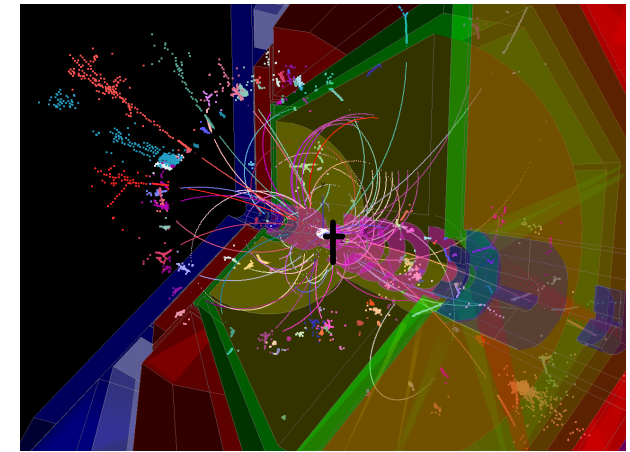
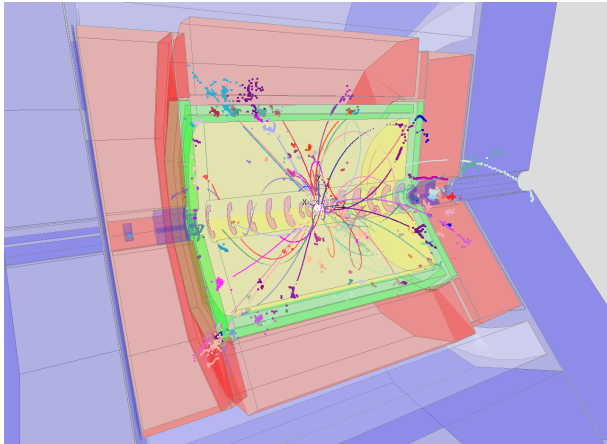


Discussion

simulation baseline

DBD Monte Carlo production



Frank Gaede, DESY
ILD Software Meeting
Orsay, May 22, 2011

ILD software timeline

5 month	Analysis and Writing	13 month
t0 - 5m	Monte Carlo production finished	
5 month	Grid Production	
t0 -10m	start Monte Carlo production	
3 month	Test, Debug and release ILDsoft	
t0-13m	freeze ILDsoft development	~20 month
>1 month	implement baseline in simulation	
t0-x	ILD baseline defined	
	evaluate technology options develop tracking package develop geometry LCIOv2 improve simulation realism improve reconstruction study machine backgrounds	

agreed timeline for ILD software:

- -> would prefer a timeline that
- has any major MC production as late as possible (13 month before DBD)
- use time until then to
 - optimize detector
 - study options/alternatives
 - develop tools
- have 'optimal' detector for DBD incl. new results from R&D groups

- need to define simulation baseline very soon – ideally now
- need time to integrate, test and debug the code
- develop reconstruction software (mainly tracking) before end of year

ILD software baseline

- need to define a **software baseline model** for the DBD
 - to be used for the central Monte Carlo production of benchmark channels and background
 - can't afford massive production with more than one model
 - other models with technology options can (and should) be used for comparisons and benchmarking (e.g. jet energy resolution)
- NB: the technologies used for the simulation baseline have to be chosen according to software requirements – this is no decision on ILD's hardware baseline

- requirements for subdetector software in baseline model:
 - **improved realism wrt. LOI**
 - gaps, cables, services and imperfections
 - **tested and debugged Mokka driver** exists
 - that writes proper GEAR parameters
 - **tested and debugged digitizer code** exists
 - **tested and debugged reconstruction code** exists, that
 - has demonstrated **the physics performance** that is needed
 - backed up by tbeam
 - is **approved** by corresponding **R&D group**

ILD simulation status overview

- beam pipe:
 - no final engineering design
 - first design exists
- B-field
 - realistic field map for bg studies
 - simple field for mass production
- Physics List
 - use QGSP_BERT (re. by geant4)
- VXD
 - realistic models for 3 double and five single layers
 - cabling missing
 - first estimate of services exist
 - **baseline: CMOS or FPCCD ?**
- FTD
 - more realistic design in Mokka - rotated wafers
 - **=> can we develop digitization and tracking for this on time ?**
 - **might need fall back to simpler model**
- SIT, SET, ETD
 - realistic and detailed sim. exists in Mokka
 - cabling & services ?
 - **no digitization and tracking yet**
 - **might fall back to simpler model**
- TPC
 - rather realistic model exists
 - cabling and support implemented

ILD simulation status overview

- Sci- and Si/W ECal
 - realistic driver exists
 - can vary mix of Scint./Silicon
 - -> can study options !
 - cabling and services implemented
 - **baseline: Si or Sci ?**
- AHCal - SDHCal
 - realistic simulation drivers exists
 - two geometries for dHCAL
 - cabling and services implemented
 - **baseline: AHcal or SDHcal**
- Muon
 - new more realistic model exists
 - strips vs. tiles ?
 - instrumented coil ?
- BeamCal
 - new engineering design exists
 - implemented in Mokka
- LCal
 - new realistic driver exists
 - including support, cooling
- LHCal
 - no real design exists
- also Muon design used by CLIC
 - -> see main meeting
 - **baseline needs to be defined**

... need discussion with all of ILD
to define the simulation baselin
=> scheduled for Wednesday

DBD benchmark sample

- event generation sub group of SCTG:

- A.Miyamoto - KEK
- T. Barklow - SLAC
- M.Berggren - DESY

new benchmarks @ 1TeV:

$$\begin{aligned} e^+e^- &\rightarrow \nu\bar{\nu}h^0 \\ h^0 &\rightarrow \mu^+\mu^-, c\bar{c}, b\bar{b}, gg, WW^* \\ e^+e^- &\rightarrow W^+W^- \\ e^+e^- &\rightarrow t\bar{t}h^0 \\ h^0 &\rightarrow b\bar{b} \end{aligned}$$

Changes Since the LOI

- ▶ Distribute Event Generation between KEK, DESY and SLAC
- ▶ Include initial state particles and final state polarization and color flow in event record
- ▶ Improved data base for event generation information
- ▶ Include amplitudes with CKM-suppressed vertices in event generation
- ▶ Use particle aliasing to reduce the number of distinct WHIZARD processes (let the WHIZARD program do the flavor sums)

- DESY will be happy to carry out the central Monte Carlo production
- of course any help is appreciated
- also need CPU resources on the GRID in major labs

MC Sample production

- will produce benchmark signal samples
 - for ILD_01
 - + possibly one or two options
- main bg events to these samples
 - -> to be defined...
 - ILD_01 only
- need to know rather soon of any additional requests
- repeating 500 GeV analyses (e.g. ttbar):
 - should use old LOI bg samples
 - need to be careful with efficiencies !
 - e.g. PIDs have changed ...
 - need to know early if this works, or some re-reconstruction is needed

$$\begin{array}{l} e^+e^- \rightarrow \nu\bar{\nu}h^0 \\ h^0 \rightarrow \mu^+\mu^-, c\bar{c}, b\bar{b}, gg, WW^* \\ e^+e^- \rightarrow W^+W^- \\ e^+e^- \rightarrow t\bar{t}h^0 \\ h^0 \rightarrow b\bar{b} \end{array}$$

... anything else to be discussed ?

If not - let's close the pre-meeting.

There is more software talks and discussions