Jet Energy Resolution Validation

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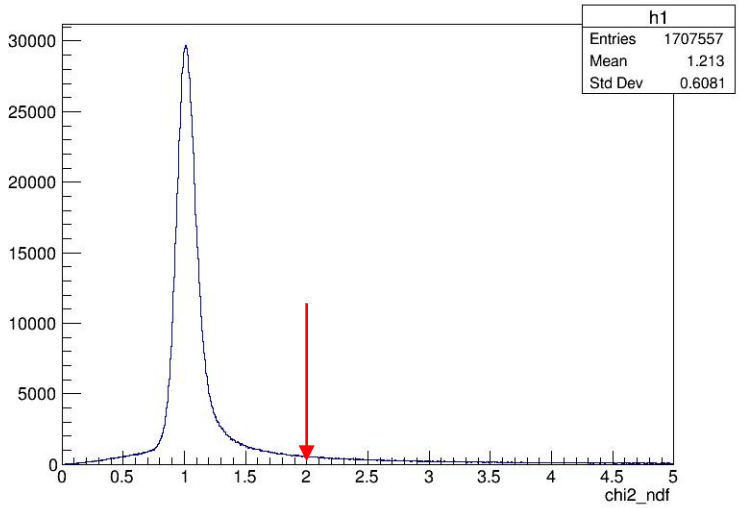
1 IHEP

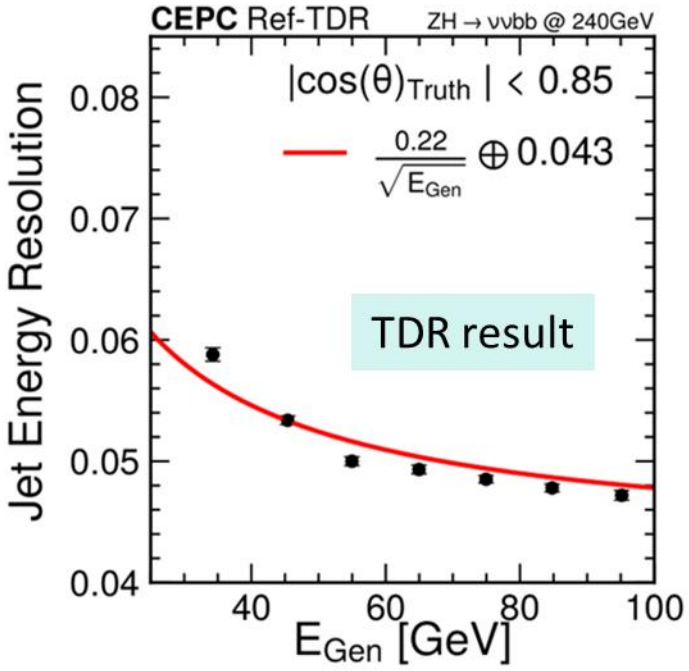
Validation

- Dataset: ee → uu events given by Kaili.
  - Six data points: E60_eeuu, E80_eeuu, E100_eeuu, E120_eeuu, E140_eeuu, E160_eeuu.
  - Reconstructed by CEPCSW25.3.7.
  - Jet Reconstruction by eekt.
  - Jet truth match with ΔR.



- Add cut on χ^2/ndf
  - χ^2/ndf < 2.0

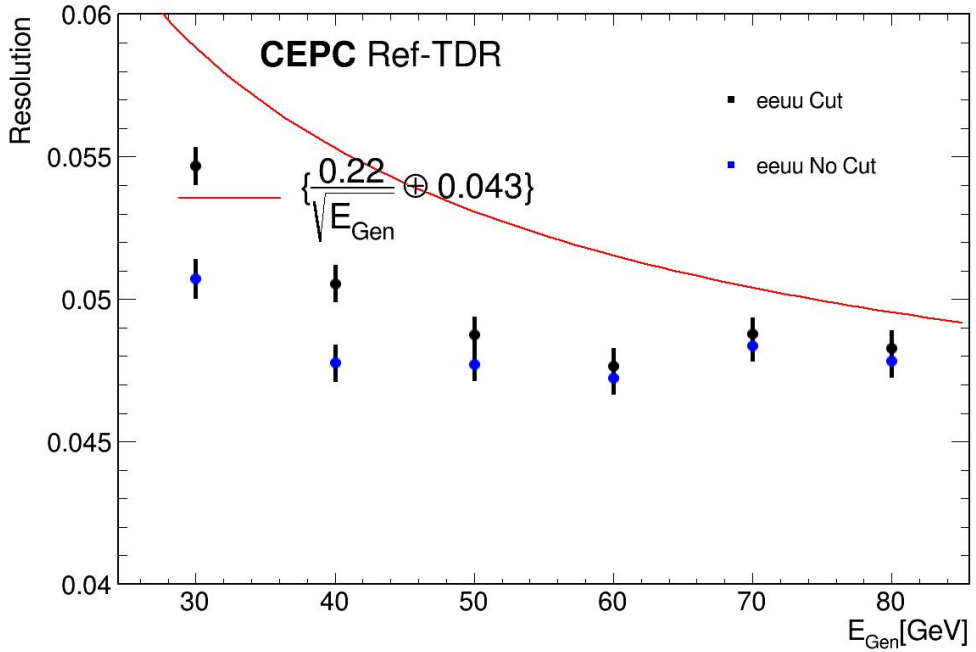
data	E60	E80	E100	E120	E140	E160
efficiency	87.47%	88.17%	88.69%	89.06%	89.37%	89.59%



