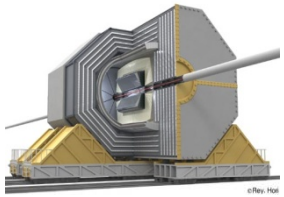
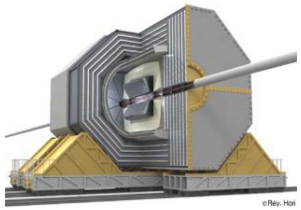


# Status of MC Production by Jupiter

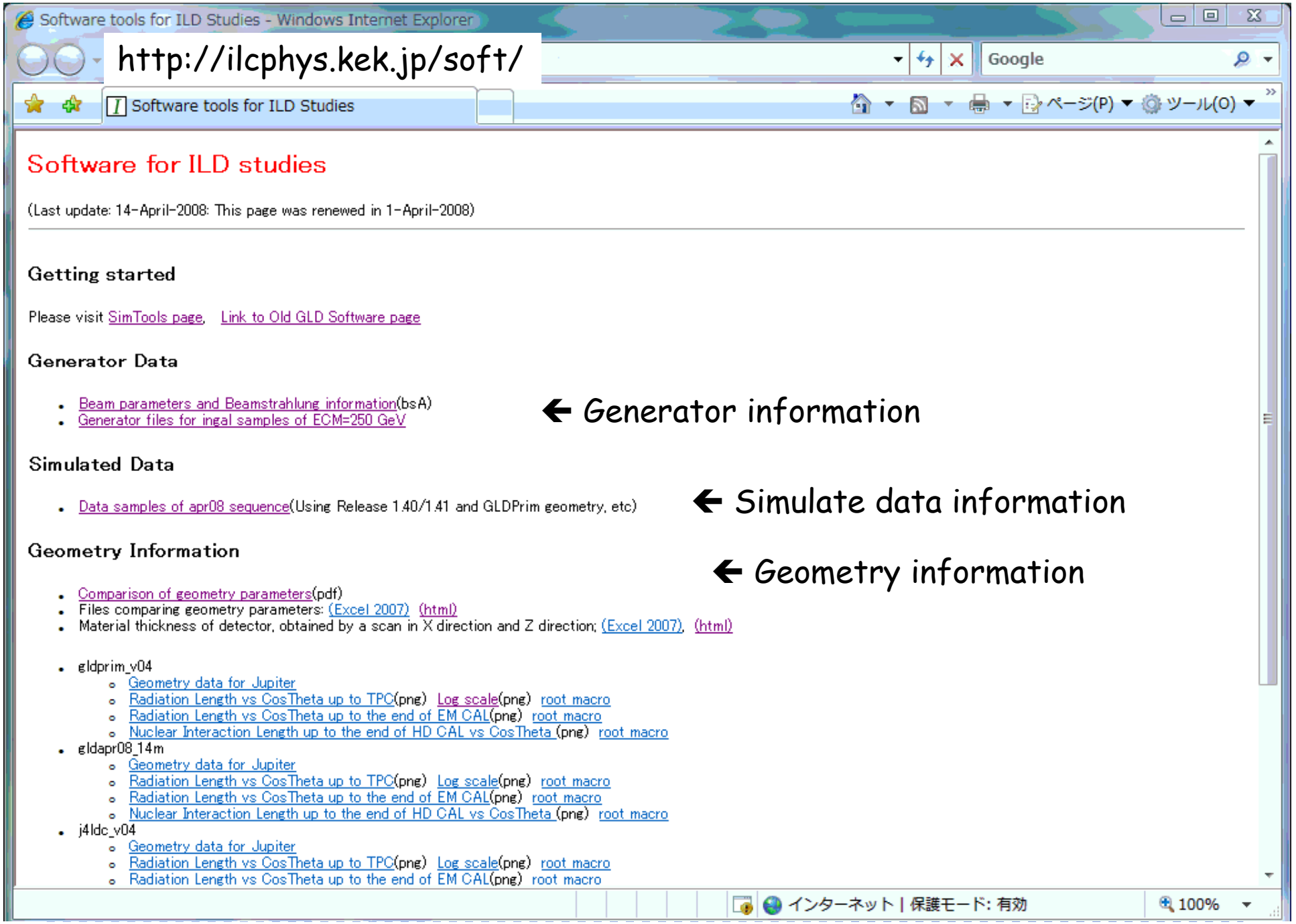
Akiya Miyamoto
KEK
16-April-2008
ILD Optimization WG



