Validation of PFA for ILD_l5_o2_v02

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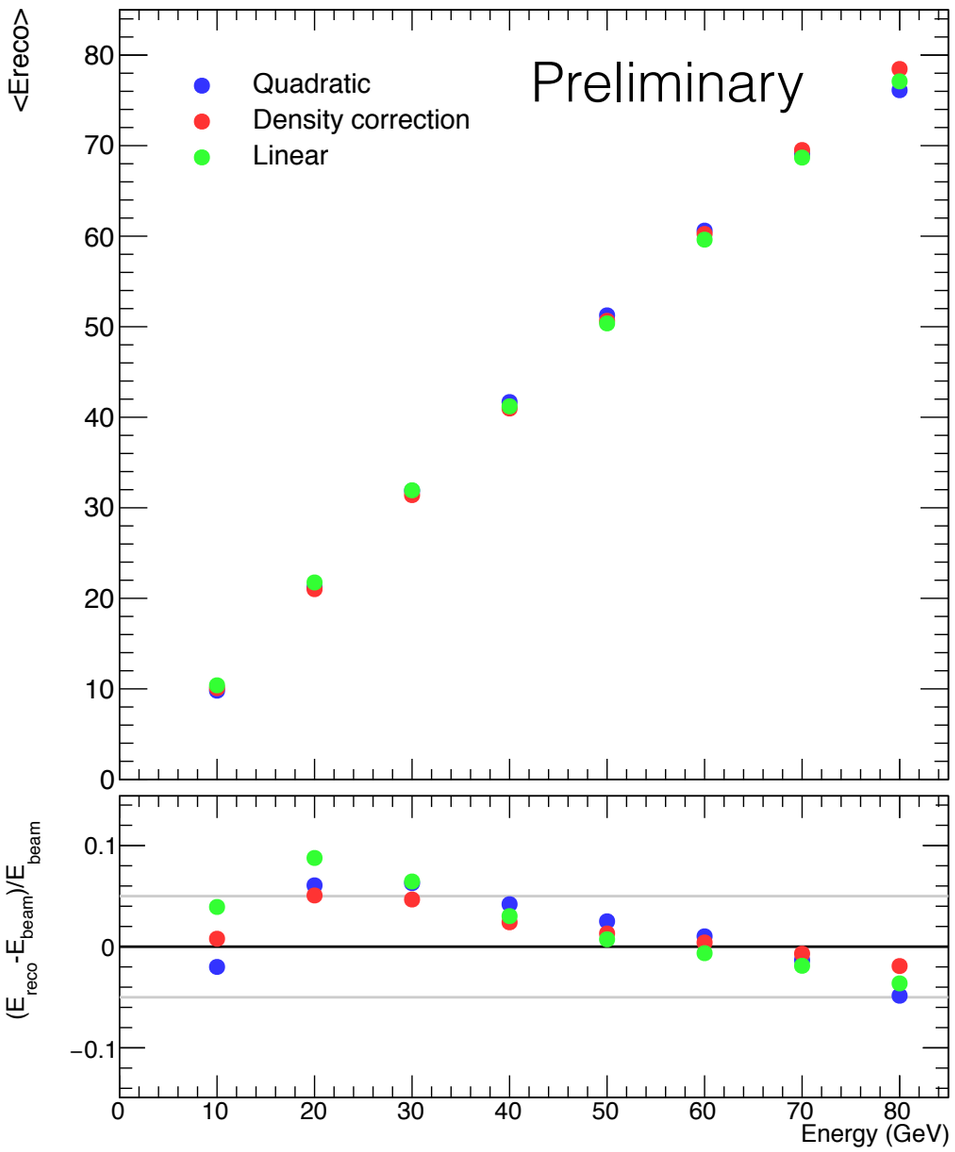
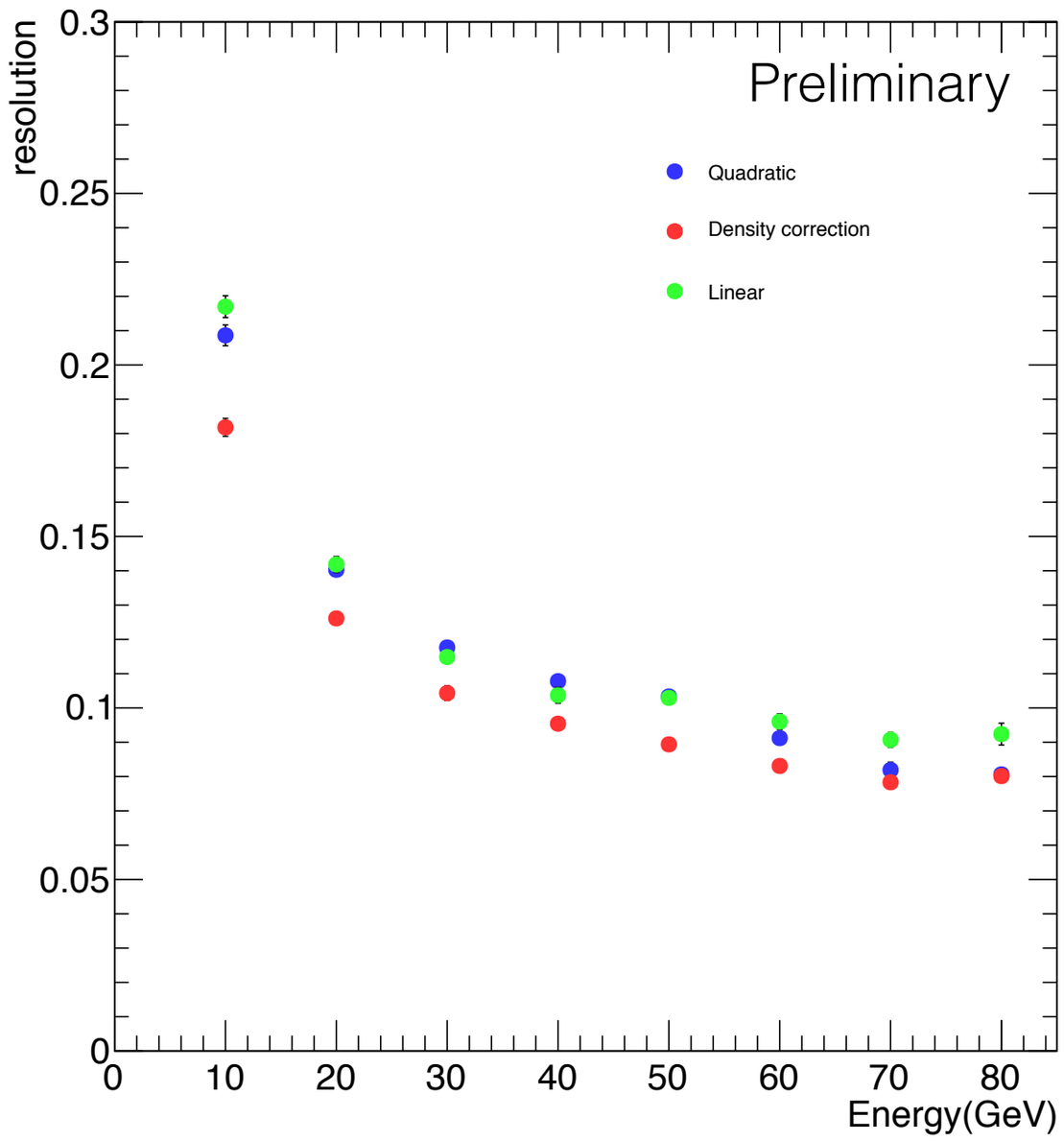
Introduction