- Cut
  - |cosθ| < 0.85.

- Calculation
  - ΔE= E(RecoJet) – E(GenJet).
  - Resolution = ΔE/E (Use TwoSidedCB to fit the ΔE/E).

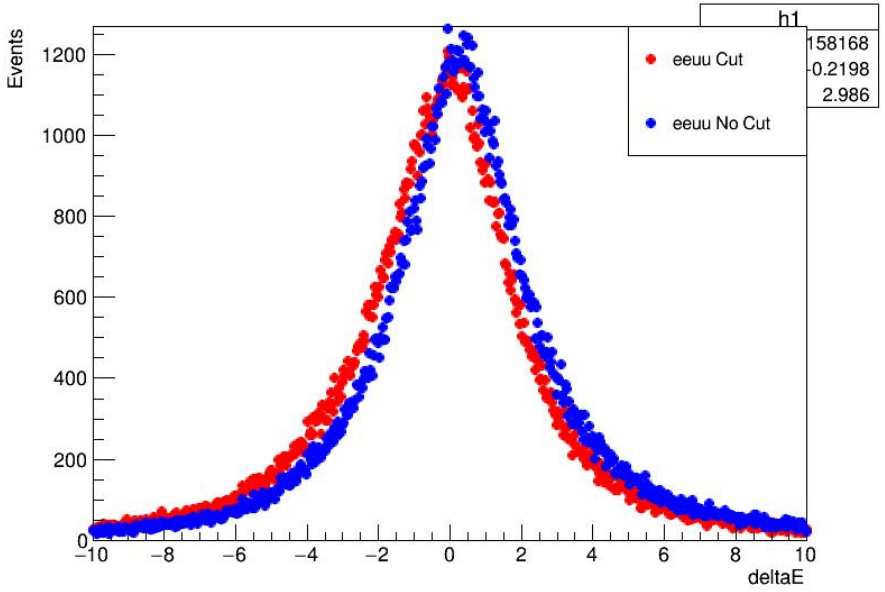
- Result
  - Cut on χ^2/ndf dosen't have positive impact on JER.

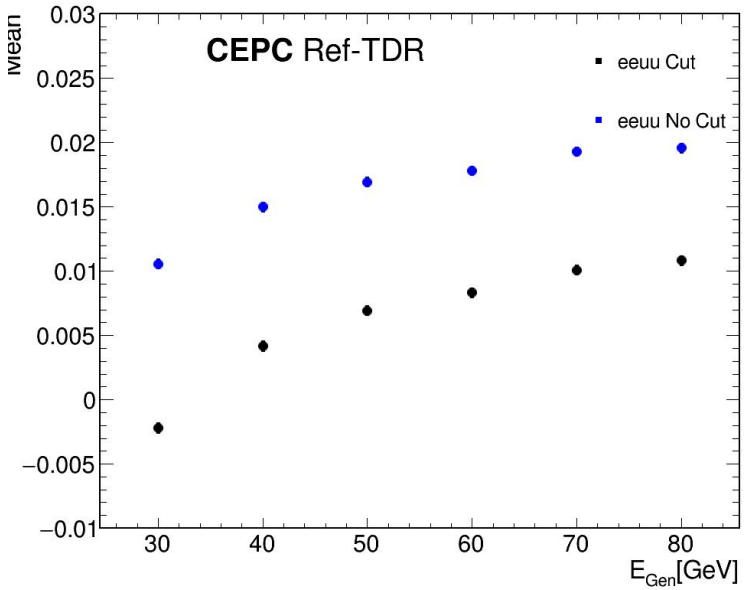


Validation

- Comparison between events before and after χ^2/ndf cut.
  - When collision energy rises, mean value of ΔE/E gradually deviates from 0.
  - χ^2/ndf cut makes a overall decline while pulling it toward 0.

