

Current progress on LCDROOT

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Status Summary

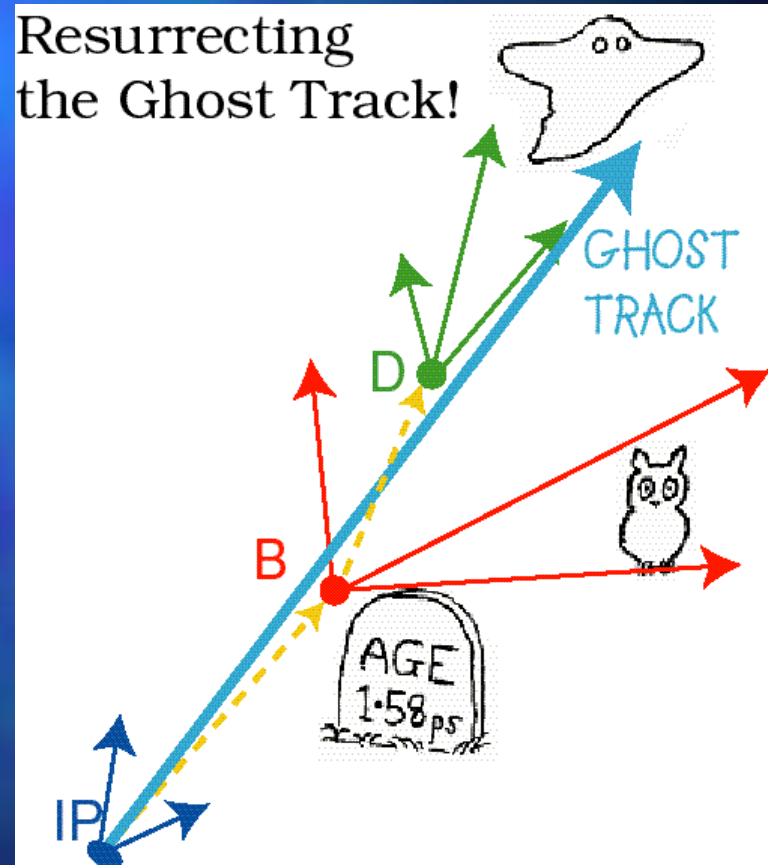
- Generator (Pandora, Pythia, stdhep inputs)
- Fast simulator (easy to change detector geometry and performance)
- Full simulator (read SIO generated by Gismo)
- Event reconstruction (Clustering, no actual tracking)
- Analysis tools (Topological vertexing, jet-flavor tag. with N.N., Track extrapolator,...)
- Supported platforms (Linux, SunOS, AIX, Windows)

Progress on LCDROOT V3.4

- ZVTOP3
a new topological vertex finder.
- Support new Pandora(V2.2) and Pandora/Pythia(V3.1)
- Change cluster position definition
- Stdhep has been supported on Windows (now most of LCDROOT functionalities works on Windows)

