Jet Energy Resolution Validation and PrimeTagSvc Test

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1 IHEP

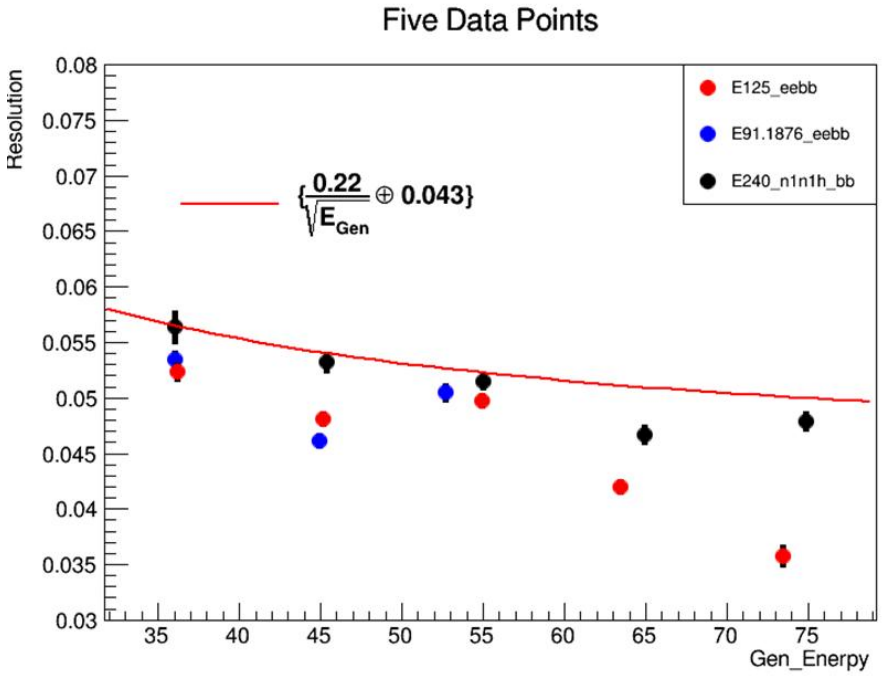
Validation

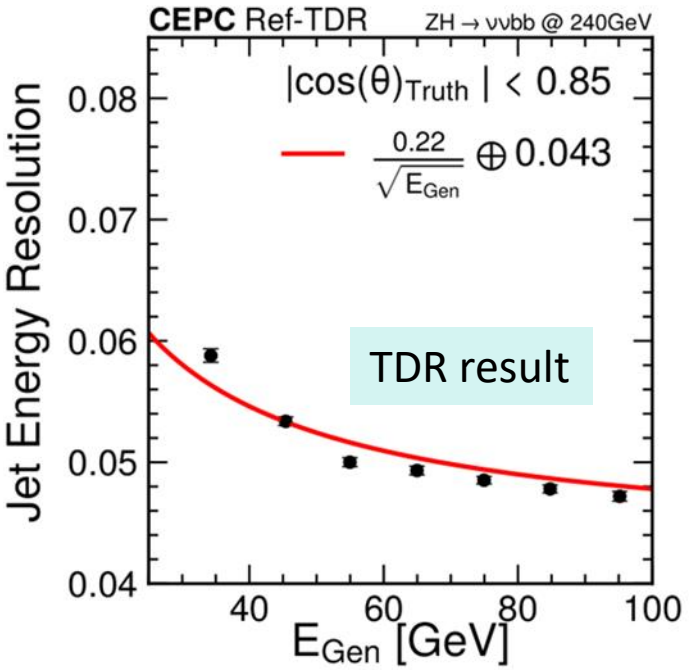
- Dataset: /cefs/higgs/mqli/submit_jobs/sub_E240_n1n1h_bb/E240_n1n1h_bb/Reco/rec*.root
  - Use the same process as TDR.
  - Reconstructed by CEPCSW25.3.7.
  - Jet Reconstruction by eekt.
  - Jet truth match with ΔE(The same as GenMatch).

- Cut
  - $|\cos\theta| < 0.85$.

- Calculation
  - $\Delta E = E(\text{RecoJet}) - E(\text{GenJet})$.
  - Resolution = $\Delta E/E$ (Use TwoSidedCB to fit the $\Delta E/E$).

