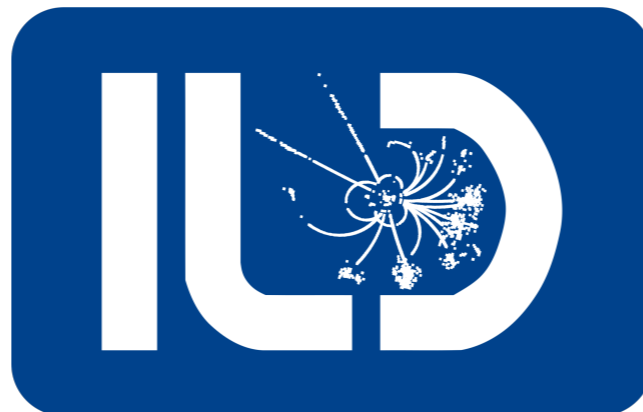


Results of PFA on ILD_I/s5_o2_v02 in the current test production

Bo Li (IPNL)

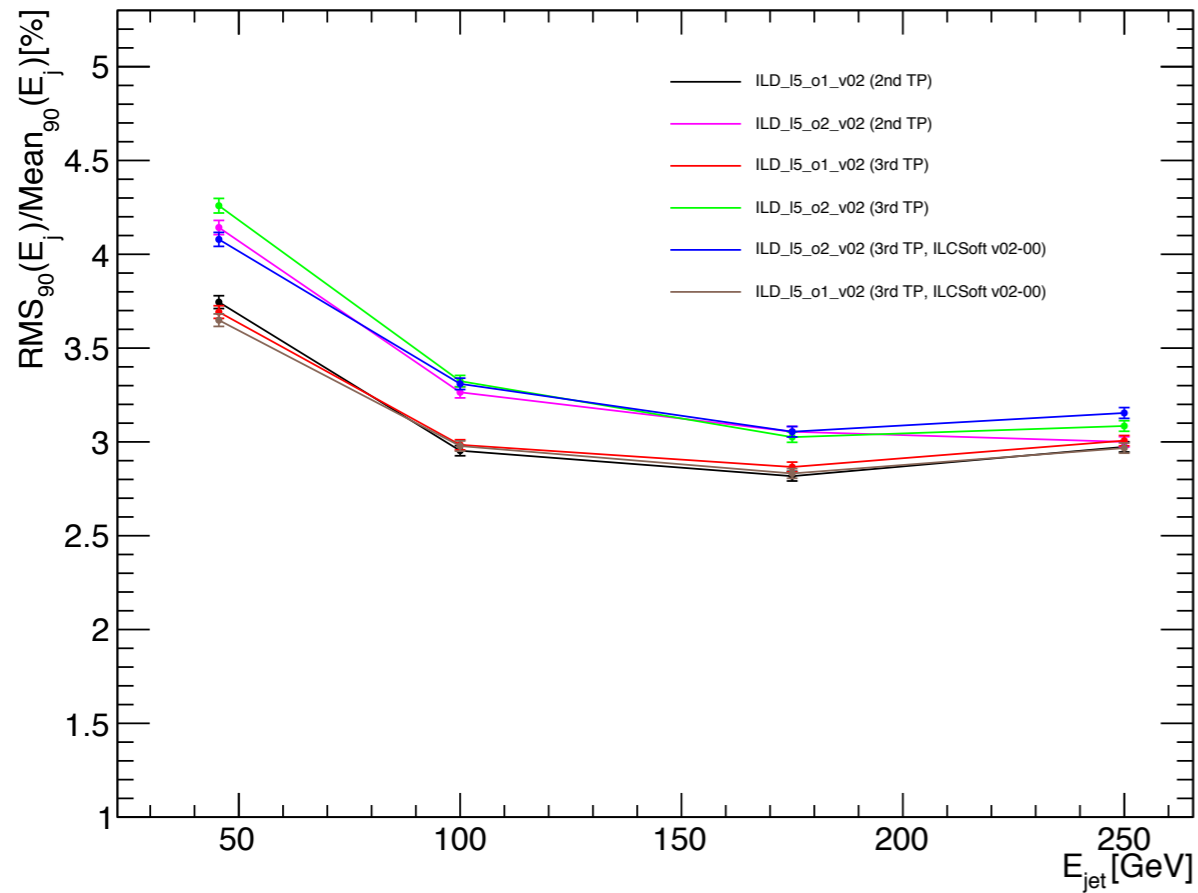
ILD Analysis and Software Meeting
May 23, 2018