# Overview

- MC samples by Jupiter have been produced since the end of March
- Produced samples are,
  - calibration samples:
    - single $\gamma$, k0L, $\mu$, … ( Inputs were Jupiter's generator )
    - uds, ccbar, bbbar samples ( Inputs were pandoraPythia stdhep files.)
  - Physics processes: Ecm=250 GeV, Statistic 250 $fb^{-1}$
    - $e^+e^- \rightarrow ZH \rightarrow eeH, \mu\mu H, \nu\nu H, qqH$
    - $e^+e^- \rightarrow ZZ \rightarrow eeqq, \mu\mu qq, \nu\nu qq, qqqq, \tau\tau qq$

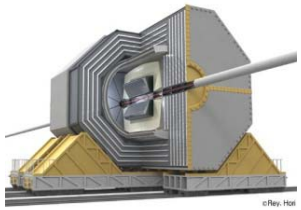
    ( qqqq, $\tau\tau$qq are in progress )
    - Generator data of stdhep format were newly created using the beam parameter given by Andrei. Pythia 6.409
- Detector parameters:
  - 3 parameters: gldprim_v04, gldapr08_14m, j4ldc_v04 in parallel.




← Generator information

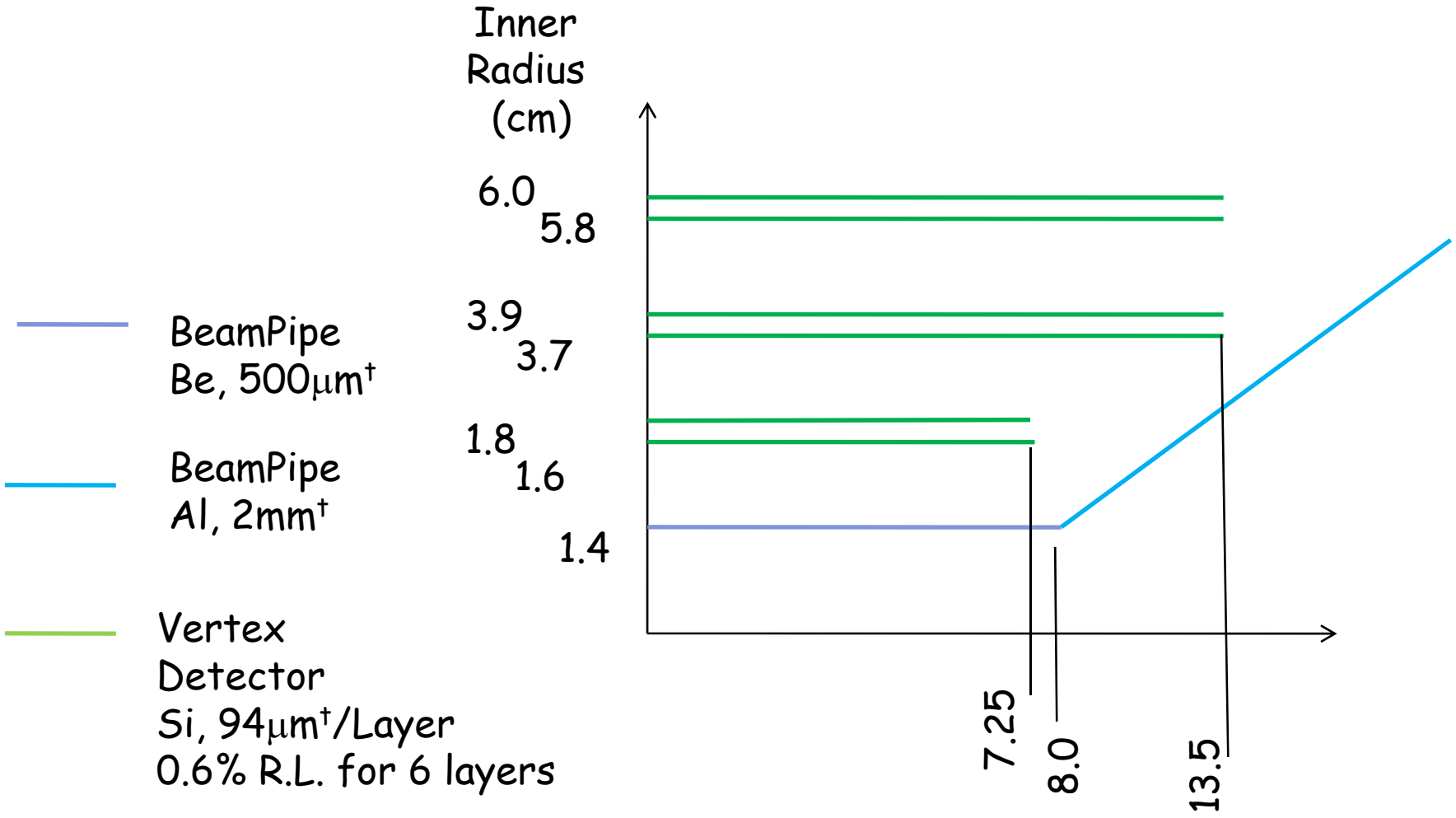
← Simulate data information

← Geometry information



# Vertex Detector Geometry

gldprim_v04



# Material in Jupiter: shown at http://ilcphys.kek.jp/soft/geom2/geantino/ScanSummary.htm

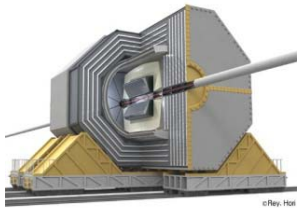
## gldprim_v04( scanned to X direction from IP )

| Name | Inner Radius (cm) | Outer Radius (cm) | Region Length (cm) | Distance from IP (cm) | Rad. Len. of Region | Rad. Len. Accumulated from IP | Nuclear Interation Length of region | Nuclear Interaction Length accumulated from IP |
|---|---|---|---|---|---|---|---|---|
| IR/IRBPIP | 1.4 | 1.45 | 0.05 | 1.45 | 0.00141739 | 0.00141739 | 0.00126861 | 0.00126861 |
| VTX/Layer0 | 1.6 | 1.6094 | 0.0094 | 1.6094 | 0.00100362 | 0.00242593 | 0.000205868 | 0.00147659 |