- Result
  - Shows a decline in 60~80GeV, but is more consistent with TDR than E125_eebb.





PrimeTagSvc

- Dataset: ee → bb events generated by whizard1.9.5(91.1876GeV, 200000 events).
  - Reconstructed by CEPCSW25.5.0.

- MissingET Package (including PrimeTagSvc)
  - Jet Reconstruction by eekt.
  - Prediction given by PrimeTagSvc(latest version).

- Confusion Matrix
  - Jet truth match with ΔR.
  - Compare the model prediction and the label of truth particle.

- Result
  - More than 75% of truth particle can be tagged correctly.

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                    Jet Summary Report
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Total Events Processed: 250
Total Jets Processed  : 500
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Jet Flavor Fractions (M6-level):
  - b-jets (b+b_bar) : 454 / 500 (90.80%)
  - c-jets (c+c_bar) : 26 / 500 (5.20%)
  - light-jets       : 20 / 500 (4.00%)
Detailed b-jet Counts (M11-level):
  - b quark jets     : 236 / 500 (47.20%)
  - b_bar quark jets : 216 / 500 (43.20%)
------------------------------------------------------------
Event Pair Fractions (for 2-jet events):
  - bb events: 209 / 250 (83.60%)
  - cc events: 2 / 250 (0.80%)
  - ss events: 0 / 250 (0.00%)
  - gg events: 3 / 250 (1.20%)
    - b + b          : 29 (13.88% of bb)
    - b_bar + b_bar  : 18 (8.61% of bb)
    - b + b_bar      : 162 (77.51% of bb)
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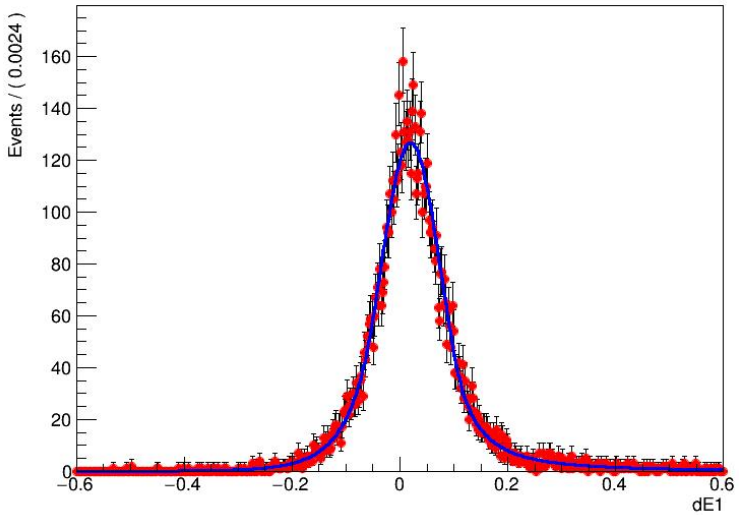
Another test of JetDump.py

Summary

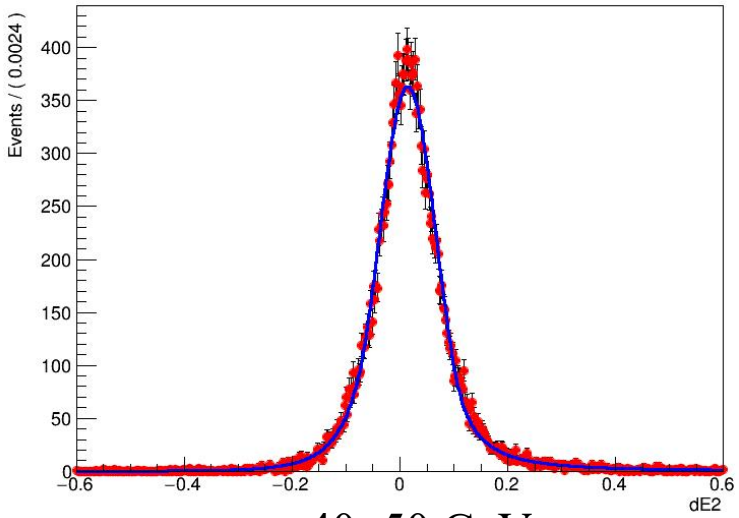
- JER validation
  - The Fit result show a decline in 60~80GeV, but is consistent with TDR in general.
  - Hao gives the similar result.

