Software Support for the Beam Test

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(Originally: 1 December ‘05)

First Things First

A fairly detailed run plan is due in a very short time (“end of next week” is being bandied about!).

To support this, we want to have a reasonably realistic simulation in place.

We need to:

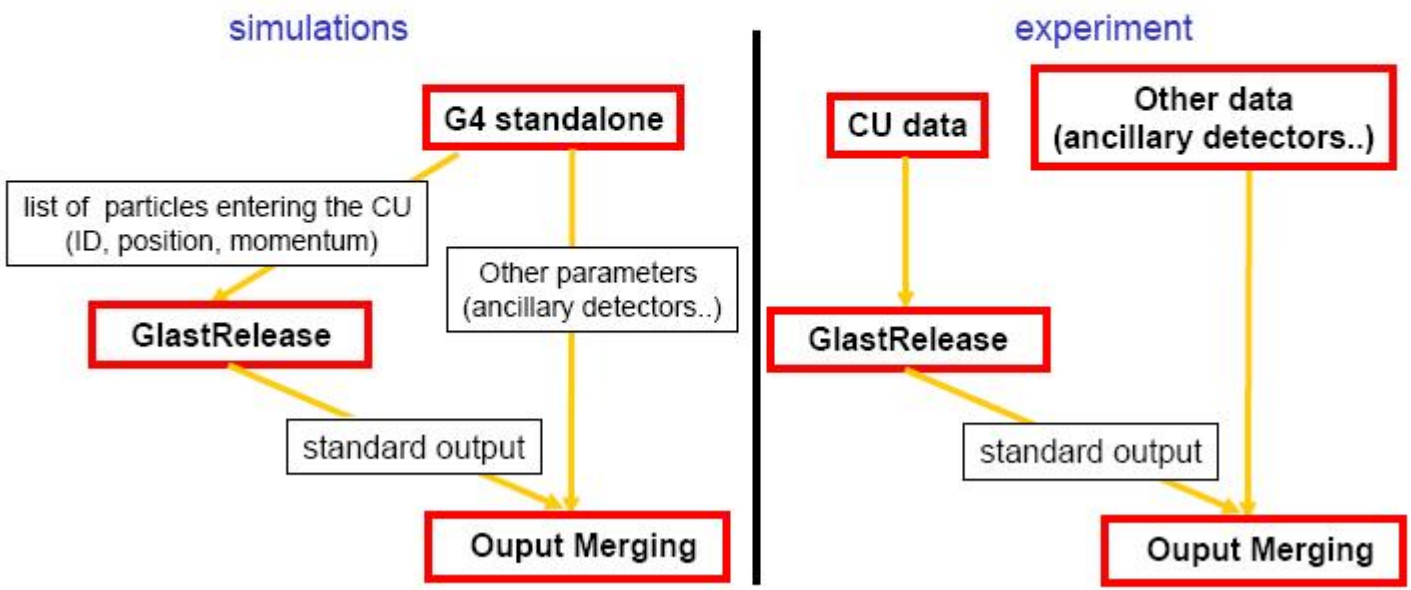
- Provide a CU (Calibration Unit) geometry
- Interface beam and Gleam
- Deal with multiple input particles per event

