

Plans and Needs of Centralized MC Production

Akiya Miyamoto
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Introduction

- “Centralized MC Production” means
 - ◆ with a code of “production” release
 - ◆ with blessed detector model(s)
 - ◆ Well defined input data
 - ◆ produced samples are placed in common area and registered in DB

- ➔ private or sub-group level mass production is always possible and coordination would not be necessary. GRID resources are not problem in 2010/2011. However we are pleased to know a plan if plan to use significant resources

MC samples from LOI era

■ Samples for LOI

◆ Input data

- 250 GeV & 500 GeV “full” SM samples & LOI benchmark signals. 250 & 500 fb⁻¹
- Calibration samples: single particles and jets

◆ Code: ILCSoft v01-06

◆ Detector models:

- ILD_00: for physics study
- ILD_00fw: forward detectors updated
- ILD_00fwp01 : with AntiDID for background studies

◆ ~ 2 months for code validation and ~ 4 months of GRID run for Sim/Rec.

➔ This sample is still valid for studies of ILD detector performances.

Limitation of LOI samples

- Input files : LOI common samples prepared by SLAC
 - ◆ hadronization parameters are not up-to-date
 - ◆ tau polarization in decay is not correct in some processes
 - ◆ beam parameters are not up-to-date

- Simulation
 - ◆ no-crossing angle
 - ◆ detailedTrackerHits off (no P at hit points)
 - ◆ ILD_00
 - Some miss-match with ILD CAD model ?
 - Not meet RD's request for DBD : “faults and limitations”

Issues to be resolved in future productions

■ Parameters for simulation

- ◆ Detector model(s)
- ◆ PhysicsList : LCPhysics → QGSP_BERT_HP recommended by G4 team but time consuming. What else ? Evolve with time ?
- ◆ Crossing Angle : yes : now default in v01-07.
 - Not compatible with samples produced for LOI
 - Boot Lab. frame → CM frame not available yet.
- ◆ Magnetic Field : with-AntiDID possible only with new tracking code

■ Reconstruction

- ◆ Required functionality and quality

■ Other issues

- ◆ When do we apply LCIO/V2 (event splitting, etc) ?
- ◆ New geometry tools
- ◆ DST format ? (ex. isolated lepton, vertex chg ...)
- ◆ Input data (StdHep) updates

In near future production, ILD_00 for physics study and ILD_00fwp01 for bkg. study
By late 2010 or early 2011, we need resolve these issues for optimization

Production for Optimization (~2011)

■ Production for optimization

◆ Define benchmark processes

- single particle, 2 jets, physics processes, ... not all processes necessary

◆ Detector models:

- vertex detector: 5 layers vs 3 layers of doublets. technology options ?
 - ECAL – Si/Sc ?
 - HCAL – AHCAL/DHCAL & geometry ?
 - Others : L*, ...
- models should be realistic : with “faults and limitation”

◆ Overlay beam backgrounds ?

Sub-detector level optimizations should be performed in advance

Mokka should be ready for these studies by then

Needs for production in 2010

■ SB2009:

- ◆ beam background samples have been produced at KEK/DESY/....

Do we need the central production ?

- ◆ physics samples :

- Tim will prepare common $\mu\mu X$ sample at 350 GeV for recoil study. Plan is to study by Fast/Quick simulator.

Do we need the central production ?

- Other request from Physics panel ? Do someone (can someone) study following channel ?
 - Higgs coupling meas.
 - $\text{Br}(H \rightarrow cc)$ vs R_{vtx}

■ Physics samples for thesis and publications

- ◆ *Requests ?*

■ Reference samples for code developments/performance tests

- ◆ single particles, jets, ...

Needs for DHCAL study (from Gerald Grenier)

For the DHCAL studies, we are thinking of getting the following MC production :

- 1) **Particle guns** with the following energy values :
 - 2GeV, 5GeV, 10GeV, 20GeV, 30GeV, 40GeV, 50GeV, 60GeV, 70GeV, 80GeV, 90GeV, 120GeV, 150GeV, 200GeV, 250GeV and the following θ range 0° - 10° , 10° - 20° , 20° - 30° , ..., 170° - 180° with full ϕ coverage. **5k~10k events** per θ and energy point
 - For the particle, we would like to have : π , K_L , μ and e (without ECAL).
 - For the detector setup, we would need it with the **DHCAL**.
- 2) **τ s in the DHCAL**.
 - $e^+ e^- \rightarrow \tau^+ \tau^-$ for the same kind of τ energies as (1)
 - $e^+ e^- \rightarrow WW$ with a W decaying hadronically and one decaying in τ neutrino for beam energies of 45.6GeV, 115GeV, 125GeV, 250GeV
- 3) **dijets** :
 - $e^+ e^- \rightarrow qq$ with beam energies of 45.6GeV, 115GeV, 125GeV, 250GeV
 - **Events with spatially close jets** (thinking of production of highly boosted Z with ISR or $t\bar{t}$ events or multijets ... any suggestion welcome)

Questions regarding DHCAL requests

- Which version of code ?
 - ◆ ILCSoft v01-06 (LOI), or v01-07 (not production release), or new one ?
 - ◆ Mokka only, Marlin as well ? Dependences on other detectors ?
- Are there any request from other sub-detectors ?
- When ?
 - ◆ Now with v01-06 ? (v01-07 is not fully tested)
 - ◆ Later with updated codes ?
 - ◆ Plan of next ILCSoft release ?
 - Test releases would be possible in monthly bases.
 - Hard to make frequent production releases
- Human power to work on production ?
 - ◆ Run, Monitor, Fix-error, Re-Run, register to DB, ...
 - ◆ Include them in GRID tools as a standard process for code verification ?

Summary

- We don't have too much needs of MC Production in 2010

- Issues of MC production
 - ◆ Not in GRID resources, but in human resources to run production
 - need to share human power with software developments
 - any volunteers?
 - ◆ May be useful to run some jobs than keep it in idle

- We need to define a clear schedule and plan
 - ◆ production release of ILCSoft
 - when, what features
 - ◆ Next milestone : mid. 2010 ?
 - Are Mokka sub-detector drivers are ready for developments of reconstruction tools and/or optimizations?
 - others ? Core tools ? Marlin ?

BACKUP

Resources for MC production

■ GRID resources (ilc-vo) (from Roman)

◆ in 2008/09

- GRID sites (ilcvo) UK(18), Fr(4), DE(4), ES(2), JP(2), IL(2),RO(1)
- #Jobs =1127k(DE,UK,FR), 4.3Mh (1~2% of total EGG grid)
- Tapes/disks : ~ 300TB used

◆ in 2010

- Resource availability
 - DE, FR: similar level as 2009
 - JP: CPU and storage capacity increase

➔ No problem foreseen in 2010. 2011, neet to re-evaluate

■ GRID tools (from Jan)

- ◆ New GRID grid production system is being developed taking account experiences of LOI studies by Jan. Hope to reduce needed human resources to run MC production.

■ Issues

- ◆ Running and testing of results are a major issue !