| VTX/Layer1 | 1.8 | 1.8094 | 0.0094 | 1.8094 | 0.00100362 | 0.00343579 | 0.000205868 | 0.00168514 |
| VTX/Layer2 | 3.7 | 3.7094 | 0.0094 | 3.7094 | 0.00100362 | 0.00450135 | 0.000205868 | 0.00191766 |
| VTX/Layer3 | 3.9 | 3.9094 | 0.0094 | 3.9094 | 0.00100362 | 0.00551121 | 0.000205868 | 0.00212622 |
| VTX/Layer4 | 5.8 | 5.8094 | 0.0094 | 5.8094 | 0.00100362 | 0.00657677 | 0.000205868 | 0.00235874 |
| VTX/Layer5 | 6 | 6.0094 | 0.0094 | 6.0094 | 0.00100362 | 0.00758663 | 0.000205868 | 0.00256729 |
| IT/Layer00 | 9 | 9.05616 | 0.05616 | 9.05616 | 0.00599608 | 0.0136807 | 0.00122995 | 0.0038394 |
| IT/Layer01 | 16 | 16.0562 | 0.05616 | 16.0562 | 0.00599608 | 0.0199043 | 0.00122995 | 0.00516724 |
| IT/Layer02 | 23 | 23.0562 | 0.05616 | 23.0562 | 0.00599608 | 0.0261278 | 0.00122995 | 0.00649507 |
| IT/Layer03 | 30 | 30.0562 | 0.05616 | 30.0562 | 0.00599608 | 0.0323514 | 0.00122995 | 0.00782291 |
| TPC/Half/SupportTub | 39.5 | 43.5 | 4 | 43.5 | 0.0198 | 0.0524608 | 0.0105474 | 0.0185034 |
| TPC/DriftRegion | 43.5 | 174 | 130.5 | 174 | 0.0113229 | 0.0637837 | 0.00191784 | 0.0204213 |
| TPC/Half/SupportTub | 174 | 180 | 6 | 180 | 0.0198789 | 0.0836626 | 0.0105894 | 0.0310107 |
| CLX/EM-First | 185 | 185 | 1.00E-05 | 185 | 3.28E-10 | 0.0838264 | 1.41E-10 | 0.0310812 |
| CLX/EM | 185 | 204.8 | 19.8 | 204.8 | 28.4044 | 28.4882 | 1.05347 | 1.08455 |
| CLX/HD | 204.8 | 314 | 109.2 | 314 | 48.2641 | 76.7522 | 5.23869 | 6.32324 |
| SOL/SOLCoil | 340 | 370 | 30 | 370 | 20.8974 | 97.6504 | 1.92456 | 8.24816 |
| MUD/Block | 405 | 690 | 285 | 690 | 140.27 | 237.922 | 14.9787 | 23.2274 |