Strategy: Divide and Conquer

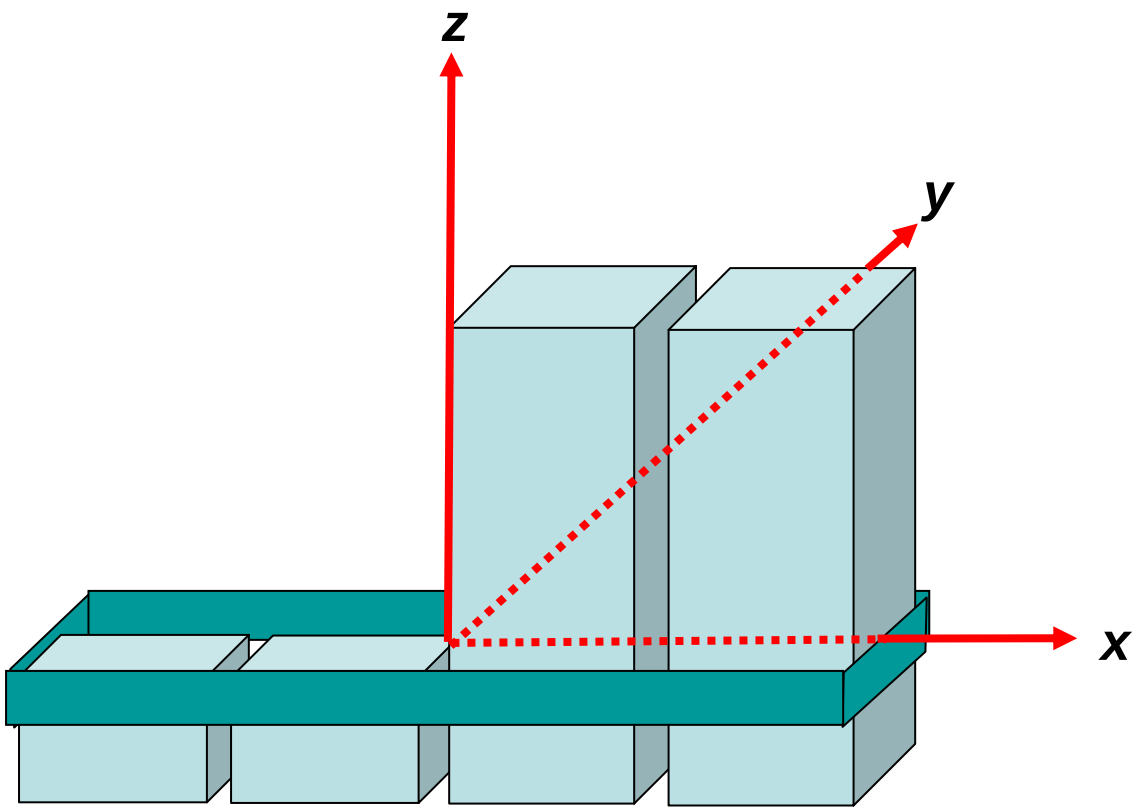
Simulations are needed soon to
- determine the required statistics
- optimize the setup
- investigate the effect of contamination, "pile-up" (multi-particle events)…

Ultimately, they will provide the reference the data have to be compared to.

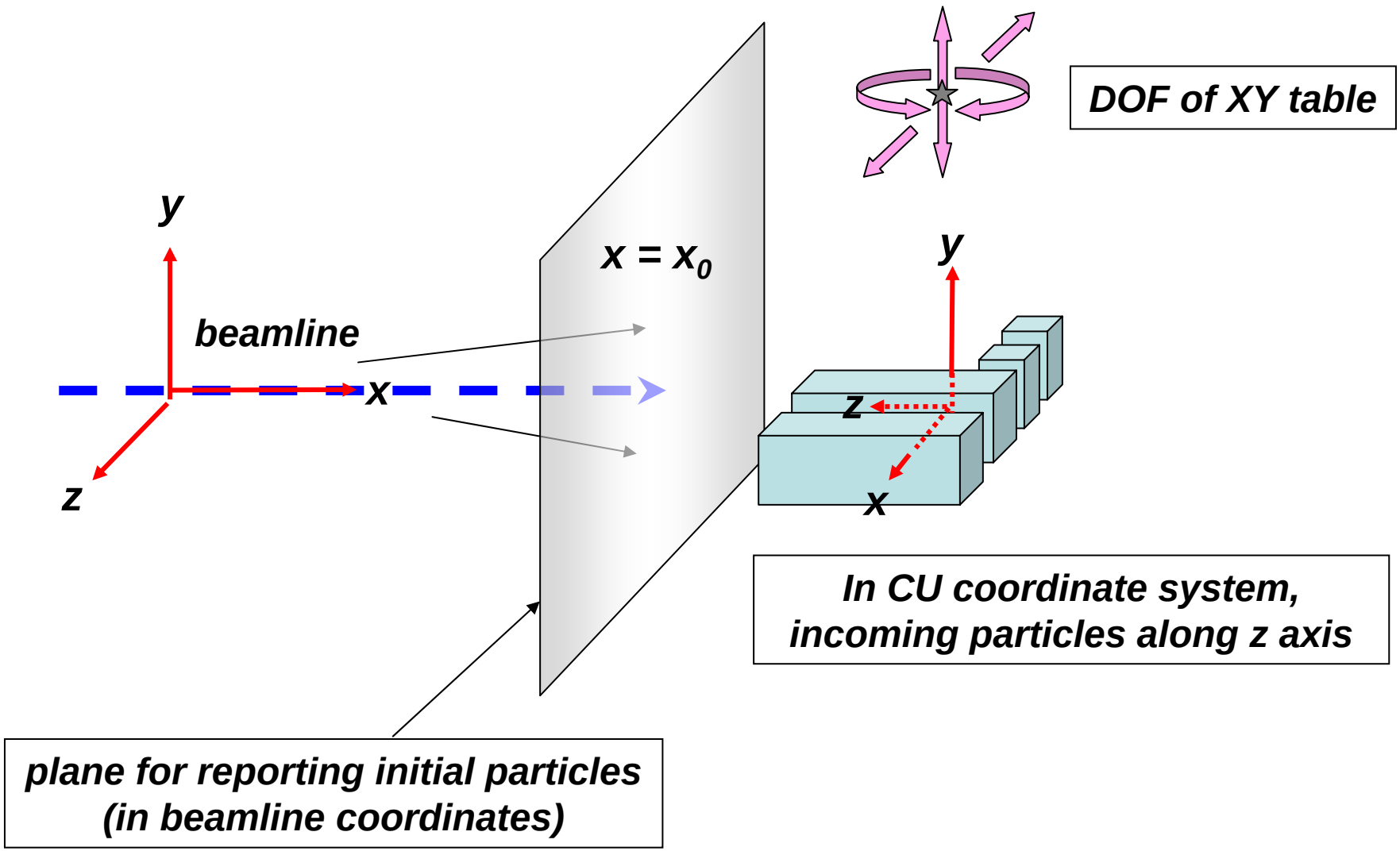
(my personal) current view: 2-step process