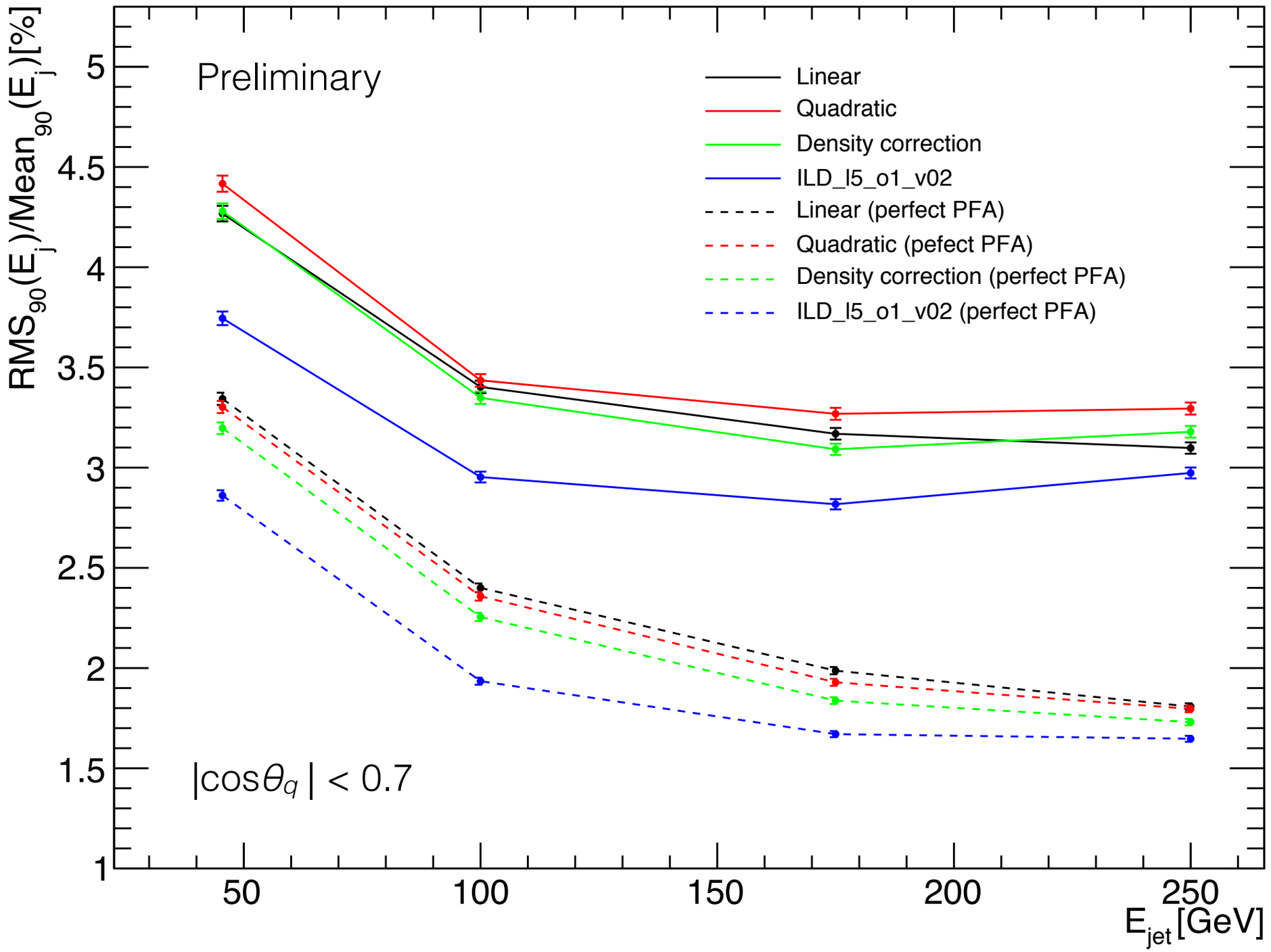
- ILCSoft: v01-19-05
  - ILDConfig: v01-19-05-p01
  - ILD model: **ILD_l5_o2_v02** (with SDHCAL)
- Digitizers for SDHCAL
  - SimDigital
  - SimDigitalToEnergy (**linear parametrization**)
- Event samples
  - Calibration: shoot pions at HCAL endcap, position: (180, 1400, 2650)mm
  - JER: uds samples of the 2nd test production, 6k; Reconstruction for ILD_l5_o2_v02 from simulation sample (91 GeV) and reconstructed one.
- Implementation and modification:
  - Hadronic energy correction plugins in PandoraPFA: **quadratic parametrization** and hit **density correction**
  - Perfect PFA:
    - LCRelation of hits: CaloHit -> SimHit ? (RealisticCaloDigi.cc and DDMCParticleCreator.cc)
    - PandoraPFA.xml: the value of RelTrackCollections should be MarlinTrkTracksMCTruthLink

SDHCAL calibration





Jet energy resolution



Summary

- The JER of ILD_l5_o2_v02 is basically better than 4%.
- For the performance, two aspects are undergoing on our side:
  - PFA aiming for improving shower separation with the granularity of SDHCAL
  - Energy reconstruction with additional variables, such shower shape.