SiD: Simulation and Reconstruction
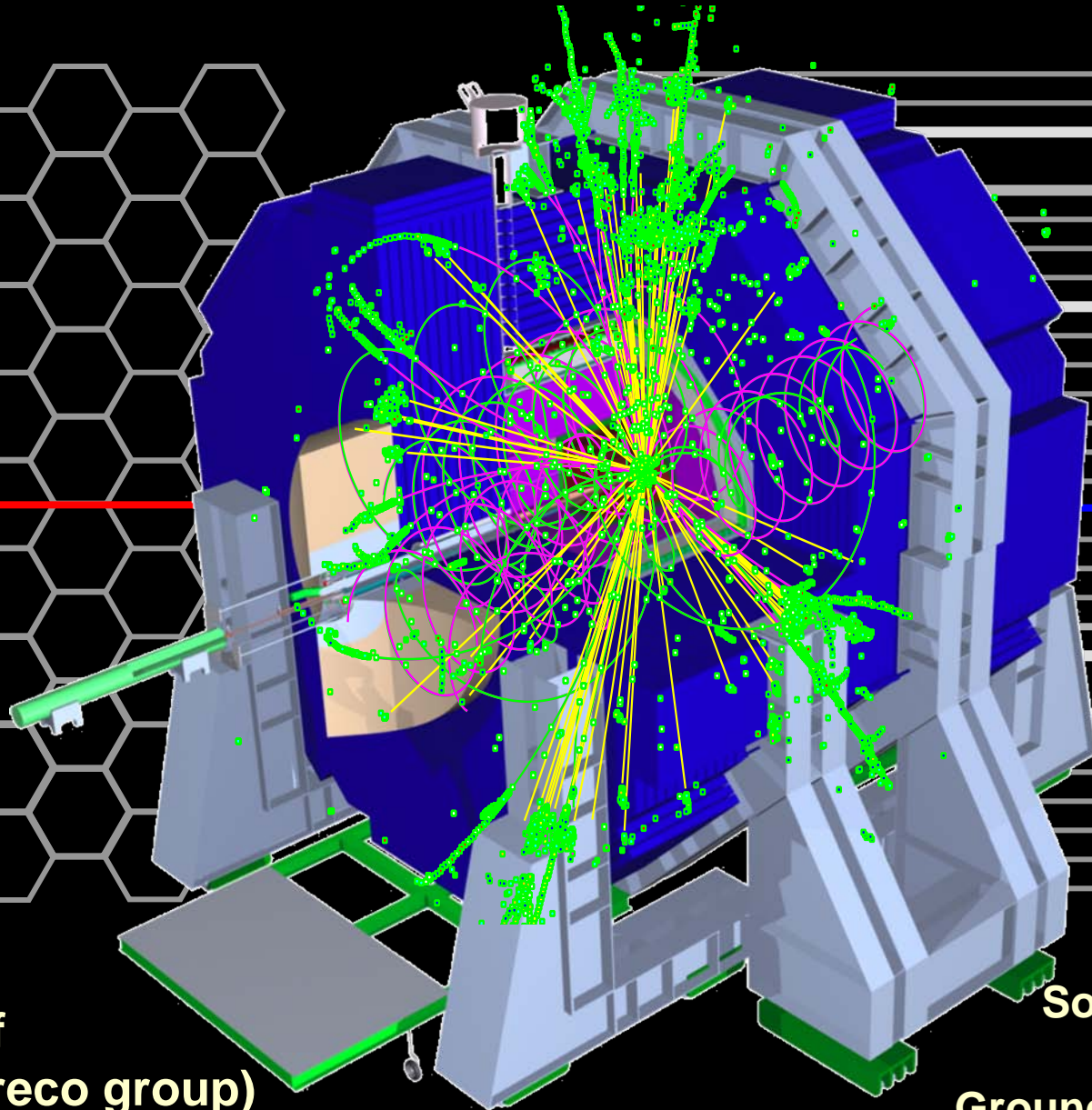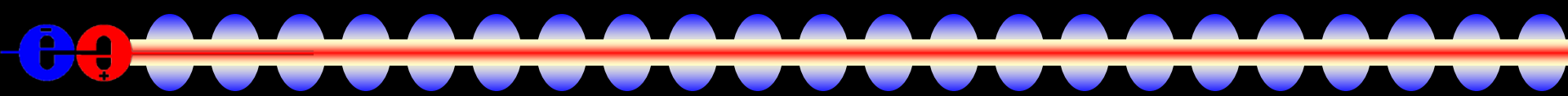
**Norman Graf
(for the sim/reco group)**

# DBD Goals for 2012

- Finalize global system design via detector performance optimization using physics analyses.

- Incorporate latest detector R&D results.

- Incorporate latest engineering designs.

- Improve and understand tracking, PFA and flavor-tagging reconstruction.

- Automate & streamline production sim/reco.

- Fully saturates available manpower.

