CEPack in BaBar Simulation

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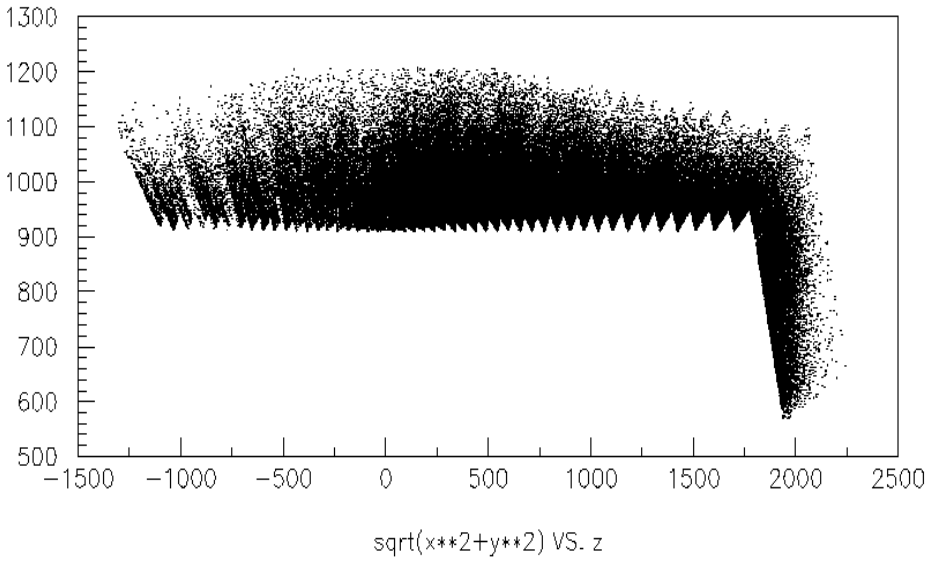
Intro

- Lelaps was developed originally for BaBar with the purpose of a fast parameterized simulation
- It was never completed however the documentations shows example of results from the simulation of an SVT and an EMC model

- EMC: G. Grindhammer and S. Peters, arXiv:hep-ex/0001020v1 (2000)
- Multiple Scattering: Gerald R. Lynch and Orin I. Dahl, Nucl. Instr. And Meth. B58 (1991) 6.
- de/dx: R.M. Sternheimer and R.F. Peierls, Phys. Rev. B3 (1971) 3681.



Bogus

- BaBar application layer over the Geant4 simulation toolkit
- model the BaBar detector geometry and materials, propagate particles through a varying magnetic field, perform particle interactions and decays, and provide scoring of detector hits
  1. initializing the Geant4 kernel,
  2. extracting event generator tracks from the Framework AbsEvent,
  3. invoking Geant4 to propagate these tracks through the detector and B field
  4. writing final GTracks and GVertexs into the AbsEvent.
- At point 3 we can insert the parametrized simulation

BgsCEPack

- Creates a parameterized model of subdetector based on
  - EMC: G. Grindhammer and S. Peters, arXiv:hep-ex/0001020v1 (2000)
  - Multiple Scattering: Gerald R. Lynch and Orin I. Dahl, Nucl. Instr. And Meth. B58 (1991) 6.
  - de/dx: R.M. Sternheimer and R.F. Peierls, Phys. Rev. B3 (1971) 3681.
- From the point of view of Bogus/Geant4, the parametric model appears as an empty volume
- When a particle enters a parametrized subdetector hits are created along its trajectory until it leaves (or is stopped) the subdectector
- When it has left the subdetector, Geant4/Bogus takes them back. The particles is then propagated to another subdetector or outside the detector.
- Geant4 Volumes are filled with vacuum to limit the production of secondaries

(Dis)Advantages

- Can use Babar event generator
- Can store Babar tracks in Babar event store therefore use the tracking code to produce BetaCandidates
- It was never completed
- It is broken now
- Can be run only in the Babar framework
- It is not up to date with the latest standalone Lelaps but the basic routines should be similar
  - Does not read geometry from a flat file (GODL)
- Will the BaBar framework slow it down ?

Status

- Updated application to compile in a recent release
- Updated and cleaned up tcl path (using Moose as guide)
- Various bug fix to allow to run up to the first event
- Program crashed with an error related to the interaction between Bogus and Geant4
  - `Bogus::BgsSensitiveManager.cc(213):Suspended track is out of sequence`

Quick to-do/wish list

- Fix the error on the suspended tracks
  - Contacted Bill Lockman and Dennis Wright
    - little feedback received...
  - Contacted Gabriele Cosmo (@CERN) & Makoto Asai (@SLAC)
- would benefit from the help of some of the above experts
- will need to update the BgsCEPack routines to the latest standalone version: not sure how difficult this can be
  - In particular add the ability to read flat files