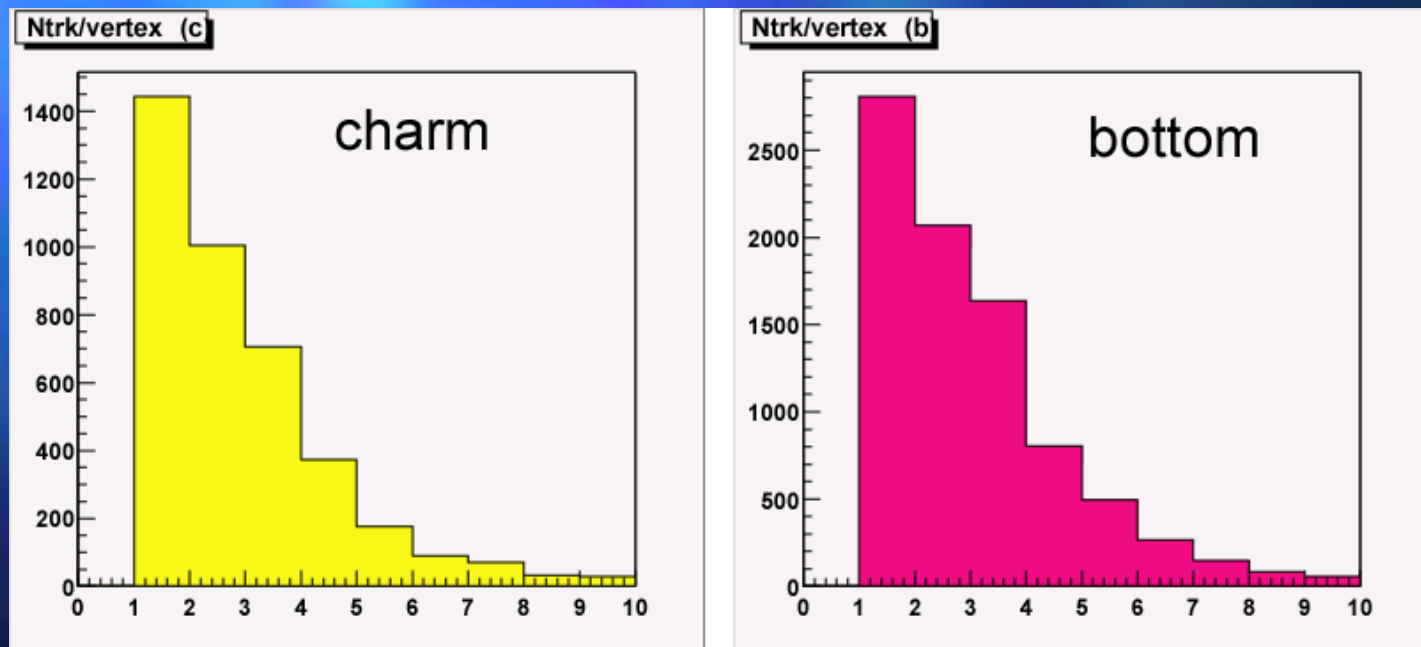
ZVTOP3

- Ghost-track vertex finding algorithm implementation
- Use straightness of b-decay chain



of tracks in a vertex

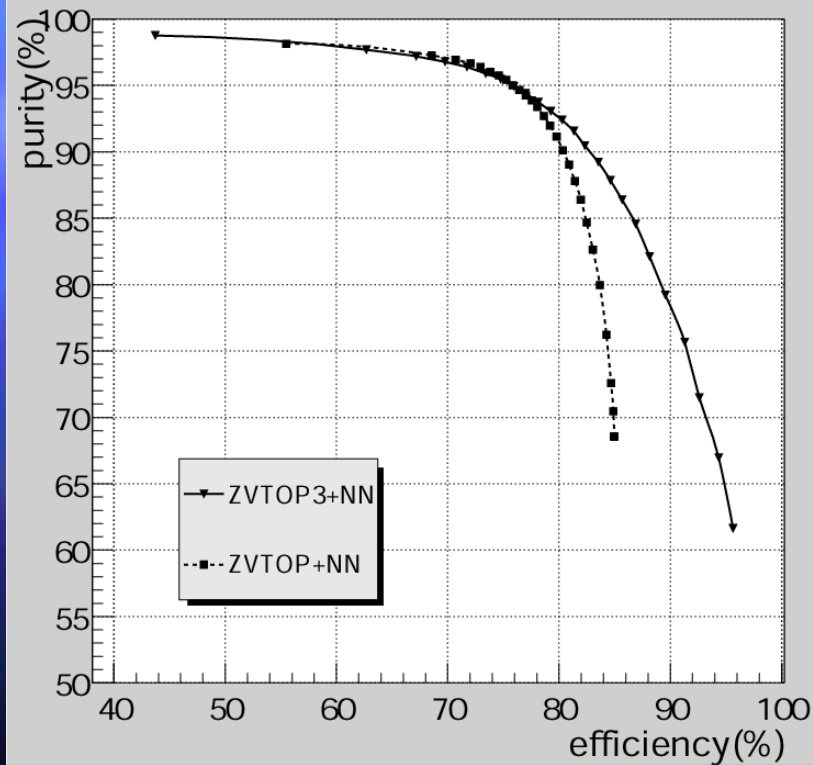
- The ghost track algorithm gives one-prong vertices.