- Test of PrimeTagSvc
  - Show a good performance on Flavor Tagging and Charge Tagging.

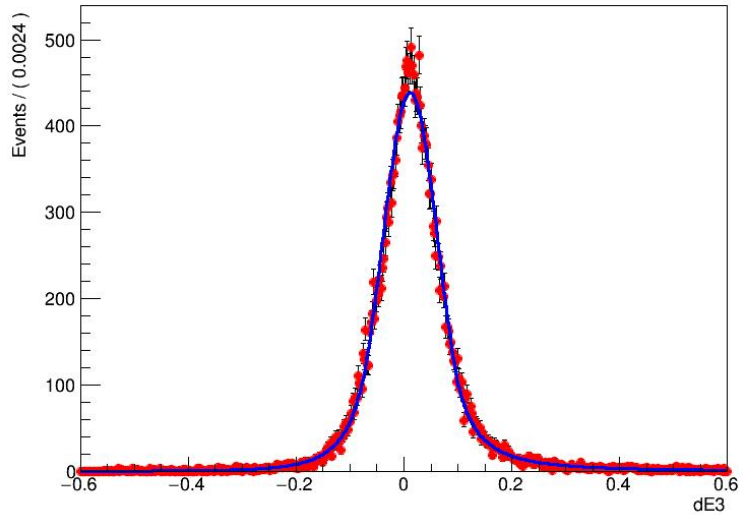
Back Up



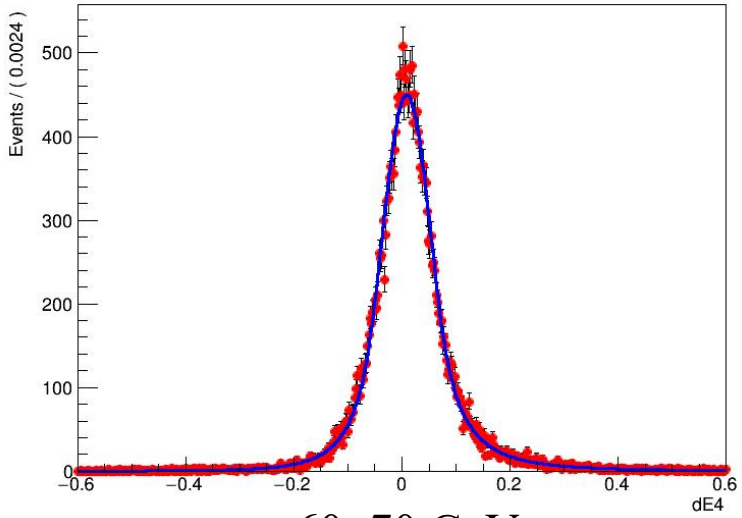
30~40 GeV



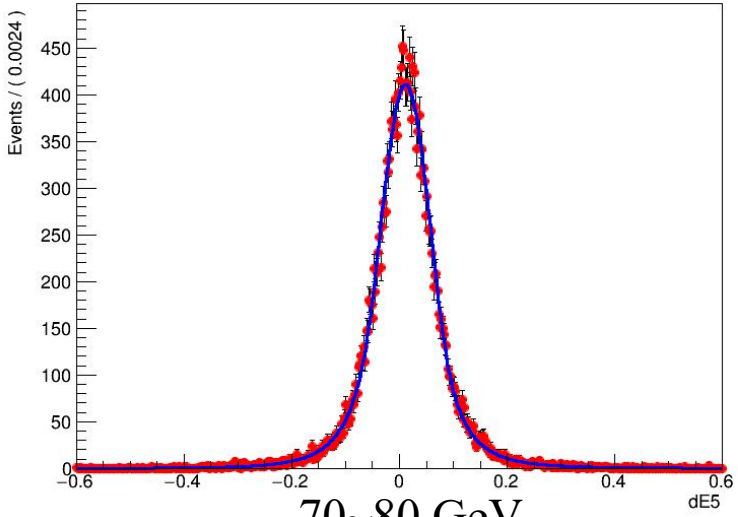
40~50 GeV



50~60 GeV



60~70 GeV



70~80 GeV