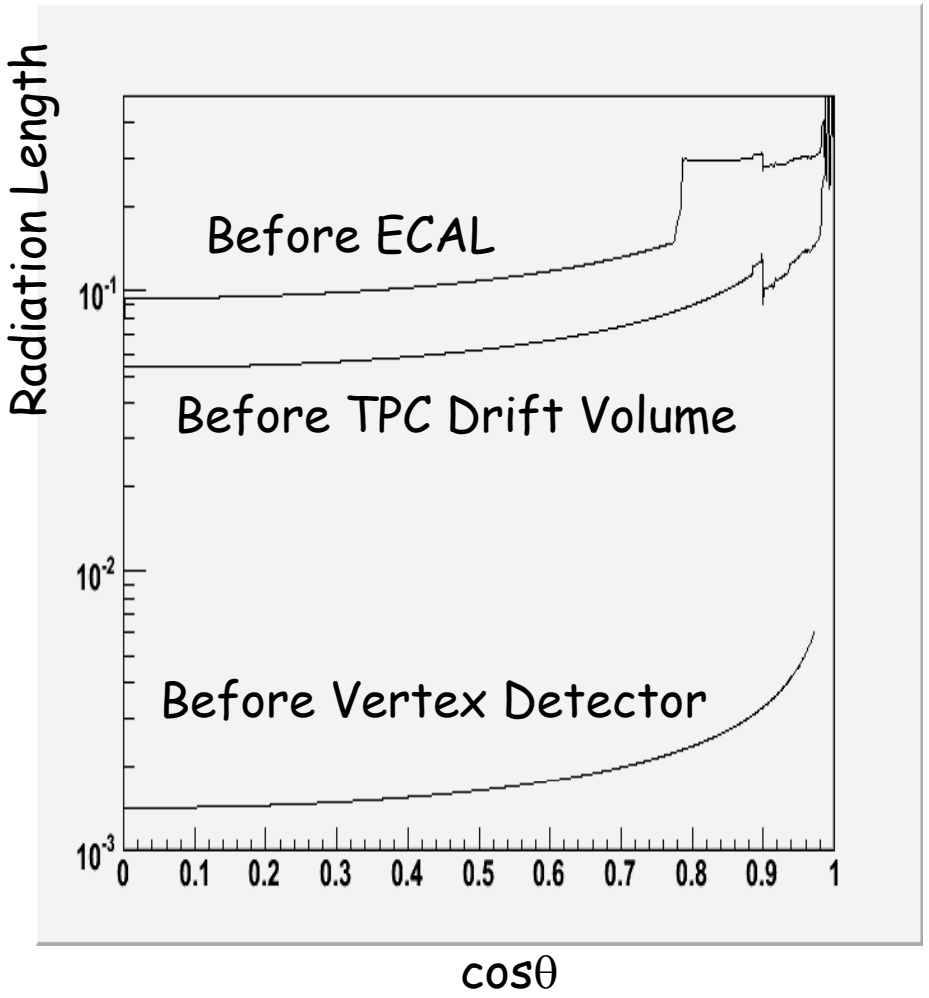
gldapr08_14m-barrel | gldprim_v04-barrel | j4ldc_v04-barrel | gldapr08_14m-Endcap | gldprim_v04-Endcap | j4ldc_v04-Endcap