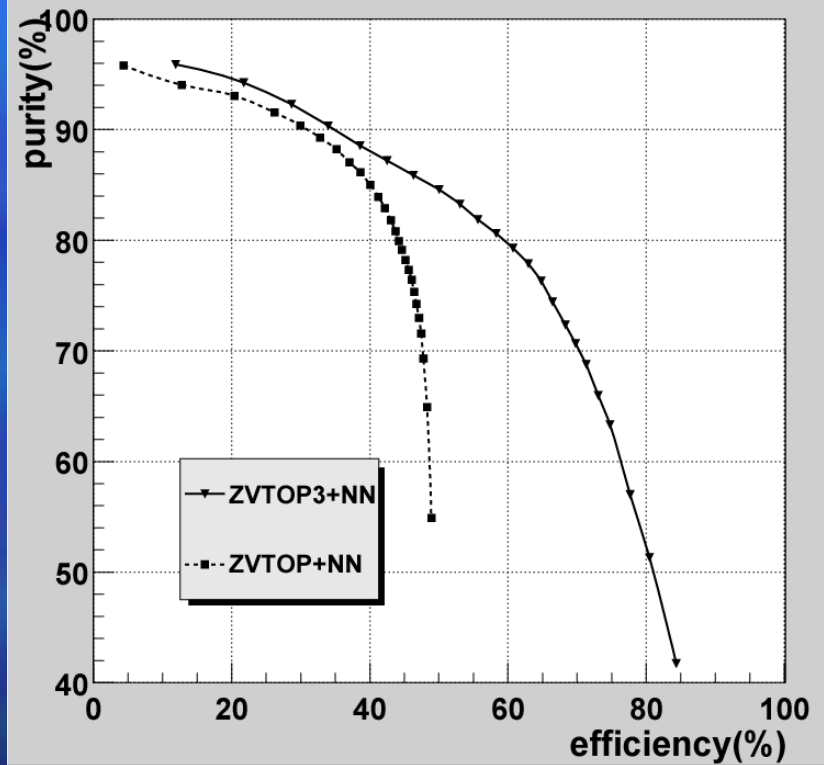
Performance

$Z \rightarrow qq$ @ $\text{Root}(s)=91.26\text{GeV}$

b tag efficiency vs purity



c tag efficiency vs purity

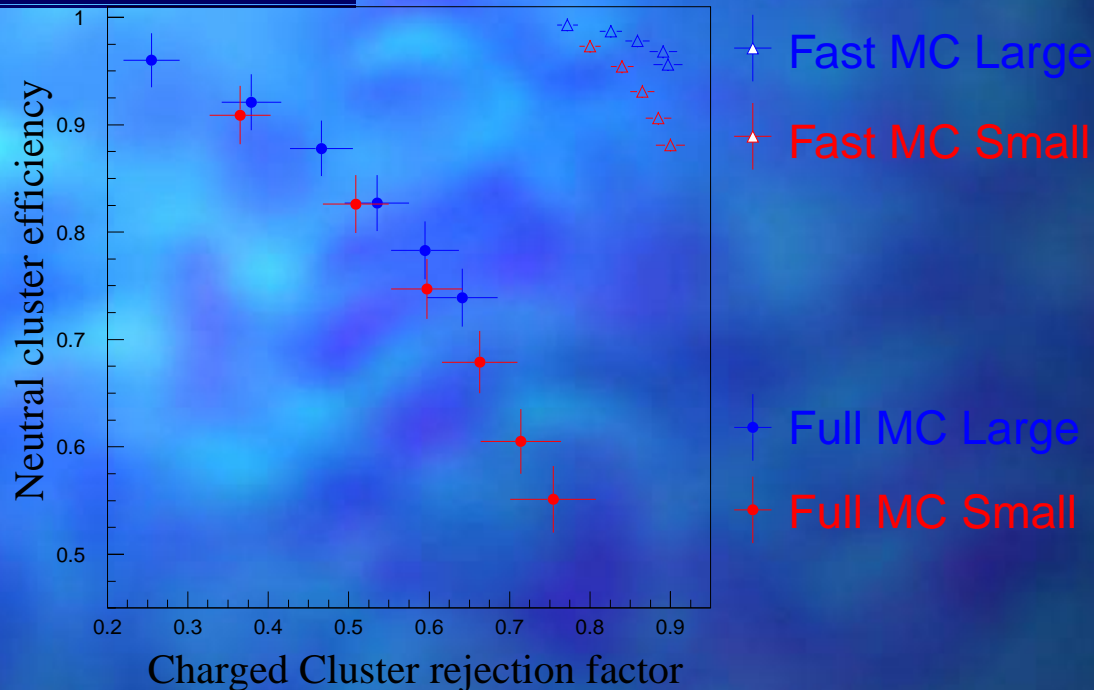


Towards LCDROOT V3.5

LCDROOT has progressed farther.

