

SLAC Physics Lists

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SLAC Physics Lists

- **LCPhys**
 - for linear collider calorimetry
- **Space electronics physics list**
 - for component damage in space radiation environment
- **A01**
 - demonstration of double arm spectrometer
- **BaBar**
 - BaBar detector simulation
- **GLAST**
 - gamma ray satellite simulation

General Comments (1)

- The SLAC-supported physics lists are used in medium-to-high energy applications
 - two were designed at the request of a specific user community
 - one is an extended example
 - most can be used in realistic applications without modification
 - standard EM processes used
- Simple and modular physics lists are used
 - avoid the overhead of the pre-packaged lists, e.g. extra libraries, templates
 - follow a “flatter” code design (longer code, but easier to read and understand)

General Comments (2)

- “Physics Lists Supported by SLAC” web page is under development
 - currently contains fully documented versions of LCPhys, Space Electronics and BaBar physics lists
 - A01, GLAST physics lists to be included
- http://ww.slac.stanford.edu/comp/physics/geant4_slac_physics_lists/G4_Physics_Lists.html

LCPhys

- Modular physics list
- Physics nearly identical to QGSP_BERT
 - use EM production cuts = 1 mm (instead of 0.7 mm)
 - uses Bertini for hyperons
- Fully documented
 - description of each physics module
 - reasons given for choice of models
 - code is hyperlinked to physics list web page
- Distributed on cvs.freehep.org

Space Electronics Physics List

- Modular physics list
- Physics: QGSP_BERT with following additions
 - HP neutrons
 - Binary light ion cascade
 - Sihver, Shen, Tripathi, Tripathi light cross sections
 - uses Bertini for hyperons
- Fully documented
 - same level of detail as for LCPhys

A01 Physics List

- Part of examples/extended/analysis
- Currently used as a “Getting Started with Geant4” example on SLAC Geant4 web page
- Soon to be included on “Physics Lists Supported by SLAC” web page as a beginner's physics list
- Modular physics list
 - standard EM, decay process
 - LEP, HEP models for hadrons

BaBar Physics List

- Developed and maintained by BaBar collaboration (currently frozen at Geant4 6.1)
- Simple physics list
 - written before modular lists were available
 - standard EM physics
 - no hadronic physics above 4-5 GeV
 - option to switch between BaBar and Geant4 transportation
 - option for using HP neutrons

GLAST Physics List

- Developed by GLAST collaboration
- Soon to be included in “Physics List supported by SLAC” web page as a “real life” physics list
- Modular physics list