



Status of the SiD-Iowa PFA

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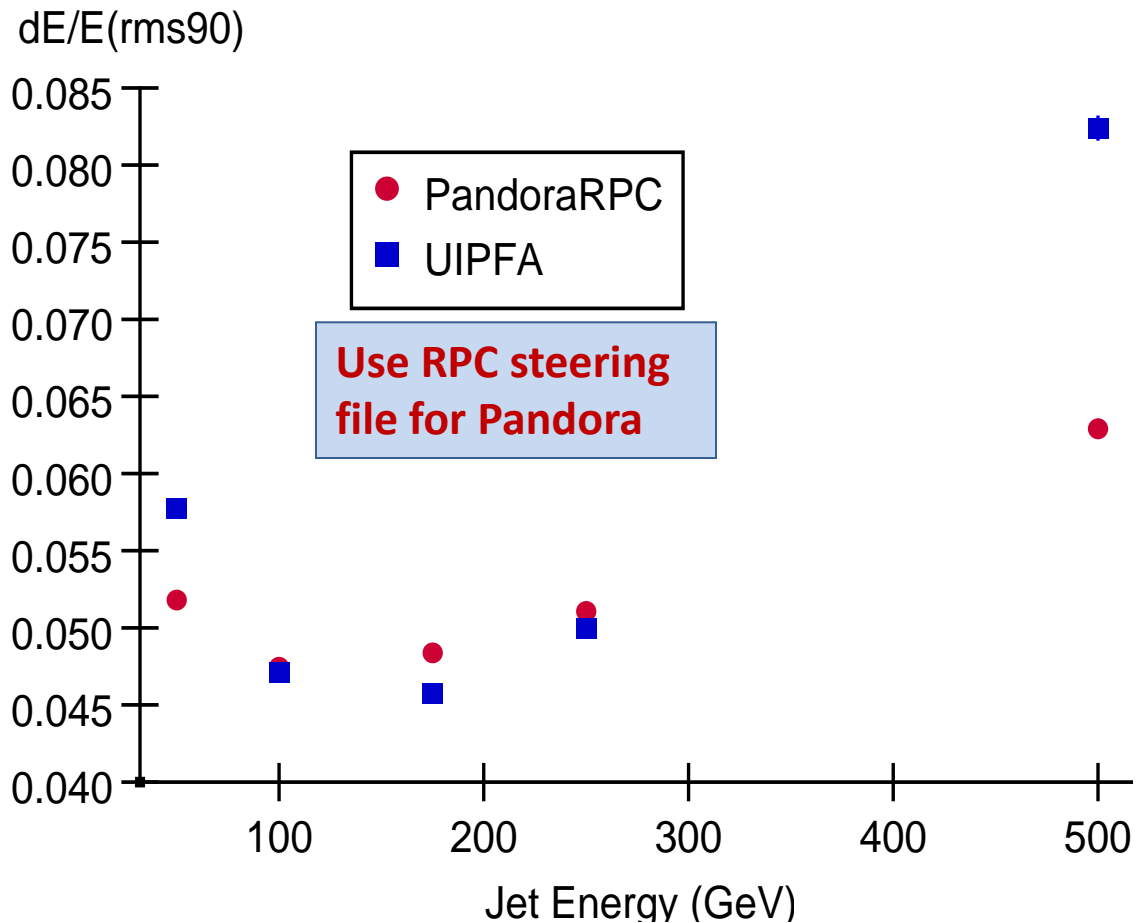
SiD PFA meeting

Introduction

- Latest version of the PFA:
 - Several improvements w.r.t. LOI 2009
 - Performance for SiD02 and SiD03:
 - Resolution
 - CPU
 - The code status in CVS

Baseline performance

QQ_sidloi3.aida



From Ron Cassell's presentation at the PFA meeting on Mar 31st 2011

- Cut events with $q |\cos\theta| > 0.95$
- Plot sum of energy of all Reconstructed Particles.
- Use distribution $(\text{rms90}/\text{mean90}) * \sqrt{2}$