- New clustering algorithm to improve energy flow analysis with full detector simulation.
- Track fitter for calorimeter clusters.
- Geant4 with XML detector file.

Cluster and track matching



- There is a huge discrepancy between FastMC and FullMC.

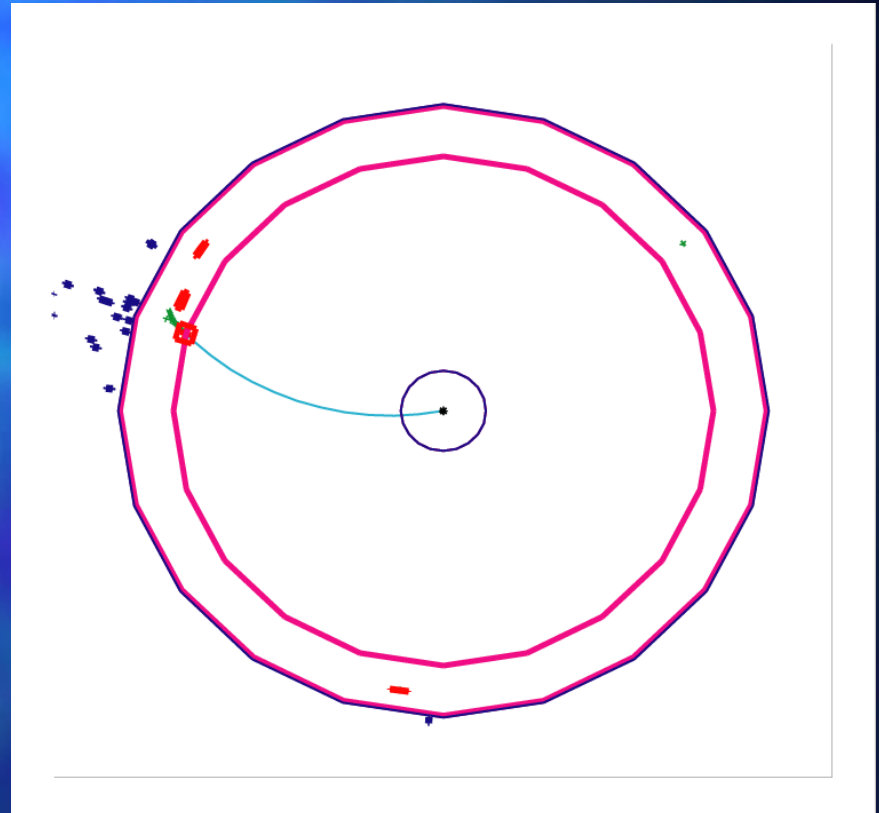
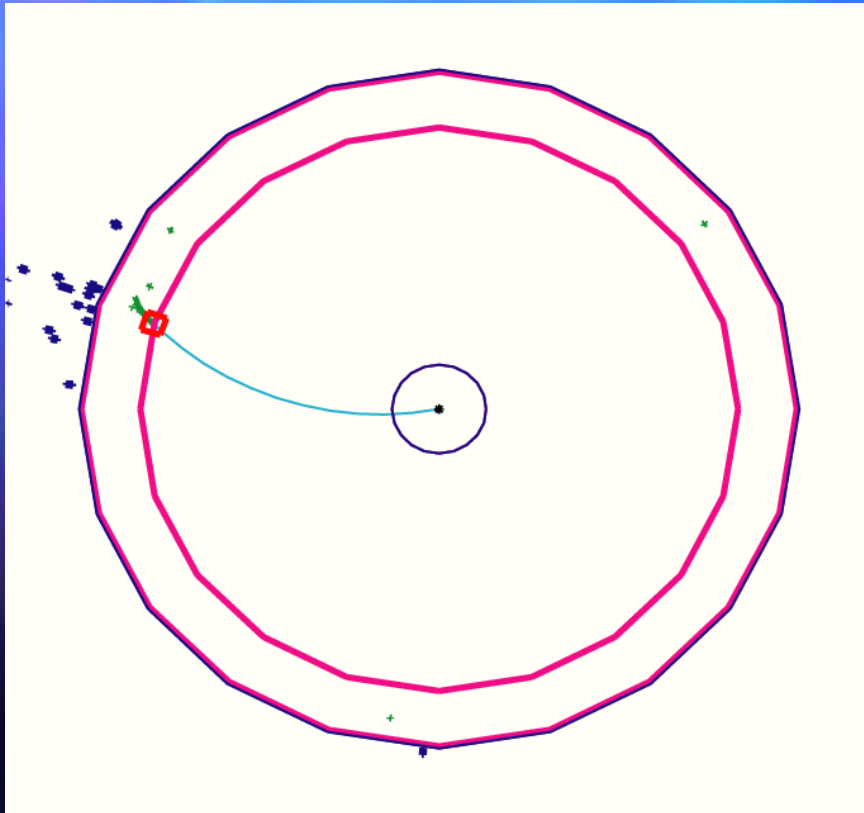
Current clustering problem