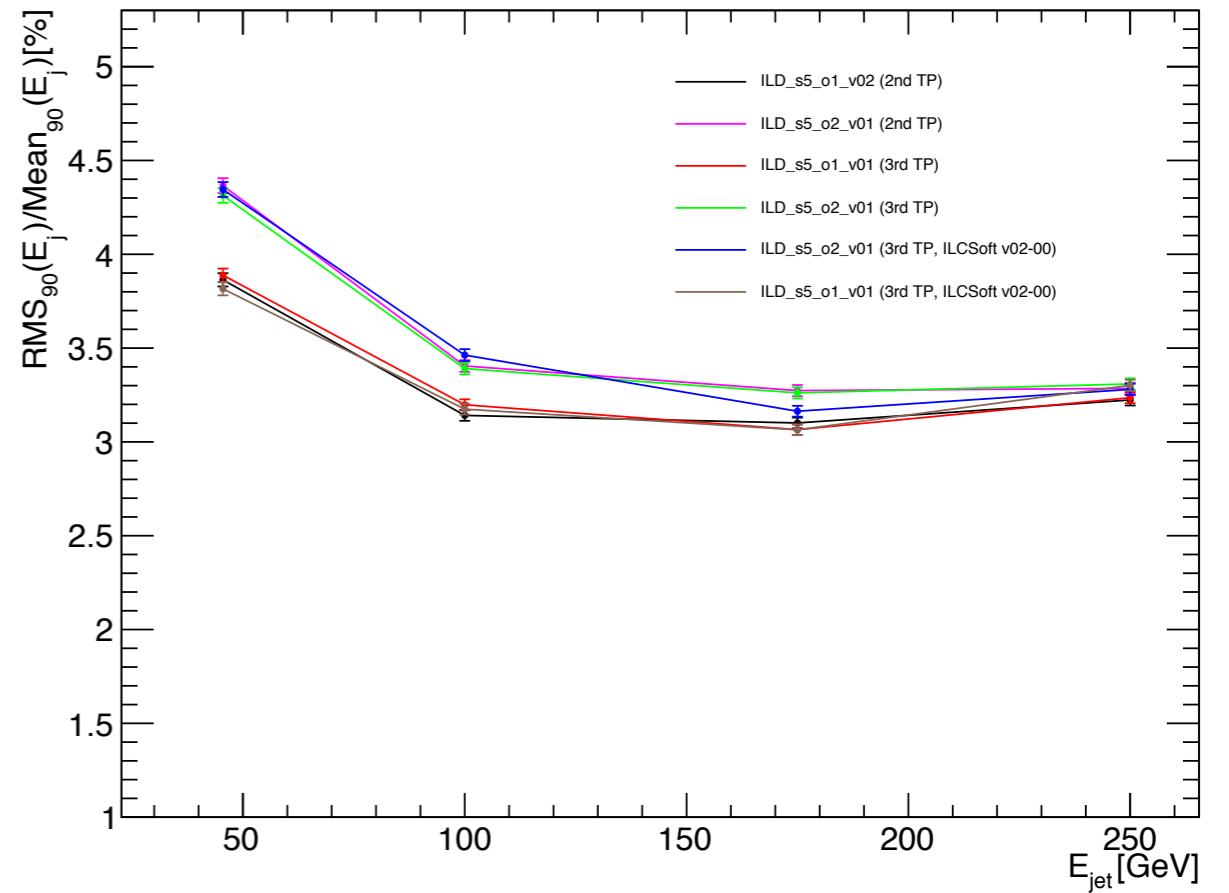
Event samples with the latest ILCSoft

- ILCSoft
 - v02-00
 - ILDConfig: v02-00
- detector model
 - ILD models with SDHCAL option: ILD_I5_o2_v02 and ILD_s5_o2_v02
- Event samples: uds, 10k for each energy point
- Simulation and reconstruction were done by ILD software working group (April 20, 2018).