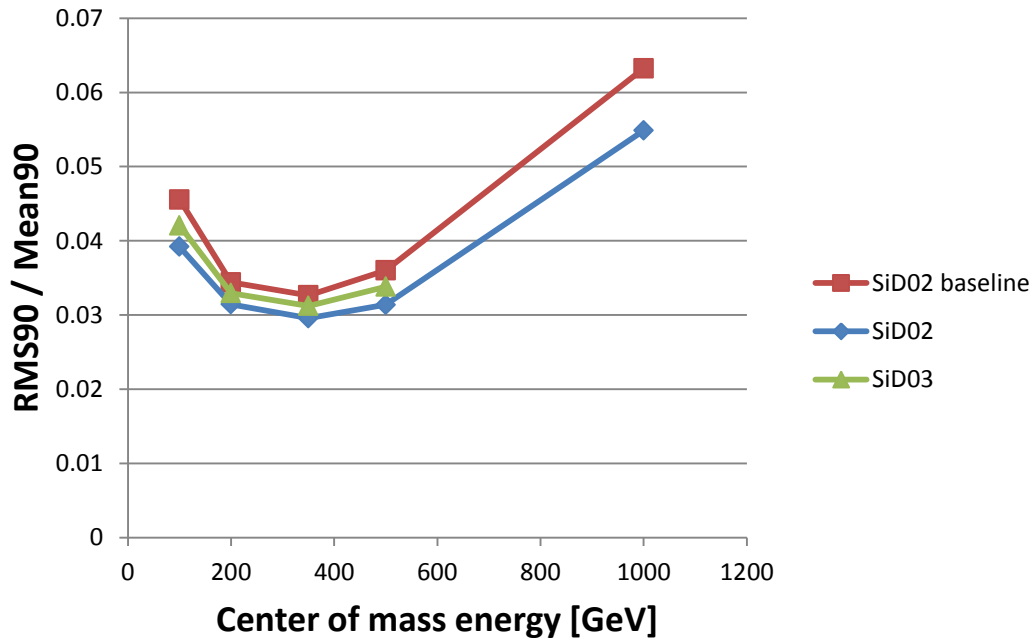
Improvements w.r.t. the Baseline

- Treatment of the photon:
 - Photons treatment: photons are treated as Hadrons if in proximity of a nearby track
- Clump finding: replace nearest neighbor clustering with a new k-mean clustering
- Link scoring: rely entirely on a likelihood optimized differently in different sub-detectors and taking into account high correlation
- Improved track-seed matching: fixing pathological track-seed matching cases due to the presence of high energy photon nearby.

