





Summary of the Software, Simulation, Reconstruction and Performance Sessions

André Sailer(CERN)

International Workshop on Future Linear Colliders (LCWS)
Belgrade, Serbia
October 6–10, 2014

Content







- 1 Sessions
 - Core Software Tools
 - Flavour Tagging
 - Tracking and Calorimetry Software (Joint Session)

Talks









Talks















Common software used by all concepts

- Whizard 2 event generator (J. Reuter)
 - Correlated beam spectra, top-threshold, and many more improvements
- DD4hep and LC Geometry (F. Gaede)
 - DD4hep provides: 'Framework' to describe geometry, connection to Geant4, MCParticle treatment, sensitive detectors, segmentations
 - Basically have to implement geometry, specialised sensitive detectors, rest taken care of generically in DD4hep
 - ★ Small modules for Icio input and output (already written)
 - ILD detector implemented and first simulation done with it, CLICdp to come soon: needs thorough testing
 - Interface new geometry description with reconstruction
- ILCDirac (A. Sailer)
 - Grid interface for LC software
 - Adopted by all concepts and many users
 - Moved to new virtual machine infrastructure, now moving to newer software and implement some new features







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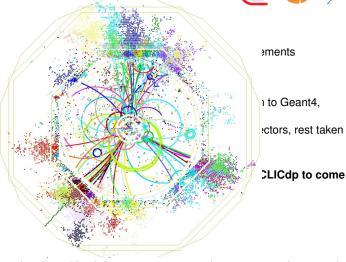


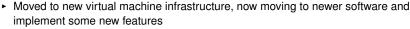




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Flavour Tagging







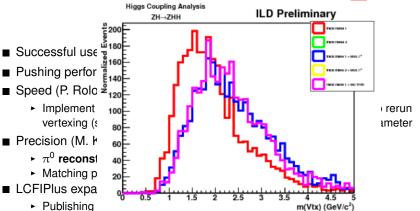
- Successful use of LCFIPlus for CDR/DBD and beyond
- Pushing performance: more speed and more precision
- Speed (P. Roloff)
 - ► Implement jet different jet clustering inside LCFIPlus, avoid having to rerun vertexing (slow), when changing jet radius → faster tuning for R parameter
- Precision (M. Kurate)
 - π^0 reconstruction for flavour tagging improvements
 - Matching photons in jets to π^0 's and attaching to vertices
- LCFIPlus expansions (T. Suehara)
 - Publishing paper soon
 - Ambitious plans for improvements, and volunteers are welcome

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- Vertex Detector Studies for CLIC (N. Alipour):
 - Full simulation with different vertex detector geometries to study flavour tagging performance
 - AllPix software for pixel sensor test beam studies, is also becoming somewhat common:
 - Digitisation and sensor optimisation for pixel sensor studies
- ILD Tracking Software Overview (Y. Voutsinas)
 - ► Resolution goal reached, but looking for higher efficiency
 - ► Studies including beam-induced backgrounds, which can also give real tracks
 - ► FPCCD TrackFinder, or making use of the mini-vectors
 - ► Study dependence on single hit and timing resolution of sensors
- Tracking Software for CLIC detector optimisation studies (R. Simoniello)
 - Changing detector, and tracker geometry
 - Extend existing ILD silicon tracking software from vertex detector to full silicon tracker
 - Study full silicon tracking; and in-homogeneous b-field





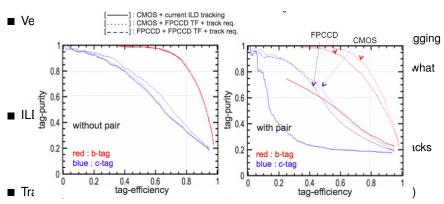


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Calorimeter and DAQ Related Software







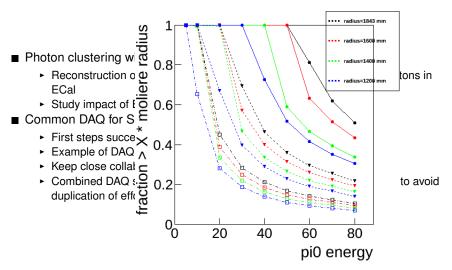
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 - Study impact of ECal parameters on this reconstruction
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 - First steps successful: Running producer, writing data to Icio file
 - Example of DAQ for ILC, find common solution
 - Keep close collaboration with software group
 - Combined DAQ should be coordinated among all sub detector groups to avoid duplication of efforts

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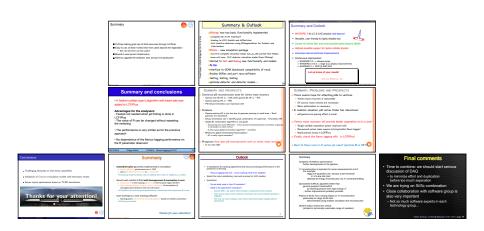
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Summary of Summaries









Conclusions







- Moving to more and more common software
 - LCIO, DD4hep/DDSim, Whizard(2), LCFIPlus, Tracking, ILCDirac, PandoraPFA, DAQ, . . .
- Squeezing more and more performance out of the detectors
 - Based on the robust and reliable reconstruction software available
 - Optimise reconstruction for specific physics channels
- Adding more realism: all beam-induced backgrounds, in-homogeneous B-field
- Never resting from making the software better



Thanks to the speakers and attendees

Thanks to the workshop organizers