JER vs. jet energy



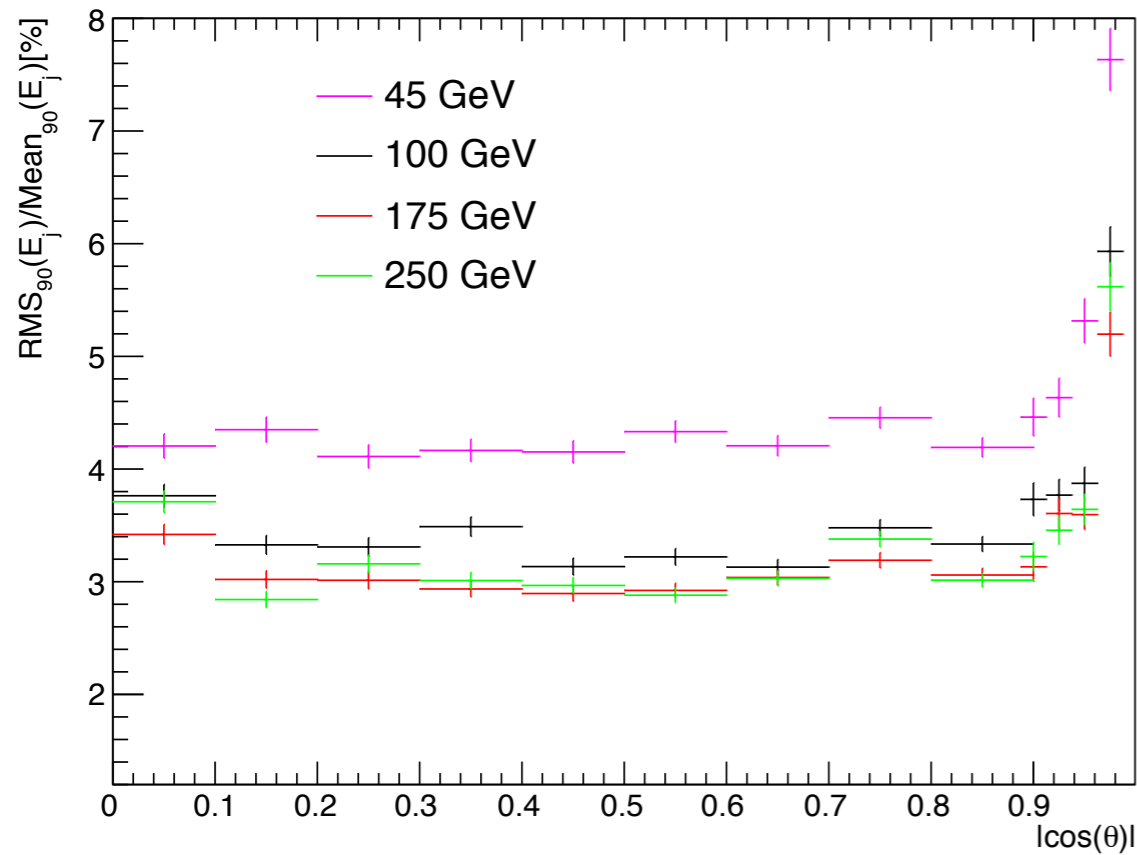
large models



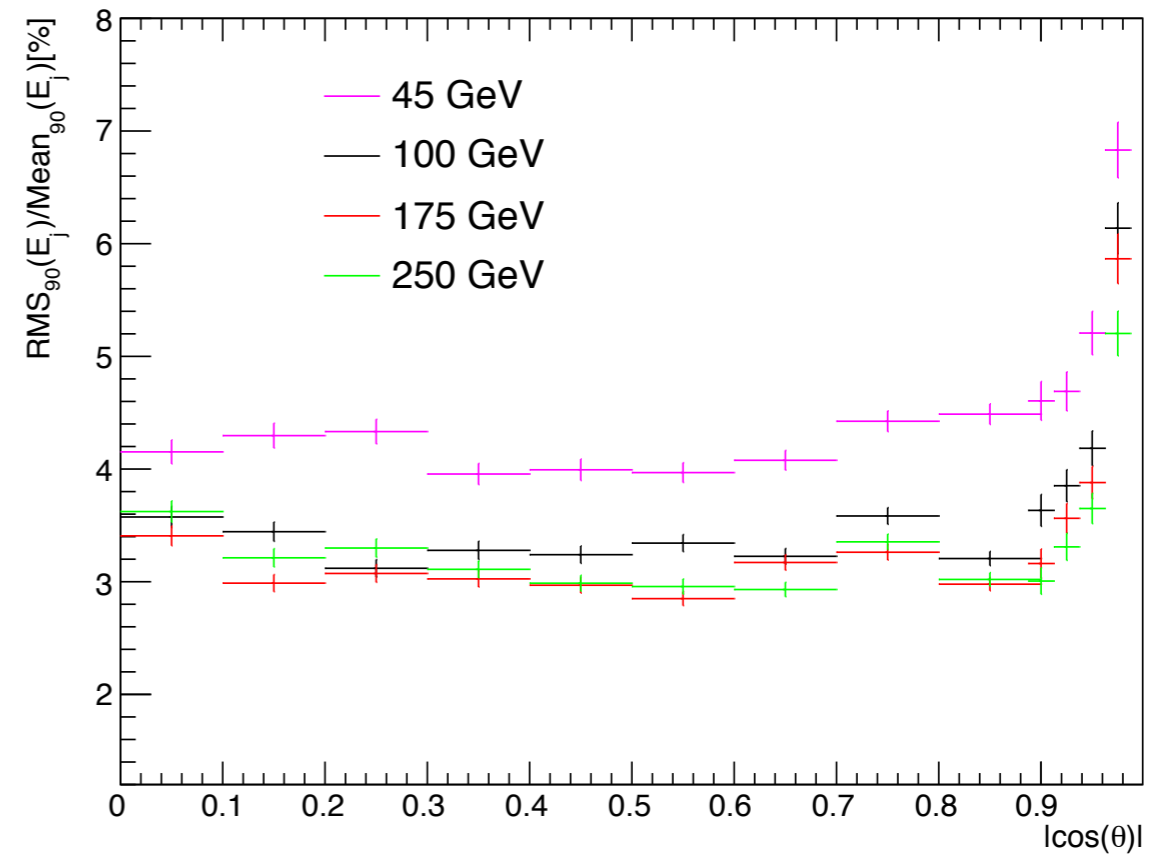
small models

JER vs. polar angle

ILD_I5_o2_v02



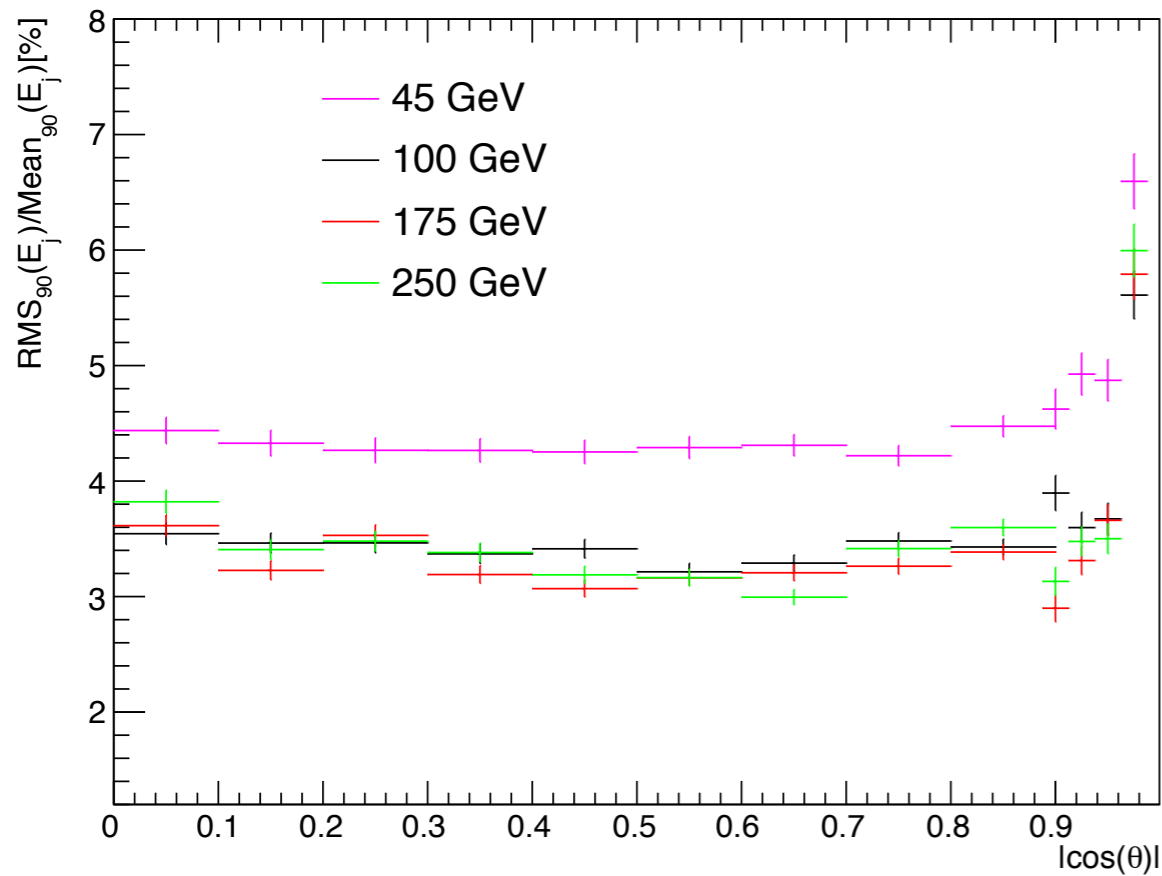
ILCSoft v01-19-06



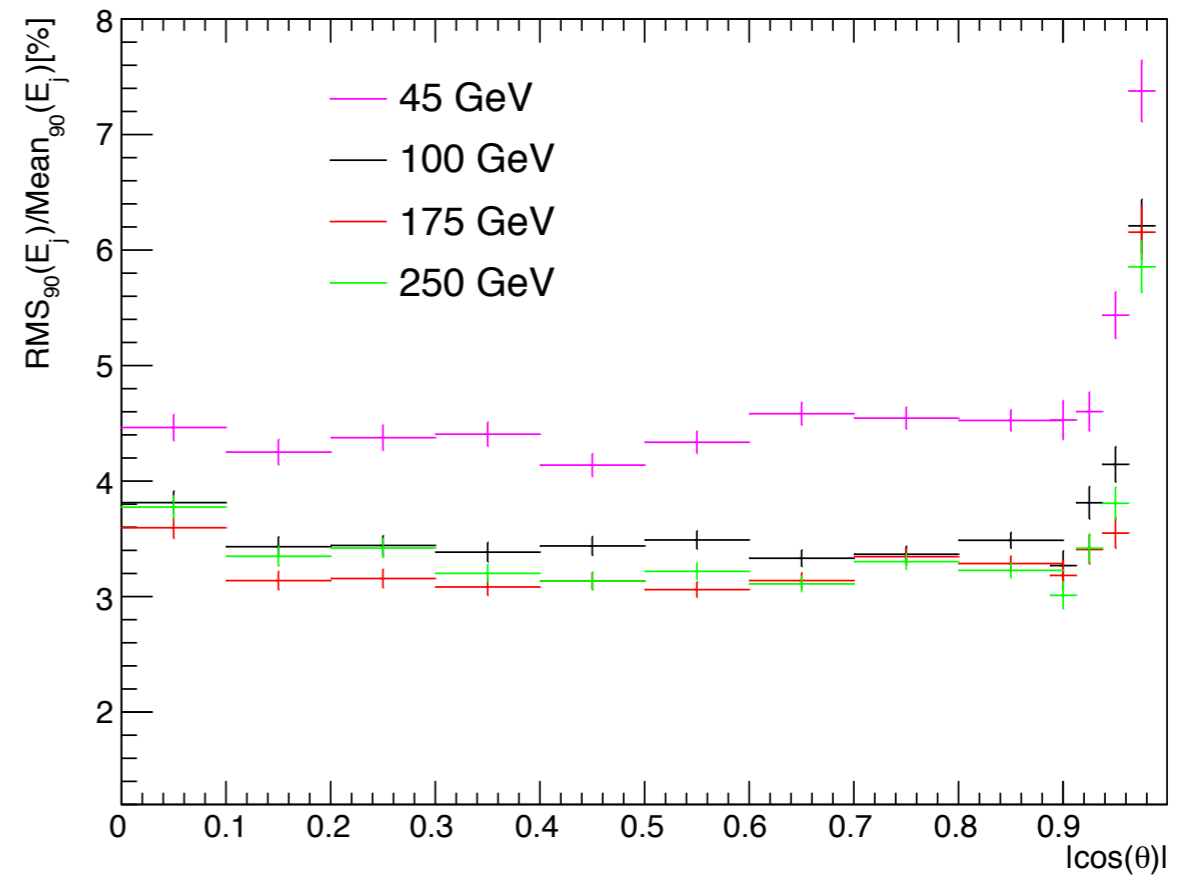
ILCSoft v02-00

JER vs. polar angle

ILD_s5_o2_v02

