Software Coordinators Report

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ILD SW&Ana Meeting, July 19, 2017

Outline

- Generator
- Simulation
- Reconstruction
- MC Production
- iLCSoft

Generator M.Berggren, J.Tian

- generator group is in close contact with Whizard authors
- addressing show stopper identified for ILD MC production:
  - issue in 4q events with color assignment and W/Z mass
  - issue with incorrect ISR spectrum
- authors have committed a fix the 4q issue
  - **to be check/verified**
  - the ISR issue is technically related and should also be fixed soon
- identified new issue w/ Higgs decays
  - Whizard did branching ratios only on tree level (no $H \to \gamma\gamma$)
  - authors have implemented now loop-induced decays
    - but cannot read in *currently best measured* values from LHC
- investigating the use of BHWide for Bhabha scattering
  - cannot handle polarization
  - will probably use Whizard for Bhabha's

New ILD simulation models in DD4hep D.Jeans, S.Lu

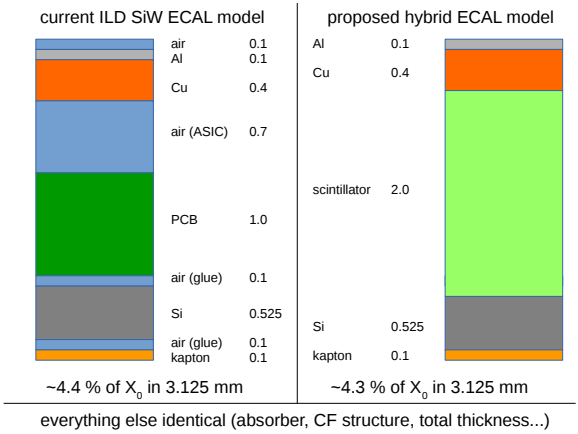
- **Ecal**: implemented increased thickness in ILD_l/s4_v02 models (+ 38.2mm)
  - (hybrid techology readout)
- **TPC**: reduced radius accordingly
  - fixed overlap issue (outer cathod grap ring):
    - removed two readout layers
    - symmetrical un-instrumented regions at inner/outer field cage
- **VXD**:
  - added missing cable cone between VXD and long beam pipe cone
- **SIT**
  - implemented pixel readout (w/ single BX tagging)
- fixed some small overlaps in **BeamCal** and **Ecal-Plug**

ILD simulation models are now considered **final**

- had one last round of validation/check by SW contacts
- based on iLCSoft release **v01-19-03**

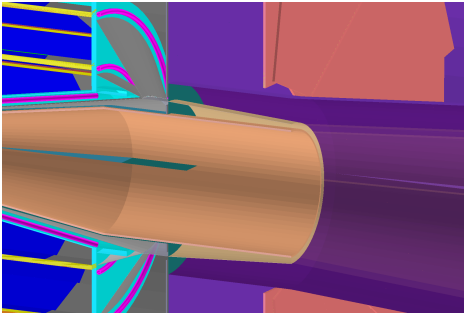
Alternative ILD simulation model D.Jeans

- implemented two new models with a hybrid readout for the Ecal based on *official* ILD simulation models ILD_l/s4_v02
- verification and validation of these models pending
- need to demonstrate that SiW showers are equivalent to 'standalone' model



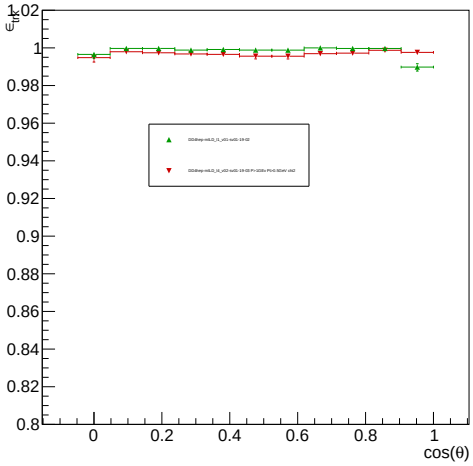
VXD cables in ILD simulation models

- added missing cable cone between VXD and long beam pipe cone
  - numbers (suggested by M.Winter): $25 mm^2$ of Cu (0.14 mm thickness)
  - **NB** this cable cone is **outside of tracking region**, where first FTD disk is hit ($\theta < 10^\circ$)
- cable budget inside the VXD have been reviewed by M.Winter and A.Besson
- changed cable *cone* to *cylinder* for now, due to issue in surface navigation with outward pointing cones
  - to be addressed later ...



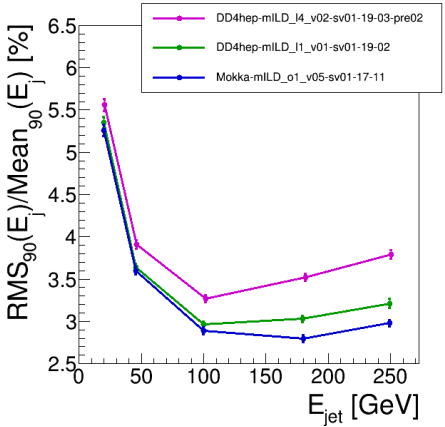
Reconstruction - Tracking S.Lu

- issue in tracking observed after implementing **pixel SIT**
- observe small degradation in tracking efficiency wrt. strip-SIT
- under investigation
  - need re-tuning of Si-TPC track merging
  - ...
- NB: a pixel readout can only improve the tracking efficiency when implemented correctly



Reconstruction - PFA R.Ete

- R.Ete has started a fellowship at DESY
- currently focusing on the calibration and tuning of parameters for Pandora
  - work in progress . . .



old (wrong) calibration for new ILD model

. . .

Monte Carlo Production

- uds and single particle samples simulated with **ILCSoft-v01-19-03**

  `/ilc/prod/ilc/mc-opt/ild/sim/calib/`

- more detailed information can be found on elog server:
  - `https://ild.ngt.ndu.ac.jp/elog/dbd-prod/68`
  - `https://ild.ngt.ndu.ac.jp/elog/dbd-prod/69`
- will start reconstruction after final iteration on configuration scripts

start small physics test production soon (next week)

- which samples, channels ?
- $ZH, Z \to \mu\mu$, $H \to \mu\mu$, ...

- currently preparing iLCsoft patch release **v01-19-03.p01**
- only change wrt. v01-19-03:
- new ILD_ls5_v02 models with *hybrid readout Ecal*

can use this release for validation of the hybrid Ecal approach over the summer