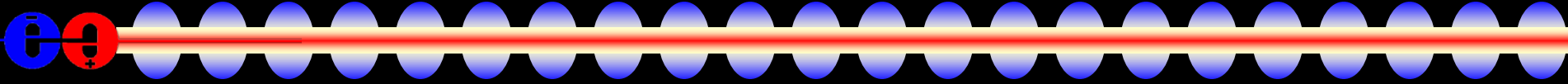- Motivates cooperation/collaboration post-2012

slic and lcdd

- Keep current with Geant4 releases (now @ 9.5)
- Improve and adapt sensitive detector handling
  - RPC charge sharing, Cherenkov & scintillation light
- Update GeomConverter to support additional subdetector types as needed.
  - refactoring to streamline this would be nice
- Working on tools to handle more complicated geometries
  - e.g. CAD to GDML for non-sensitive elements
- lcdd works very well for full detector description.
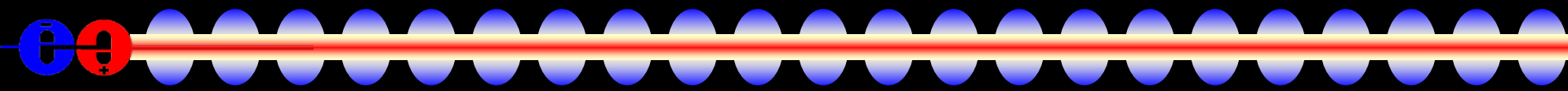
org.lcsim

- LCIO key to success of studies to-date (LOI & CDR)
  - need to adapt tracking code to LCIO2.0
  - native lcio classes not used in org.lcsim, need to handle to sets of classes, inefficient. ➜ lcsim2.0?
- Implement Kalman fitting for final track states.
  - use of trf detector elements and infrastructure
- Revive spacepoint-based track-finding (SPT, TPC).
- Revive calorimeter MIP tracking.
- Implement improved Cal response simulation.
- Continuing PFA development.

Common Framework

- Common event data model and persistency has been a huge success.

- Common geometry description would go a long way towards easing the transition to a common framework.

  - lcdd/GDML works very well for simulation, but need a tightly-coupled simpler geometry system for reconstruction.

  - Concentrate on tracking ➡ surfaces with attributes.

    - trf implements this approach, provides full support for definition of surface geometry, interactors and propagators.

- Need common geometer:

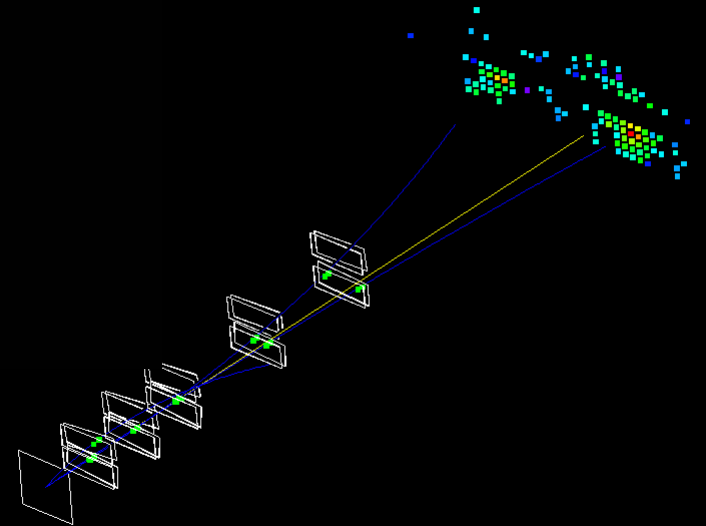 - where am I? where am I going? How do I get there?

Support Other Clients
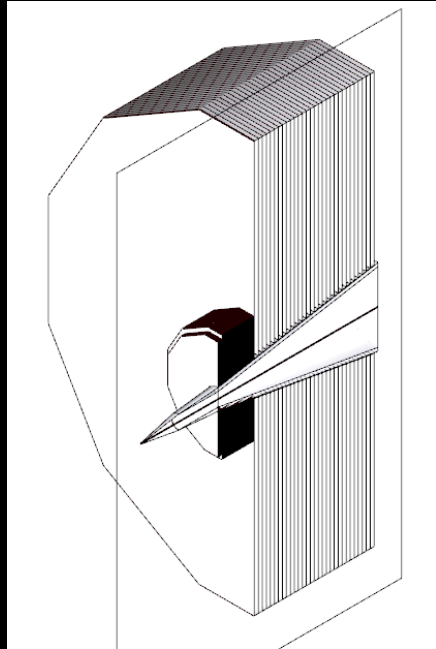
HPS @ JLab

Muon Collider
Physics and
Detectors
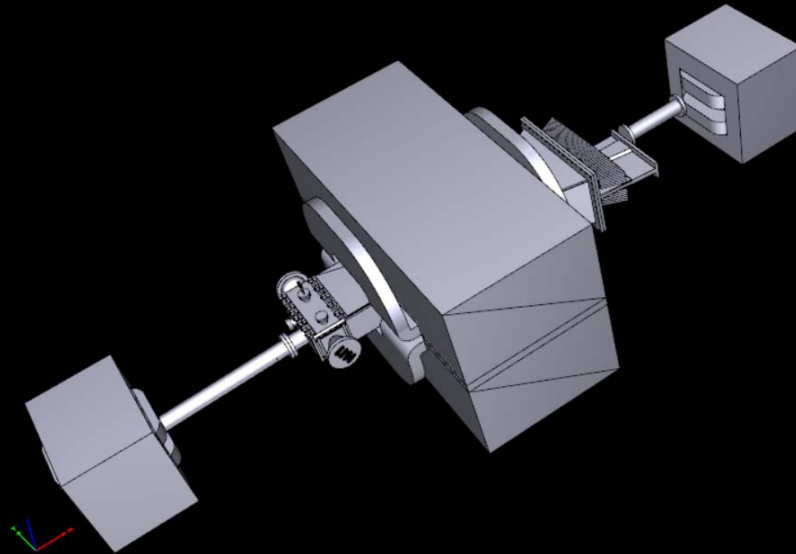
Crystal calorimetry
studies @ FNAL