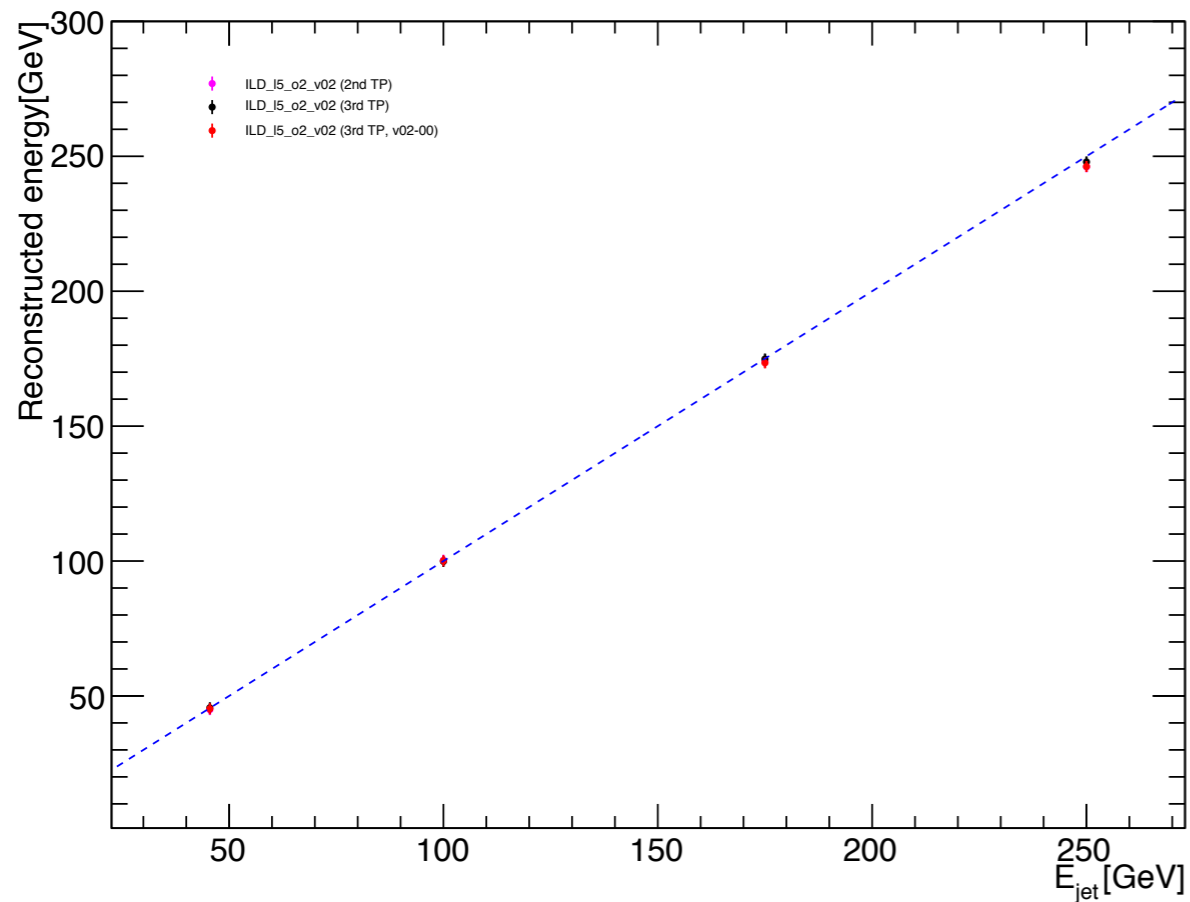


ILCSoft v01-19-06

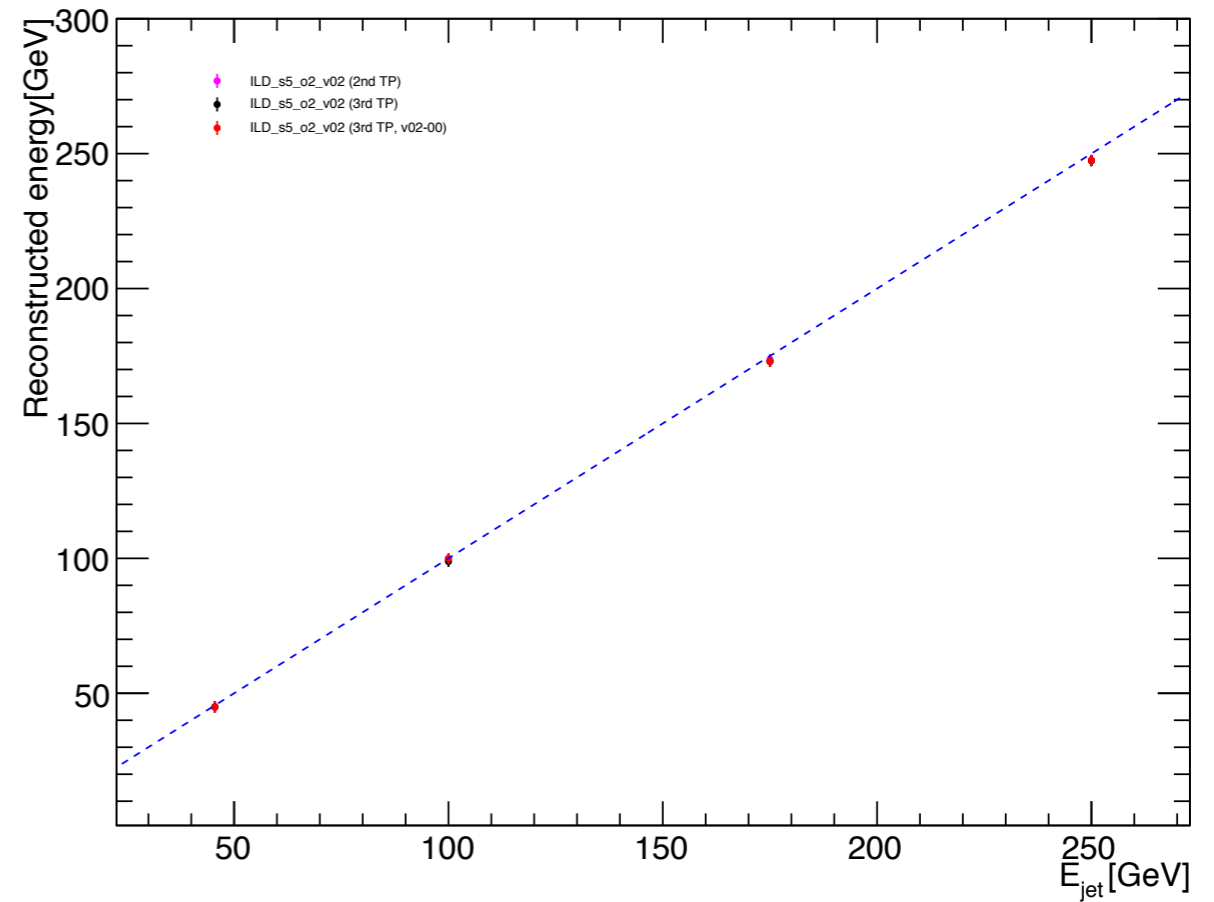


ILCSoft v02-00

Linearity



ILD_I5_o2_v02



ILD_s5_o2_v02

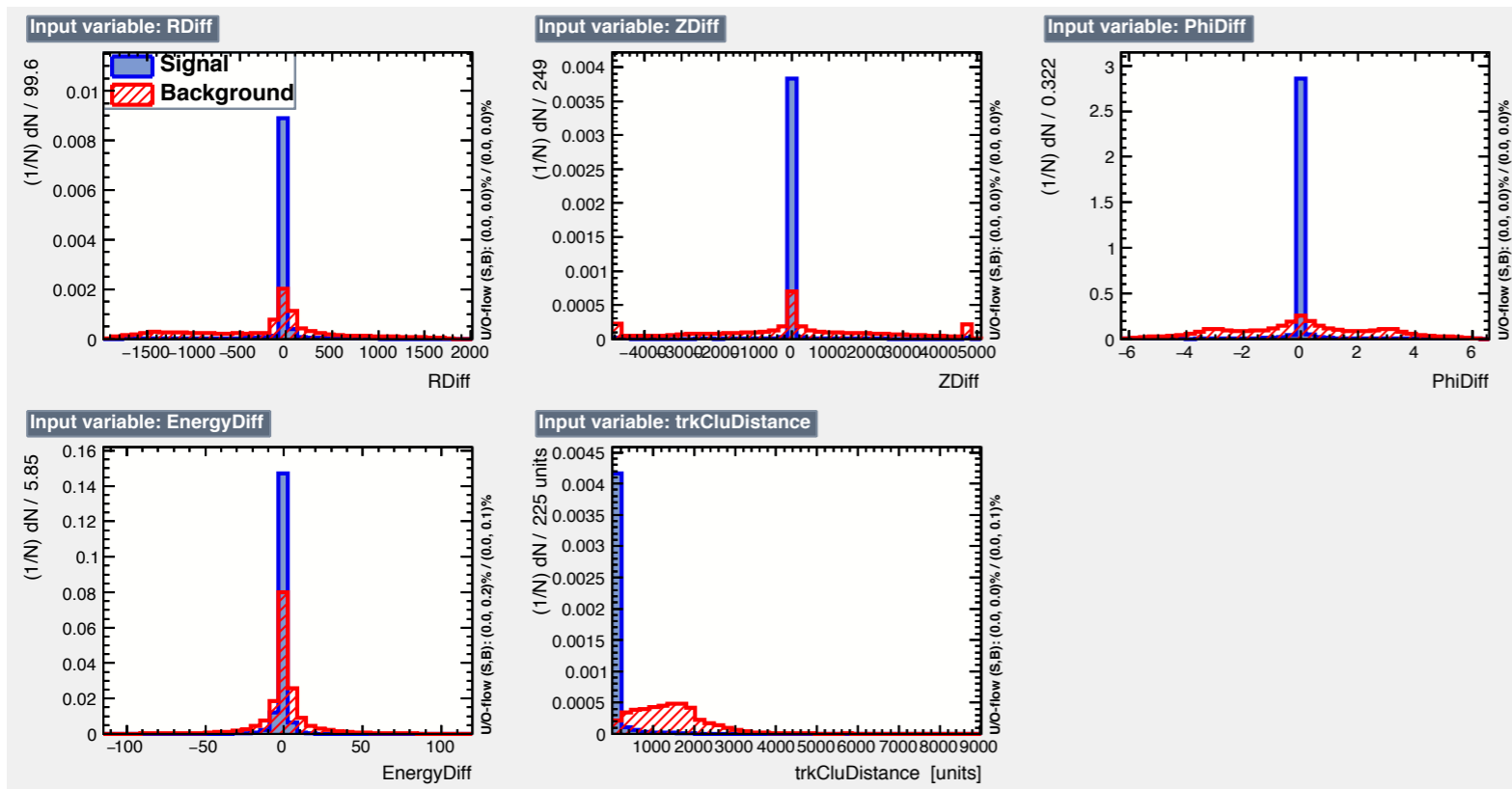
⇒ The PFA results of ILD_I/s5_o2_v02 keep the same as before.

ArborPFA

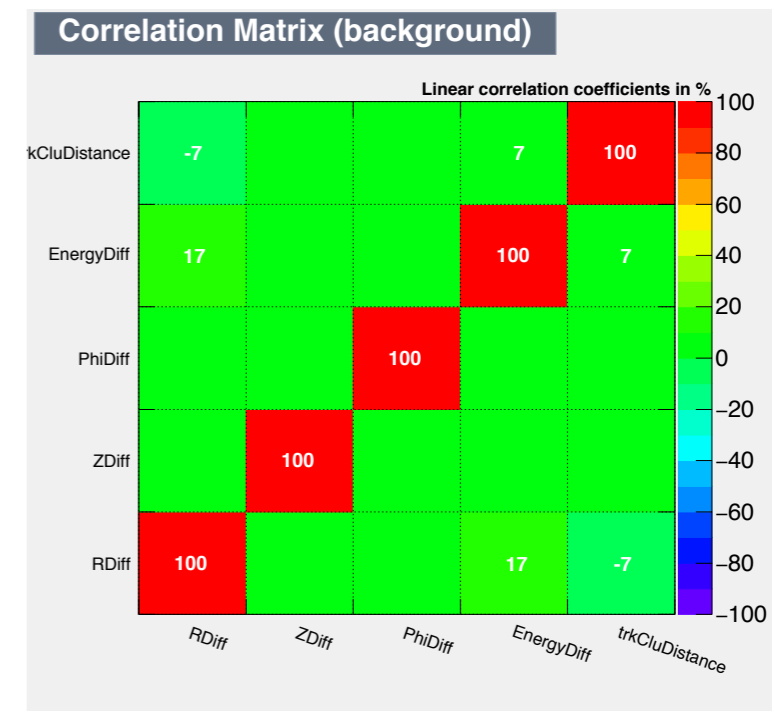
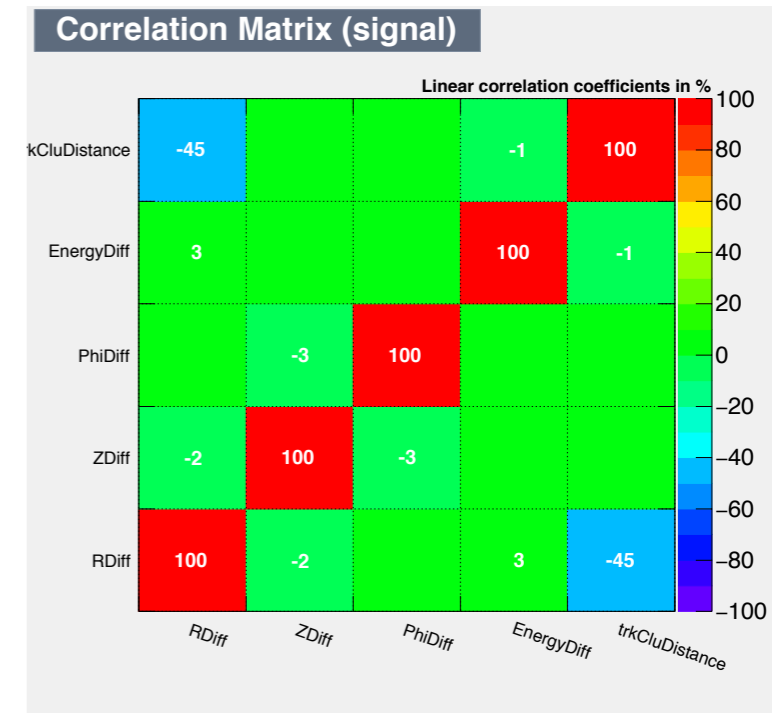
- Updated the code to make it work with the latest ILCSoft
 - use PandoraSDK in the package of ILCSoft (v02-03-00 -> v03-01-00)
 - DDMarlinArbor (from DDMarlinPandora)
- Testing code with the event samples generated in recent test production.
- Making effort to improve the performance of JER
 - Try to decompose the whole algorithm as clustering and track-cluster association as much as possible, so we can test and improve both sets separately.
 - Currently dealing with track-cluster association
 - ▶ cut based: the distance between helix and cluster, energy
 - ▶ MVA: distance, energy, direction
 - Clustering/reclustering is the important and difficult part.