- The problem comes from scattered hits in the calorimeters.
 - obviously energy-weighted cluster position is wrong.
- The definition of cluster position is already changed since LCDROOT V3.4 from energy weighted pos. to starting pos. of a cluster.
 - need more novel clustering to improve energy flow performance.

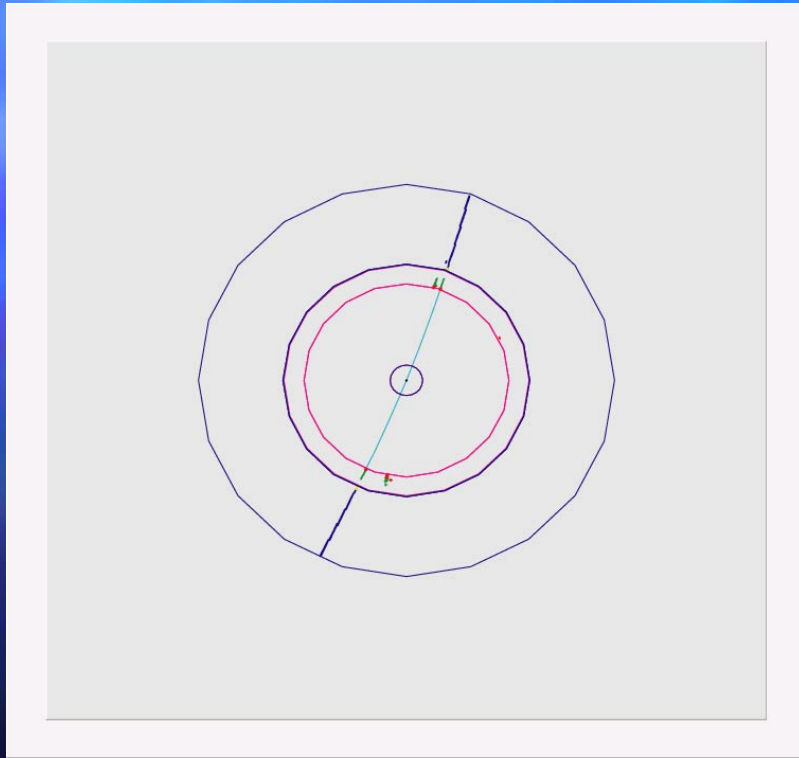
New clustering algorithm

- Masako has developed a new clustering algorithm to separate scattered hits
 - She will present performance of the new algorithm the next week.

