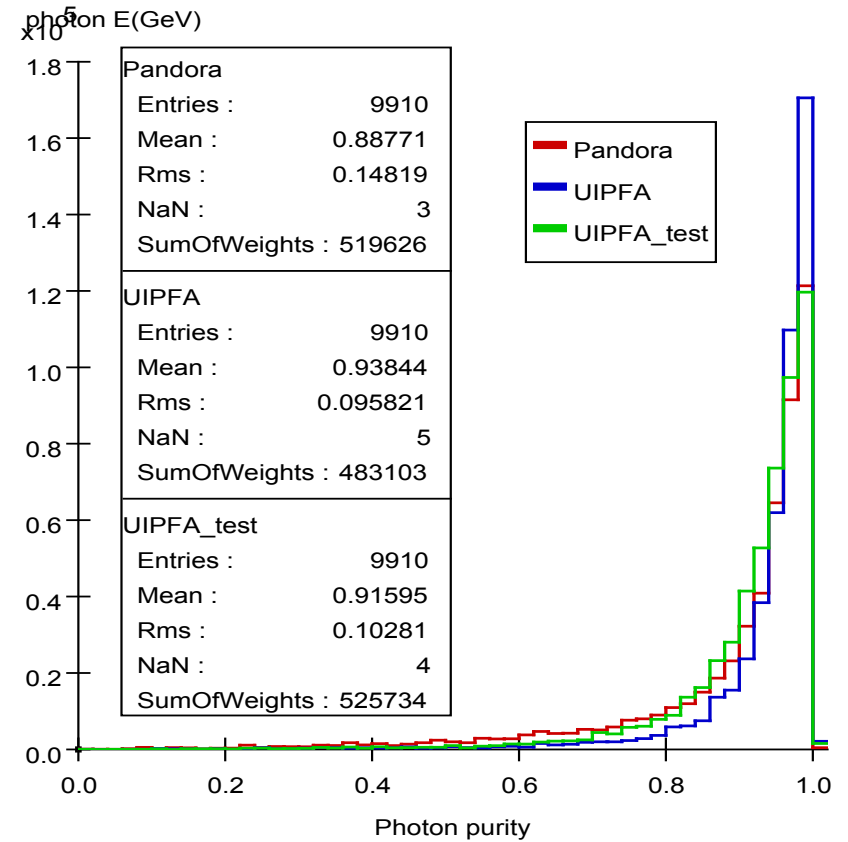


ZZqqnunu 500 GeV

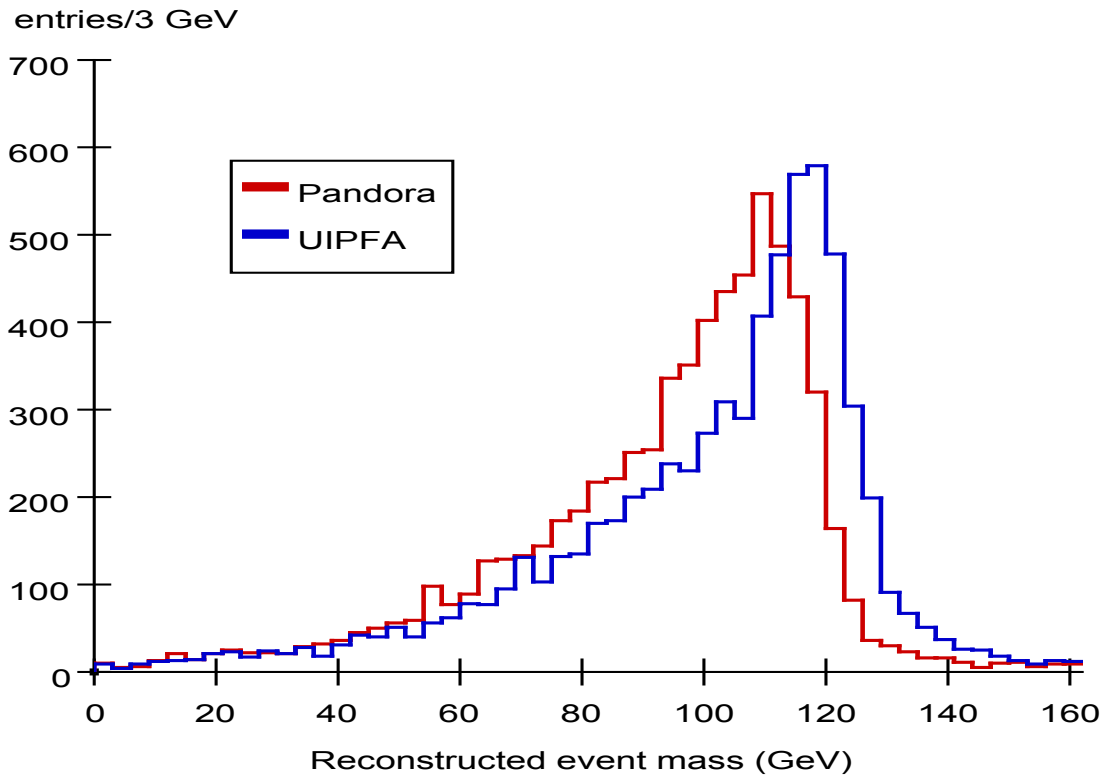
wted Event photon efficiency



wted Event photon purity



sidloi3: nunuh 1000 GeV



Jet energy resolution