MVA input variables

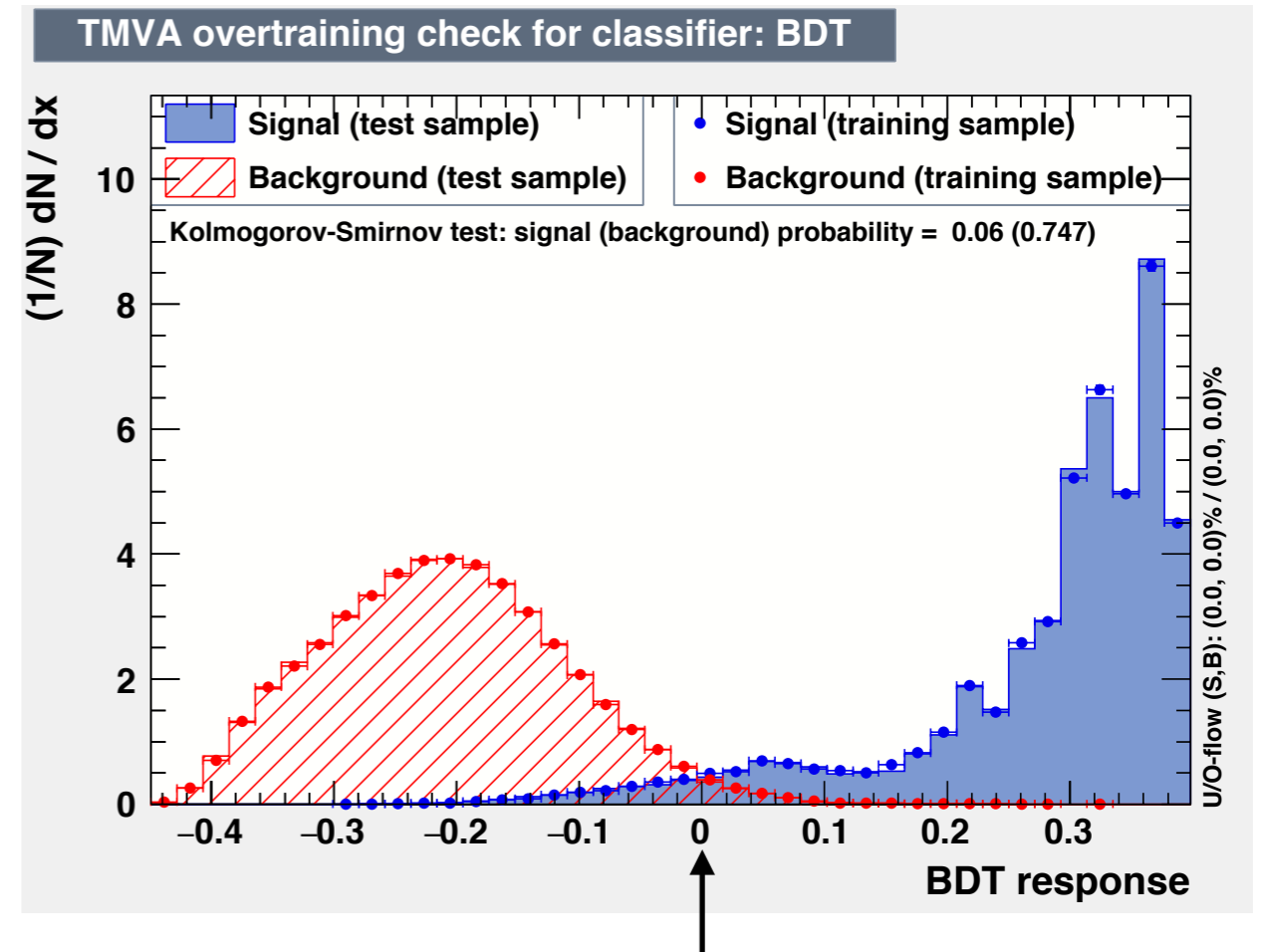
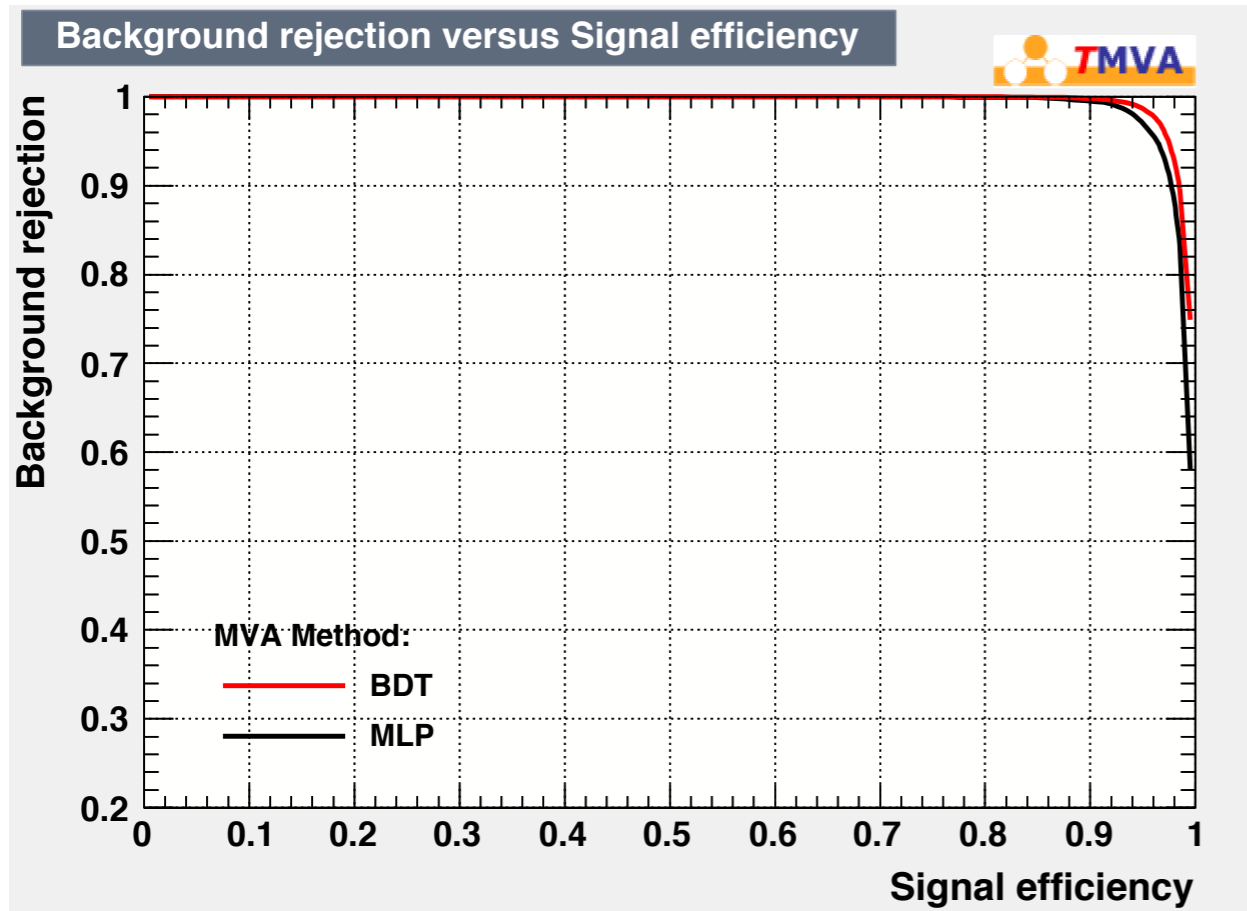
- Signal: correct track-cluster association: reconstructed MarlinTrkTracks and perfect clusters
- Background: bad association