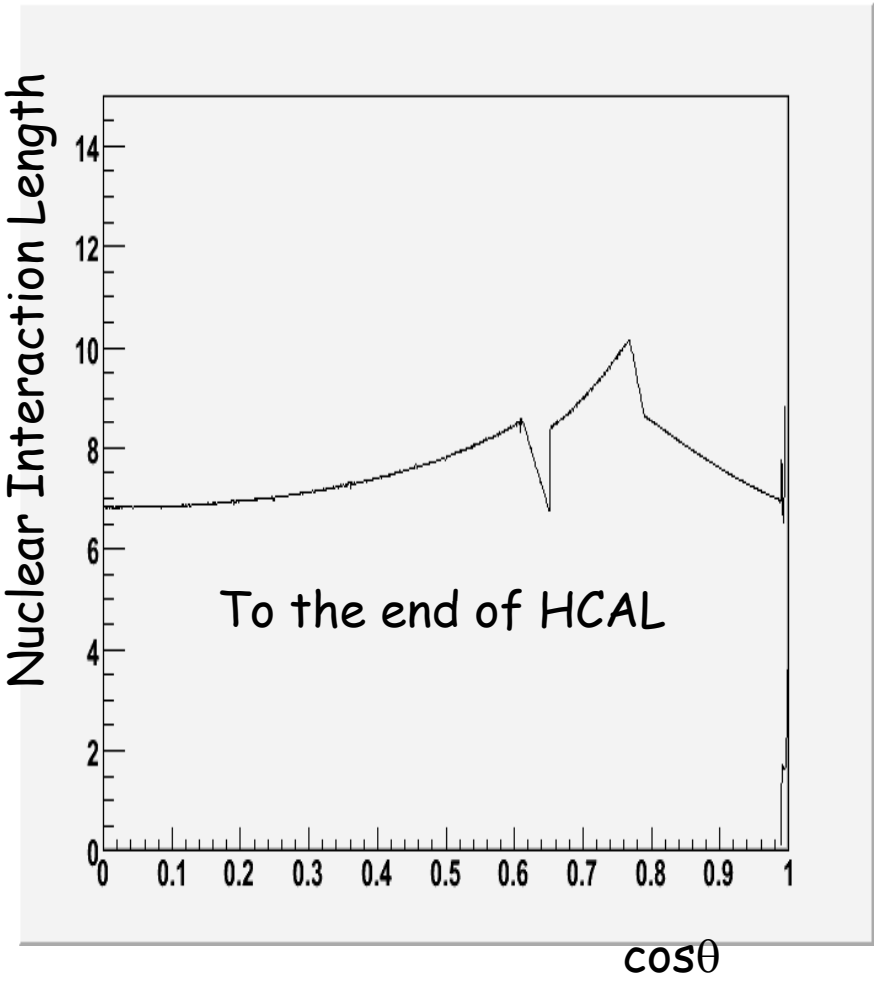
ページが表示されました インターネット | 保護モード: 有効 100%

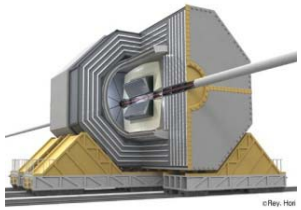
talks 2 Micros... 2 Intern... 2 XWin.... 19:54