- Conclusion
  - χ^2/ndf cut optimize the jet energy reconstruction.

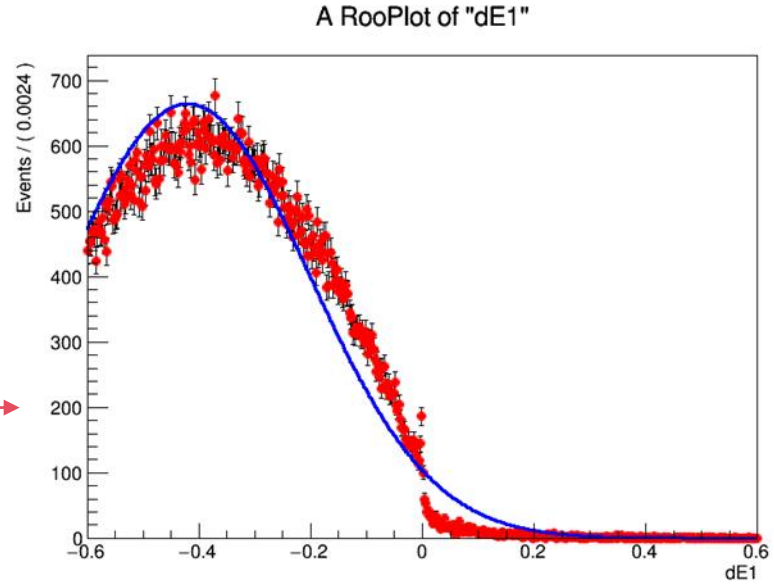


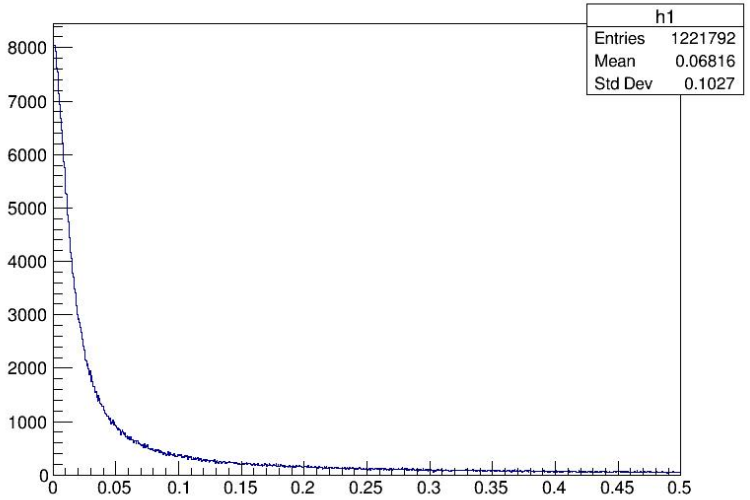


Backup

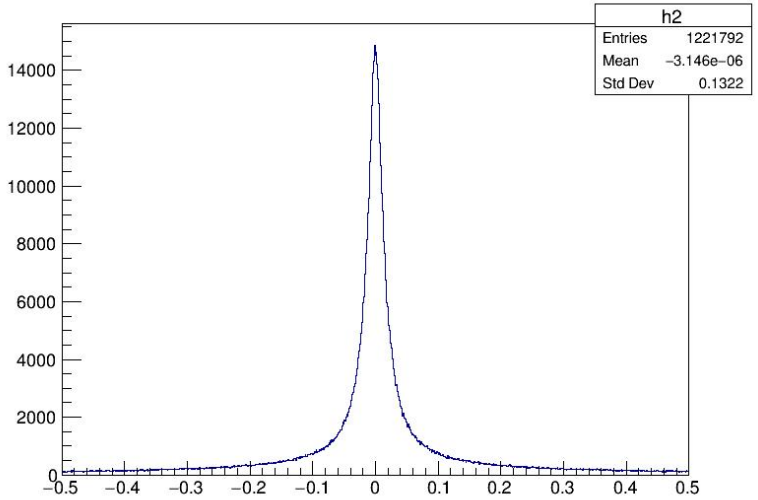
- Additional Validation: adding D0 and Z0 cut in PFO reconstruction
  - D0 < 0.2 and |Z0| < 0.2

- Result
  - JER is 4 times higher than before.
  - Distribution of dE deviate from 0.





D0



Z0