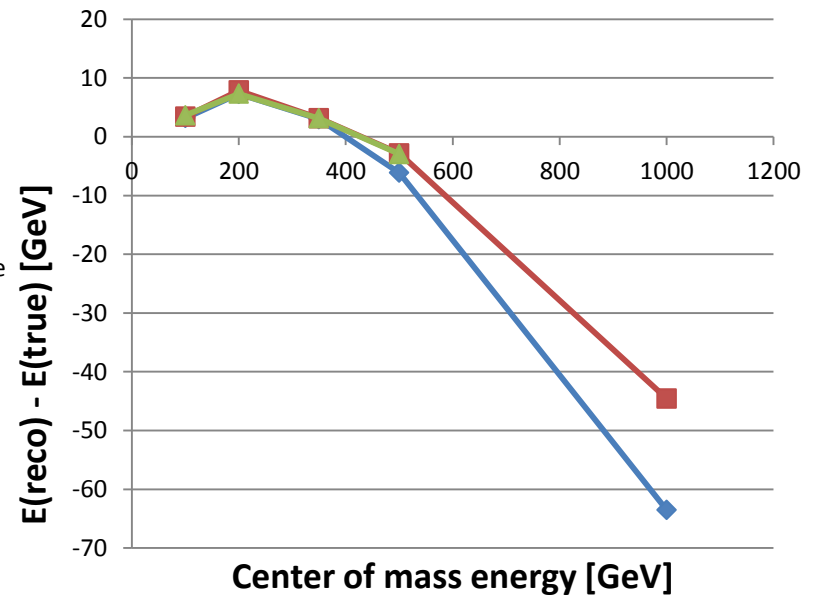
Current performance

- Missing 1 TeV point for SiD03

Event energy resolution



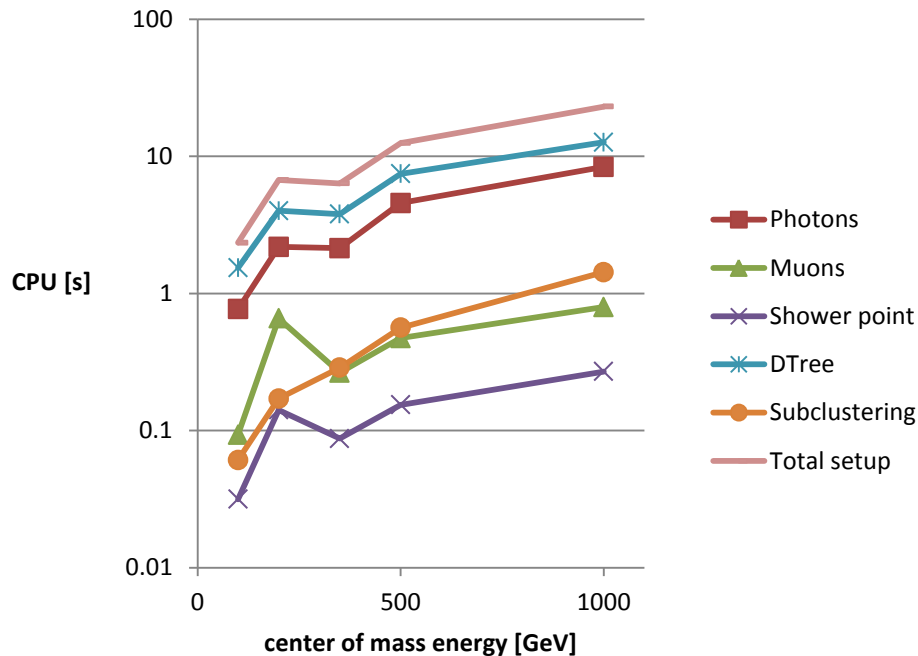
Event energy offset



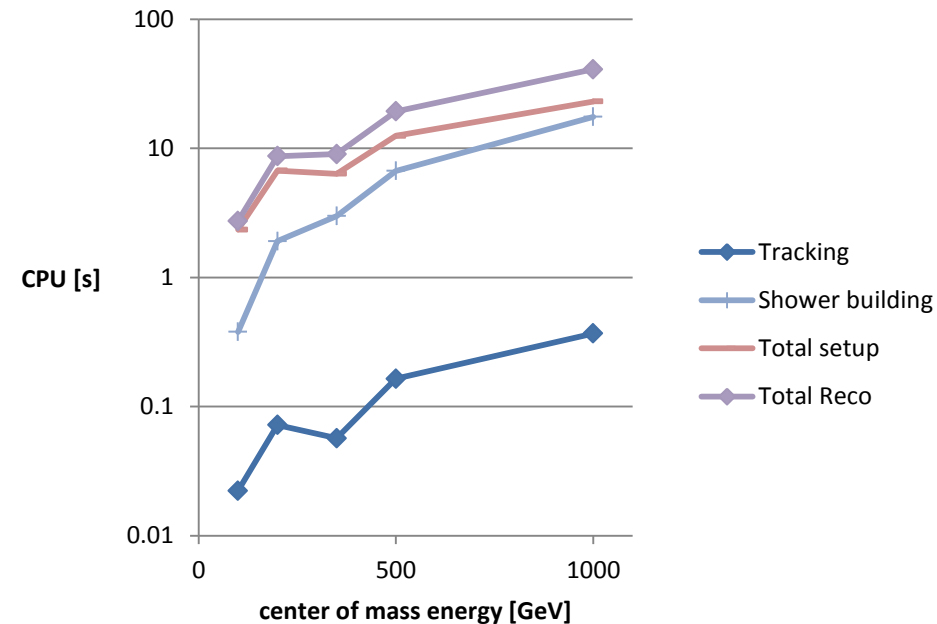
CPU performance

- Normalized to machine independent SLAC CPU units
- Total CPU dominated by the setup stage:
 - Which in turn is dominated by the DTree clustering

Setup detailed - log scale



Summary - log scale



The code in CVS

- The code is already in CVS in the contrib area:
 - Location:
 - org.lcsim.contrib.uiowa.uiowapfa
 - Packages affected:
 - org.lcsim.recon.cluster.clumpfinder
 - org.lcsim.recon.cluster.structural
 - org.lcsim.recon.cluster.structural.likelihood
 - org.lcsim.recon.pfa.structural
 - org.lcsim.recon.pfa.structural.sharing
 - New packages:
 - org.lcsim.recon.cluster.clumpfinder.kmean
 - org.lcsim.recon.pfa.debug
 - org.lcsim.recon.pfa.structural.shower

Running the code

- Run with lcsim:
 - Top level driver:
 - org.lcsim.recon.pfa.structural.PFAWrapper
 - Sample xml files:
 - Attached to the agenda
 - The difference is the tracking version between sid02 and sidloi3
- Input files:
 - /nfs/slac/g/lcd/ilc_data/ILC<CME>/qqbar/<detector>/slcio/slic/*.slcio
 - <CME> = 100, 200, 350, 500 and 1000
 - <detector> = sid02, sidloi3
 - Complete list attached to the agenda as text files compressed into a tar file