

Benchmark Studies with Perfect PFA

Standard Perfect PFA for SiD Detectors with :

DigiSim – realistic hits with timing, threshold requirements

Tracks – MC 4-vector for tracked charged particles

Perfect Calorimeter clusters for photons, neutral hadrons

Reconstructed Particle list - LCIO output or in analysis code

Comparison to Fast MC Benchmarking :

Reconstructible (min. tracker hit requirement) Tracks, not all FS charged particles (4-vectors are perfect, but could easily be smeared)

Photon 4-vector formed from simulated calorimeter hits, not smeared energy (non-linear resolution effects)

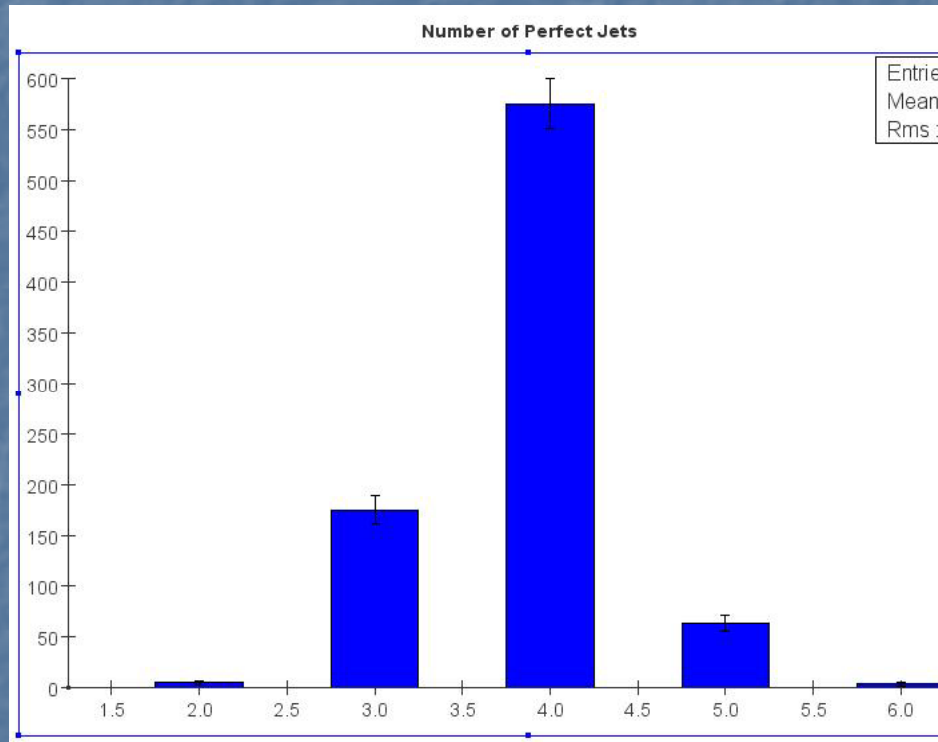
Neutral hadron 4-vector formed from simulated cal hits, including both ECAL and HCAL

JAVA Code exists and is being used in PFA development

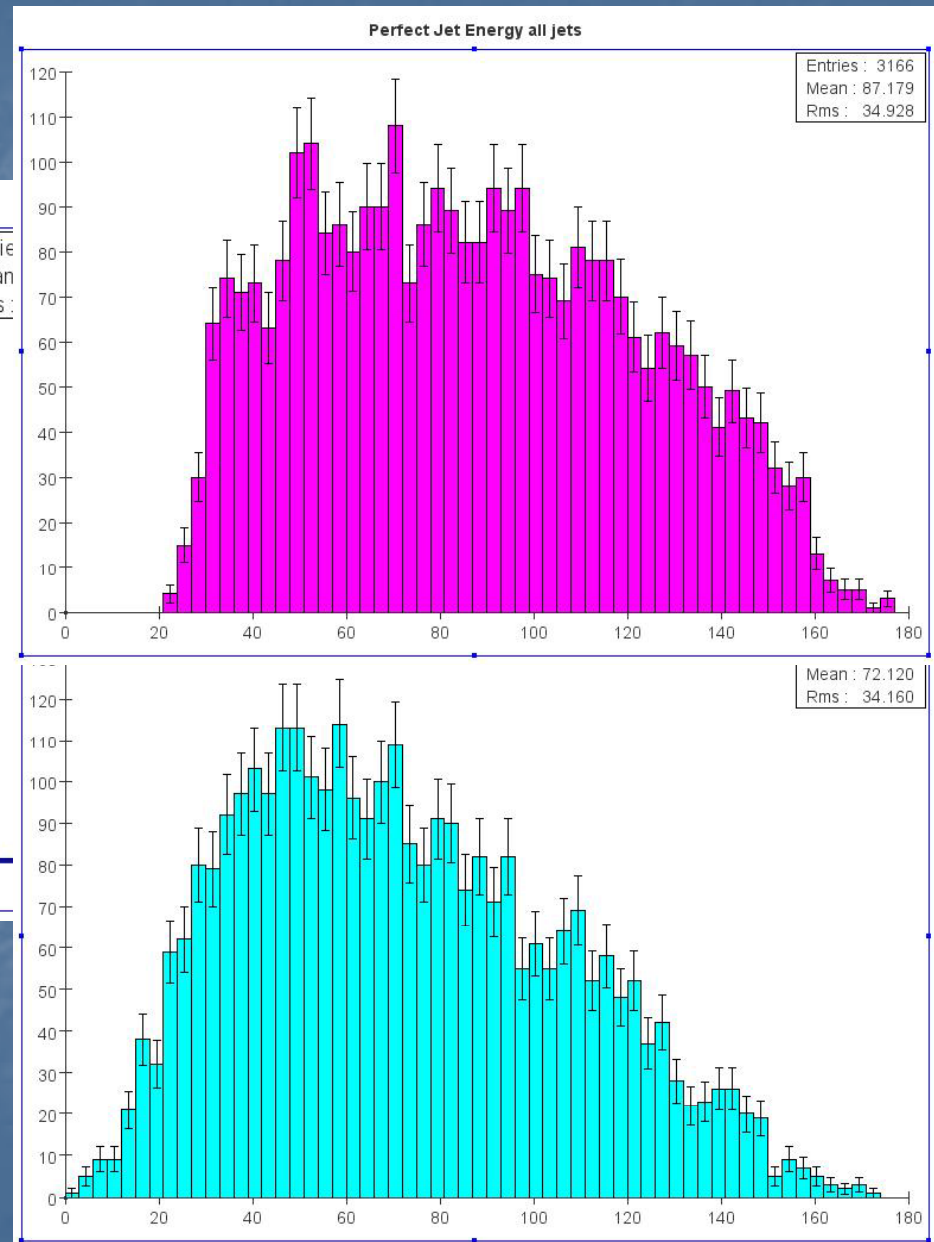
Can be written out in LCIO format

PFA Target – more realistic measure of SiD LOI Benchmark performance

$e^+e^- \rightarrow ZH @ 500 \text{ GeV}$ (4 jets) in SiD01 Detector Model



kT Algorithm with $y_{\text{cut}} = 0.008$



Plot all dijet mass combinations, fit with comb. bkgrd. function

- Perfect PFA dijet mass resolution