- RDiff, ZDiff, PhiDiff: the difference of cluster and track in the cylindrical coordinate system
- EnergyDiff: energy difference
- trkCluDistance: the distance between helix and cluster COG of inner layers

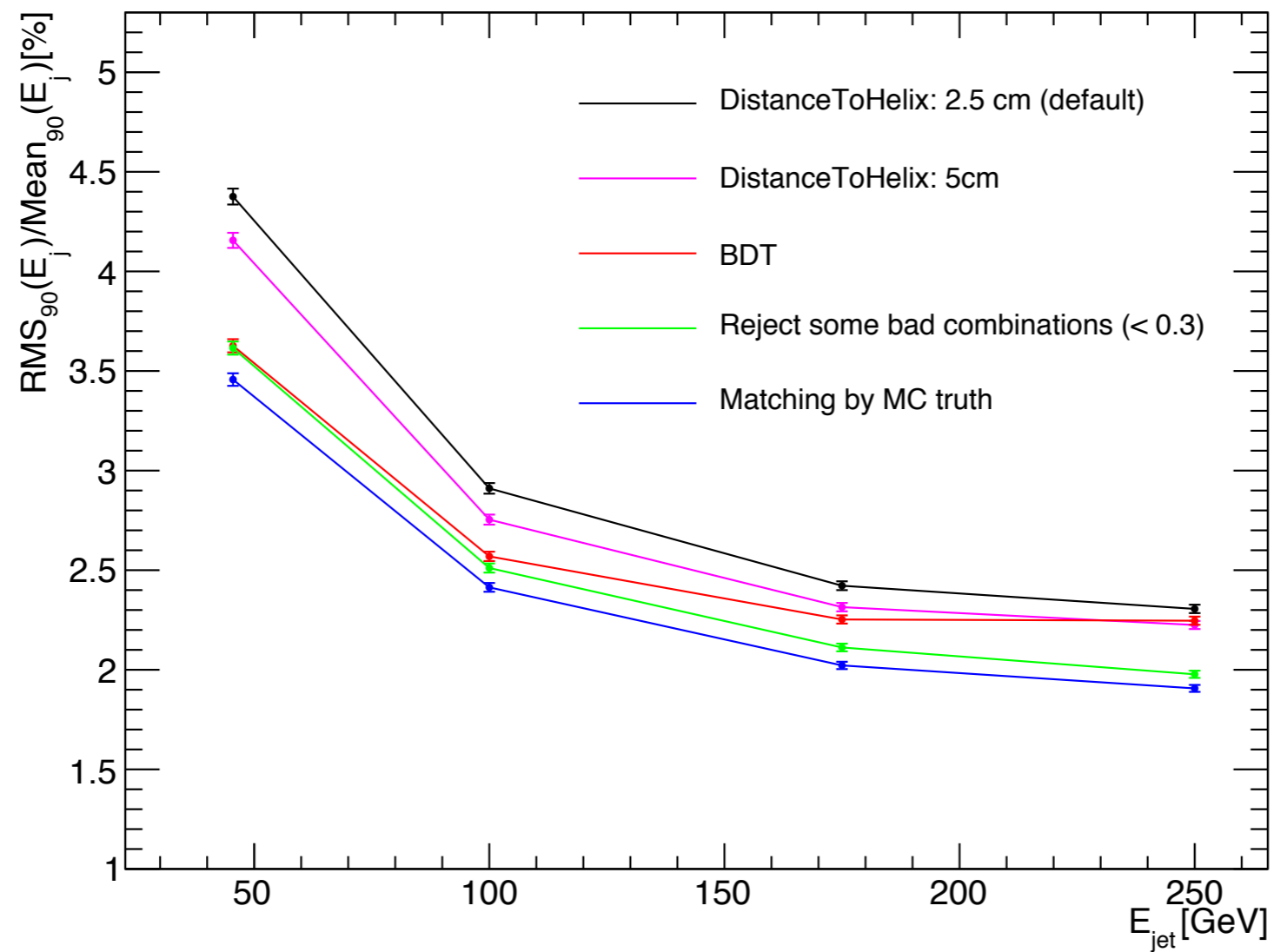


Performance



- The separation seems good, but note that number of background (bad association) could be much larger than signal (correct association).

JER



⇒ Search for new MVA variables to recover the lost information of track and cluster