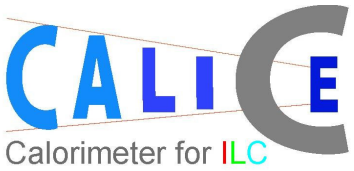

ZHH CHANNEL: SOFTWARE AND DETECTOR PERFORMANCES FOR ILC

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OUTLINE

This is an update to the LC note LC-PHSM-2007-003

- ZHH Channel: summary of reconstruction and software used
- Generator differences
- Tracking performances
- Particle Flow Algorithm performances
- Detector comparison
- First look at background
- Conclusions

ZHH Channel

- The $e^+e^- \rightarrow ZHH$ channel is an excellent benchmark for many steps of the simulation:
  - Different generators give different cross sections
  - Test physics lists available in detector simulation
  - Requires high performances from all detectors
    - Vertexing
    - Tracking
    - Clustering
  - Thus can be used to test particle flow algorithms
  - Finally can be used to compare different detector models

Generation and Simulation

- Events have been generated using Pandora-Pythia and Whizard
- The reconstruction was performed by Mokka (V06-03p02):
  - Some information @ generation level:
    - E_{CM} = 500 GeV
    - M(Higgs) = 120 GeV/c^2
    - Polarized 80% electron beam
    - Two detector model (LDC00Sc and LDC01Sc)
    - $Z \rightarrow l^+l^-$ (muons and electrons)

Marlin Processors

Marlin 0.9.7 + MarlinReco 0.3

- Processors used:
  - VTXDigi
  - FTDDigi
  - TPCDigi
  - Tracking Processors
  - PFA Processors
  - PairSelector
  - SatoruJetFinder
  - BosonSelector
  - MyROOTProcessor

Tracking Processors:

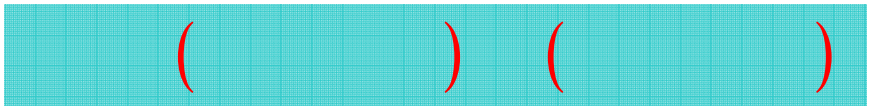
- FullLDC:
  - LEPTrackingProcessor
  - SiliconTracking
  - FullLDCTrackin
- TrackCheater

PFA Processors:

- Wolf:
  - TrackWiseClustering
  - Wolf
  - ClusterMerge
- PandoraPFA:
- TrackBasedPFA:

ZHH selection

- Select and extract the two leptons which better reconstruct the Z.
- Combine all the other particles in 4 jets.
  - Reconstruct the two Higgs minimizing the quantity:



- Look at different variables to compare the two available PFA algorithms:
  - D^2 and other combinations of jet-jet inv. Mass

- The mass of the Higgs used in the analysis is 114 GeV instead of 120 GeV to take into account the effect of invisible particles

```
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STACK:

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/WinCharSetFFFF-V2TT621301FBt
/CMap
-dictionary-
/WinCharSetFFFF-V2TT621301FBt
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