# Radiation Length & Nuclear Int. Length



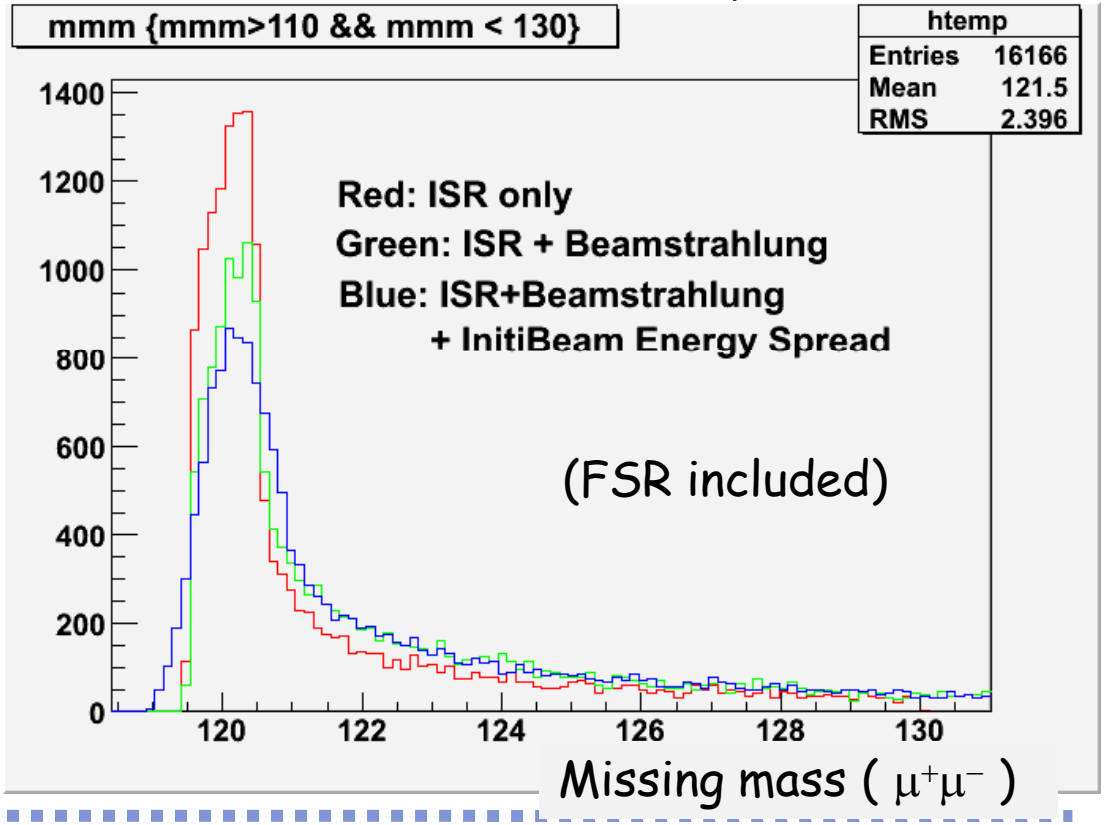


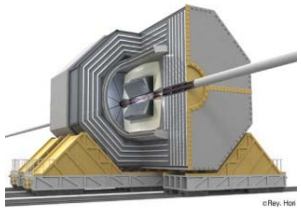
# Generator sample for 250 GeV

- SLAC sample is not ready, so we generated our own at this time.
- BSGEN was used to generate the beamstrahlung spectrum.
  BSGEN uses a function obtained by a fit to the differential luminosity generated by CAIN using Andrei's beam parameter for 250 GeV.
  ( http://ilcphys.kek.jp/soft/ILCBeam/BeamParameter.html )

- Pythia 6.409 was used.
- No beam pol., no Tauola for $\tau$ decay

- Example of generated events ➔
  Missing mass of
  $e^+e^- \rightarrow ZH \rightarrow \mu\mu H$