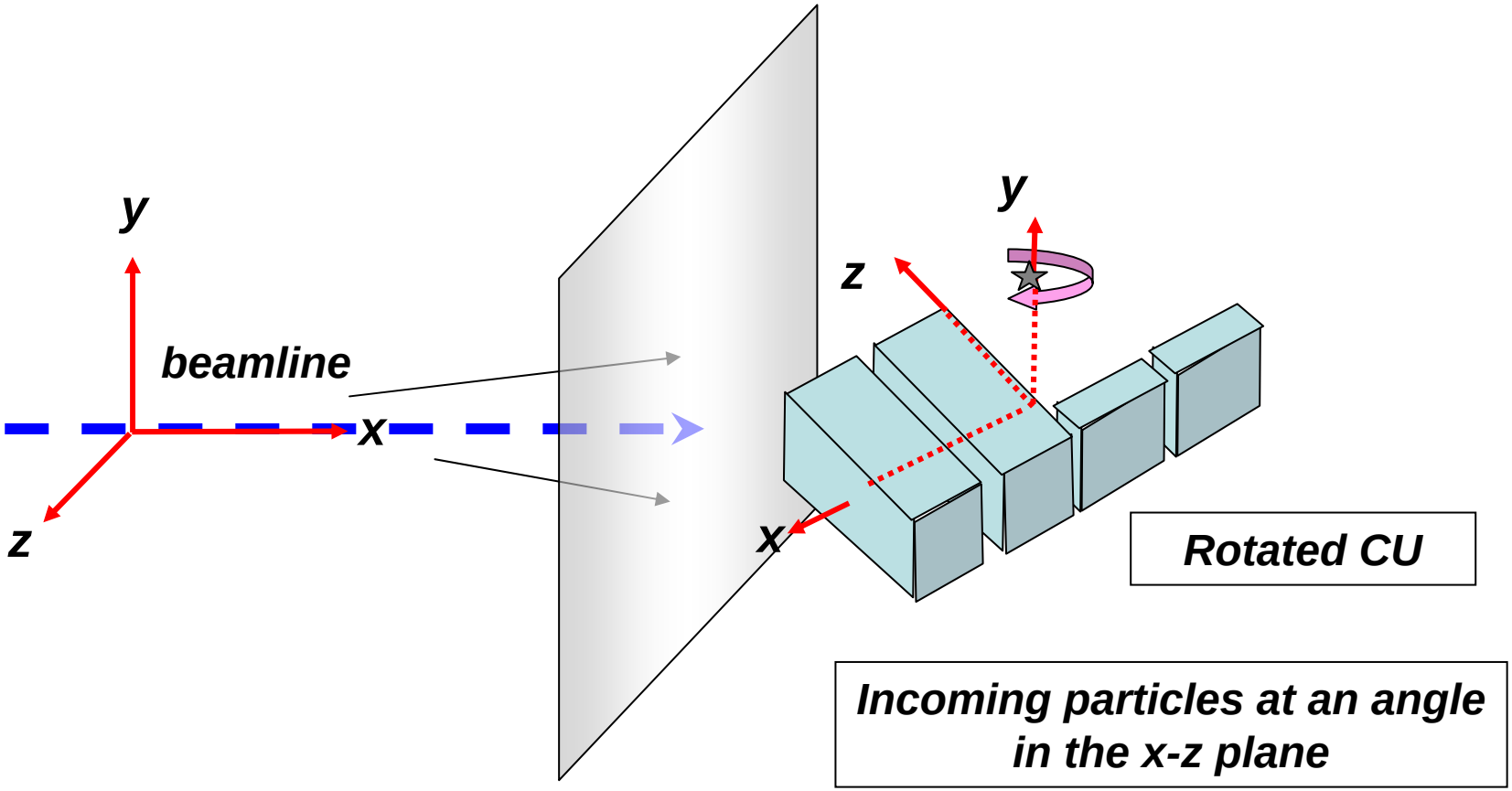
4-Tower CU



CU in beamline

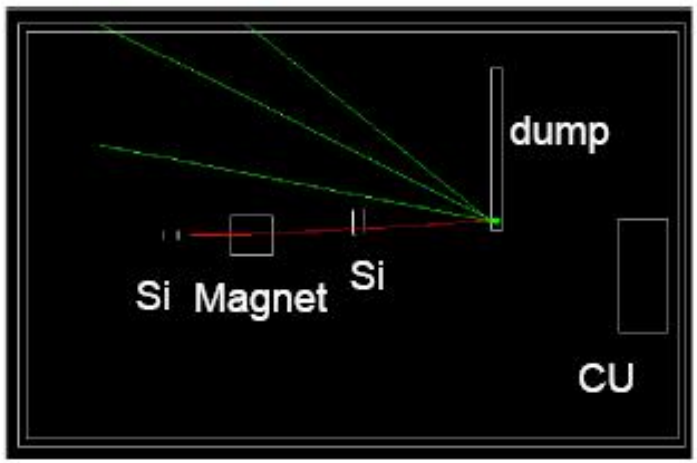


Rotated CU in beamline

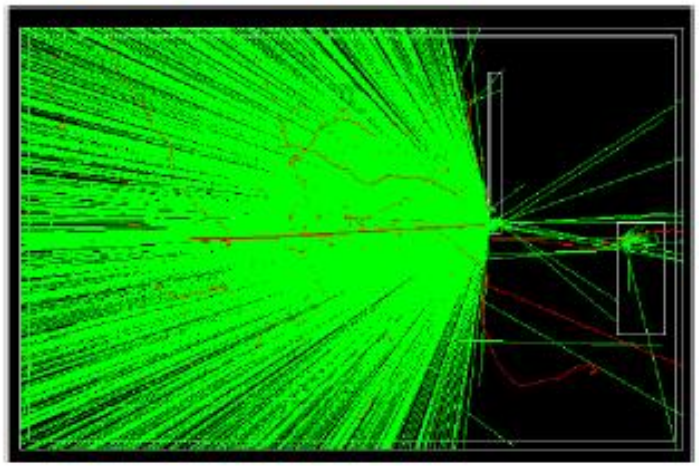


Benoit's Beam MC

Possible setup for the CERN
Bremsstrahlung beam



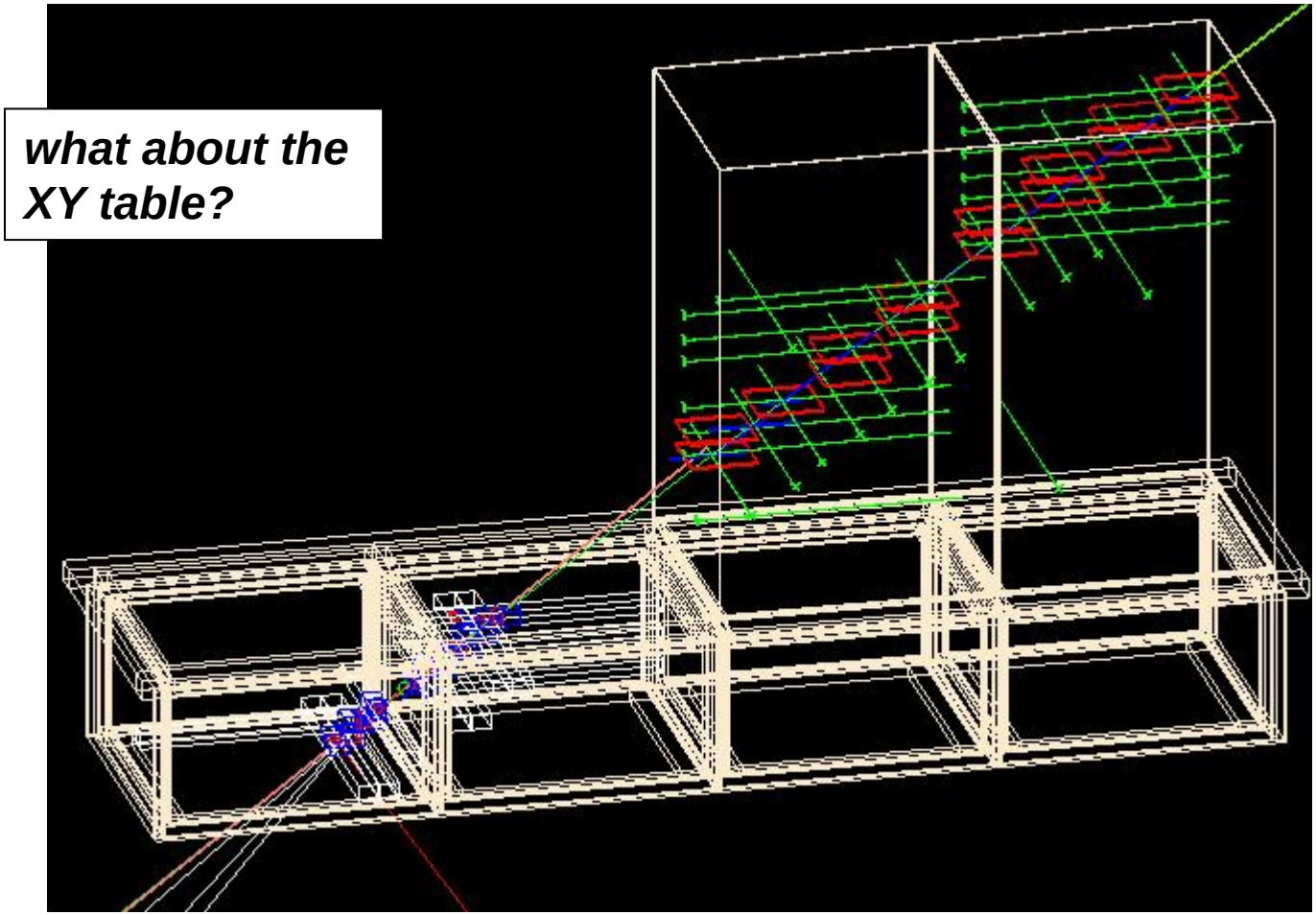
1 evt



200 evts

Current MC produces a text file of particle parameters… not very convenient for Gleam

CU Geometry: First Draft



Thanks Anders!

Then, Subdivide and Conquer

Tasks:

A. Modify Benoit's program to produce a McParticleCol instead of a text list

B. Enhance Gleam input functionality to:
   - read in more than one particle per event
   - rotate and translate event corresponding to positioning of CU

C. Enhance G4Generator and downstream code to process multiple particles

Modify Standalone MC

Heather has taken on this job.

- She has Benoit's code partially running on the norics.