Cheater and Masako's clustering

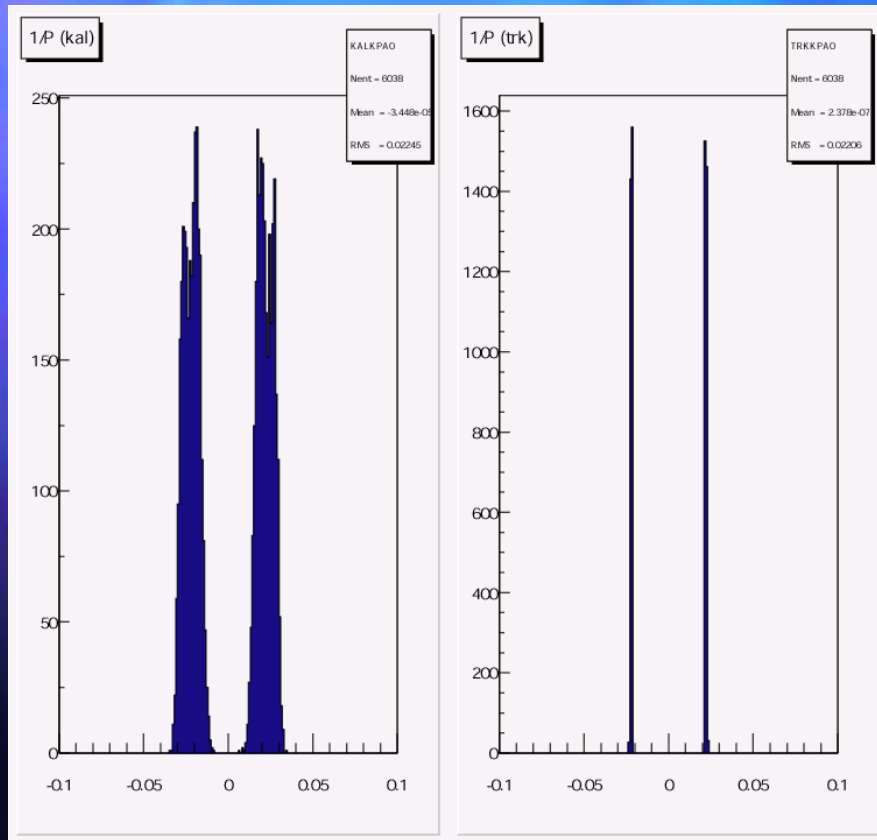


Cluster tracking



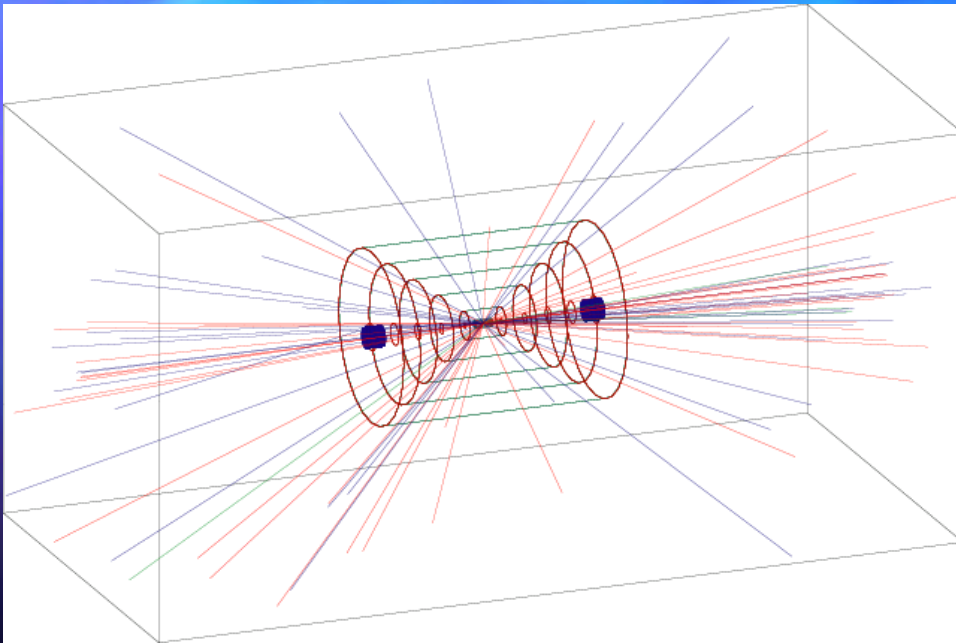
- For SD, calorimeter tracking may be a crucial issue because of small number of hit point in the tracking device.

Cluster tracking performance



- Track fitter for calorimeter has been developed for the purpose.
- Sample is $Z \rightarrow \mu\mu$
- 1/P distributions for calorimeter and tracker.

Geant4



- XML file → geant4 geometry: VXD, Tracker, LUM has been done.
- Output of hits are directly connected to LCDROOT.
- Calorimeter and other components should be ready within 10 days
- Need speed up optimization

Schedule

- Masako's new clustering algorithm should be available within two weeks.
- Detector geometry for Geant4 should be done within one or two weeks.
 - But some work (Mc particle handling, seed up etc...) will require additional two weeks.
- Hopefully Geant4 full simulation will be available by the end of this month.
- Next version must be released to allow users work for Chicago meeting.