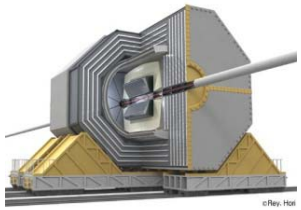


# Summary of MC Production

GLDPrim_v04 geometry

| Process | #Events /250fb | sec/ events | MB/ events | Total CPU(day) | Total Size(GB) |
|---|---|---|---|---|---|
| ZH->eeH | 1876 | 78 | 2.3 | 1.7 | 4.3 |
| ZH->μμH | 1876 | 52 | 2.2 | 1.1 | 4.1 |
| ZH->ννH | 11198 | 51 | 2.0 | 6.6 | 22.4 |
| ZH->qqH | 39375 | 90 | 3.8 | 41.0 | 149.6 |
| | | | | | |
| ZZ->eeqq | 19678 | 78 | 2.0 | 17.8 | 39.4 |
| ZZ->μμqq | 19749 | 50 | 1.8 | 11.4 | 35.5 |
| ZZ->ννqq | 76861 | 48 | 1.9 | 42.7 | 146.0 |
| ZZ->qqqq | 146512 | 88 | 3.5 | 149.2 | 512.8 |
| | | | | | |
| Sum | | | | 271.5 | 917.7 |

← Now in progress

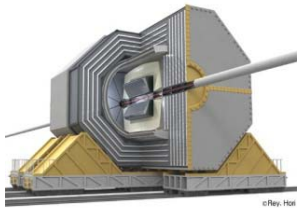


# Next step

- Study performance using 250 GeV samples
- Produce 500 GeV samples.
  - SUSY(Chargino, Neutralino, Smuon): Are there StdHep file already ?
  - ttbar
  - tautau ( Waiting new stdhep file )

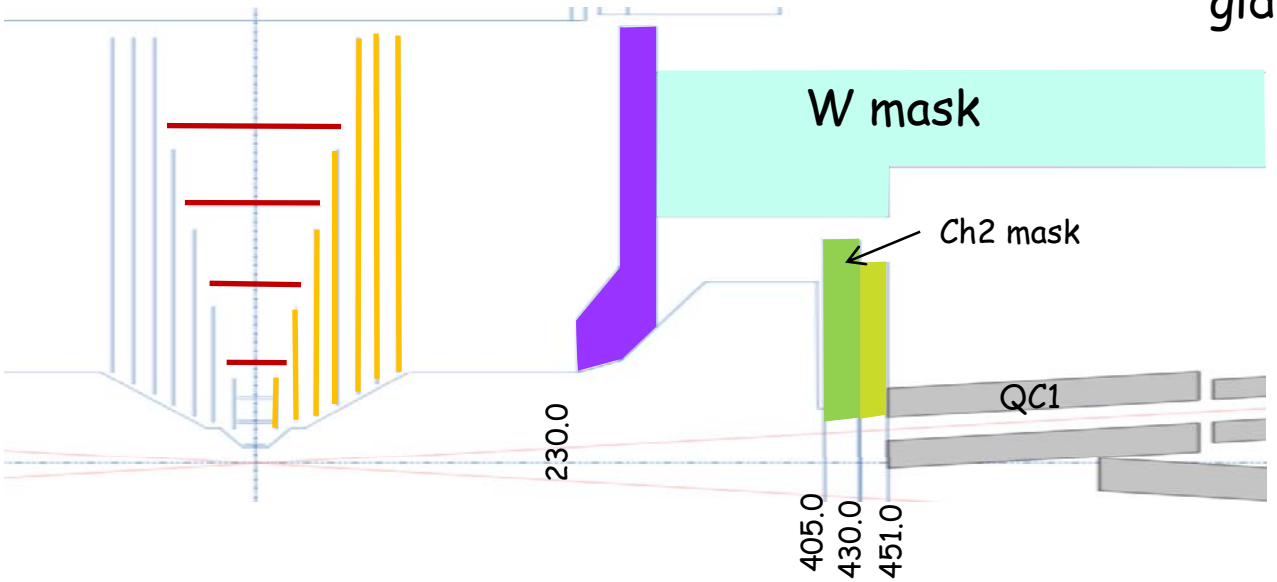
- File management issue.
  - Simulated files are saved as JSF's root format. They will be converted to LCIO format soon.
  - They are placed at local disks. Depending on demands, they will be put on GRID SE. But the transfer rate to EU will be several x100kBytes/sec (in the case of the single port transfer).
  - All generator files in stdhep files will be put on GRID

