

Software Support Preparations for Snowmass

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Mission Statement

- The goal is to enable physics and detector design simulations for the NLC to be undertaken by relative novices during the three weeks in Snowmass.
- We assume that most physicists will bring a laptop PC with them, running either Linux or some version of Windows.
- Will bundle software and documentation onto a CD which will be distributed during registration.

Simulation Tools

- We need to enable the full chain of simulation, from event generation through to histogramming of final analysis results.
- Want to provide pre-compiled executables with run-time control over parameters.
 - Simplifies matters dealing with compiler issues, etc.
- Emphasis will be on fast MC simulations.
 - Full GI SMO simulations will not be run at Snowmass.*

Event Generators

- Currently have the following generators interfaced to the stdhep output of HEPEVT common block information under run-time control:
 - PYTHIA
 - HERWIG
 - BHLUMI
 - BHWIDE
 - KORALW
- Interface to CIRCE beamstrahlung simulator is there, final H set of parameters needed.

Event Generators I I

- Pandora-pythia available under linux. Current mode of operation requires re-compilation for new processes.
 - Another release before Snowmass?
- WHI ZARD being worked on, should become available.
- Any others?

Detectors

- The emphasis will be on the high-energy IR detectors, LDMar01 and SDMar01; the P detector has received less attention.
- Full detector descriptions exist for input to GISMO and canonical data samples will be generated with all the physics processes enabled and the full detector response recorded.

Fast Sim: Tracking

- Fully covariant smearing of track parameters to simulate reconstruction available through covariance matrices provided by Bruce.
- Tracking inefficiencies and fakes are not currently included.
 - How should we handle this?

Fast Sim: Calorimetry

- Currently very rudimentary.
- Particle energies and positions are smeared according to the single particle resolutions.
 - ROOT version has first approximation to cluster merging.
- Work is proceeding to enable calorimeter cell population via a shower library.
 - Can then run existing clustering algorithms.

Vertexing

- Vertexing of tracks using the SLD ZVTOP algorithm is available.
- Work is ongoing to include refinements (e.g. “ghost track”).
- Same package for both full and fast MC.

Jet Finding

- Jet-finding algorithms are available, same package runs for Fast or Full simulations.
 - Need a coherent definition of Energy Flow Objects.
 - Still working on track-cluster associations.

Particle I D

- A new package to study particle I D issues related to detector design has been provided by Bob Wilson.

Event Displays

- Event displays exist for full simulation data.
- Are being worked on for fast MC analyses.

Data

- Small samples of some SM physics processes will be included on the CD to allow algorithm development.
- Larger samples will be available on the server, but it is not clear what the bandwidth from/to Snowmass will be. Some samples may be installed onto a local disk.
 - Local server?
- May have some limited number of data CD's.

Analyses

- Documentation will include a few examples of analyses starting from event generation through to results.
- If you have a favorite tool or technique you would like to see included, let us know.

Documentation

- Existing web-based documentation will be reviewed and brought up-to-date.
- Tutorials will be expanded to have examples for all steps in an analysis.
- Code API will be included.
 - Source code, too?
- Some documents will be there
 - "White Paper"
 - "Orange Book"
 - Selected LC notes?

Documentation

- Most of this information already exists on the web.
- For an early start, check out the following resources:

www-sldnt.slac.stanford.edu/

[nld/New/Docs/LCD_Root/root.htm](http://www-sldnt.slac.stanford.edu/nld/New/Docs/LCD_Root/root.htm)

[jas/documentation/lcd/](http://www-sldnt.slac.stanford.edu/jas/documentation/lcd/)

[jas](http://www-sldnt.slac.stanford.edu/jas)