- The program uses G4 libs that are not needed for GR or EM, so some infrastructure work needs to be done, in particular, a new extlib for the extra libs, to keep them away from GR!
- When this is done, she will CMT-ize the code and put it in cvs.
- Finally, the code will be modified to produce mc.root files. (This is the easy part! [We hope!])

Tentative format of the Event

Each event contains an McParticleCol containing an initial "particle" and one or more daughters.

- The daughters are the actual particles produced by the beam
- The initial particle is a fake, whose 4-momentum is the sum of the 4-momenta of the daughters, and whose position is on the beam line at the reporting plane.

I've made a little **toy root file** which may be useful to test the Gleam changes… probably need to iterate.

Enhance Gleam

Input: **Toby** has started working on this. The job appears to be straightforward.

- A new algorithm will apply rotations and translations as specified in the jobOptions file.

G4Generator: **Tracy** is doing this part. He’s nearly ready to try out his changes on a real input file.

Updated Update
6 December '05

Lot's of activity! I *think* we're on track for the end of this week.

- Heather is creating a CMT package with the G4 pieces needed to run Benoit's code. (turning out to be harder than we had hoped…)
- We found a RootIo bug that double the number of entries in the mother particle's daughter list. (Fixed in cvs.)
- Toby is ready to test the coordinate transformation on "real" MC particles.
- Tracy has modified G4Generator to accept multiple particles, and is working his way downstream. (See next slide…)
- Philippe is adding ACD tiles to the CU model. (Help from Heather and Joanne) He's uncovered some bugs in how HepRepSvc (?) rotates volumes.

A mu$^+$ and mu$^-$ swum through the LAT!