# Backup slides



# IT, FCAL, BCAL, Ch2mask

gldprim_v04

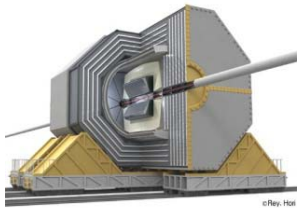



Barrel Intermediate Tracker (Si)
Rin from 9.0 to 30.0 cm
Coverage: $|\cos\theta|<0.9$
Total thickness: 2.4% R.L.

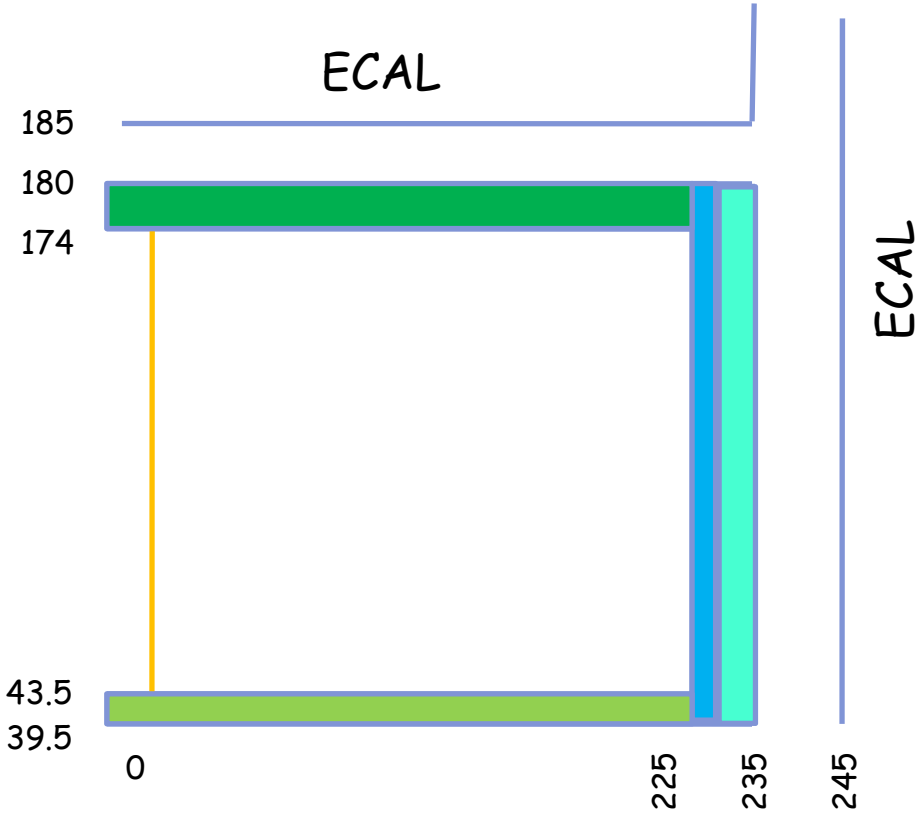
Endcap Intermediate Tracker (Si)
7 layers at Z from 15.5 to 101.5cm
Thickness: 0.6%RL/layer

FCAL:
55(45) layers in Front(Tail)
Each Layer: Si(0.3mm$^t$)+W(3.5mm$^t$)+Air

BCAL:
33 layers,
Each Layer: Si(0.3mm$^t$)+W(3.5mm$^t$)+Air



# TPC




gldprim_v04

TPC
- Central membrane: Mylar, 250μm†
- Pad plane: 1.955cm†, 0.0853RL
- Endcap: 8.045cm†, 0.0625RL
- Inner support: 4cm†, 0.0198RL
- Outer support: 6cm†, 0.0198RL

Drift Region:

Gas: Ar+CF4+isoC4H10(96:3:1)
# radial sampling: 217
( pad height ~ 6mm )