

Geant4 liquid Argon code update

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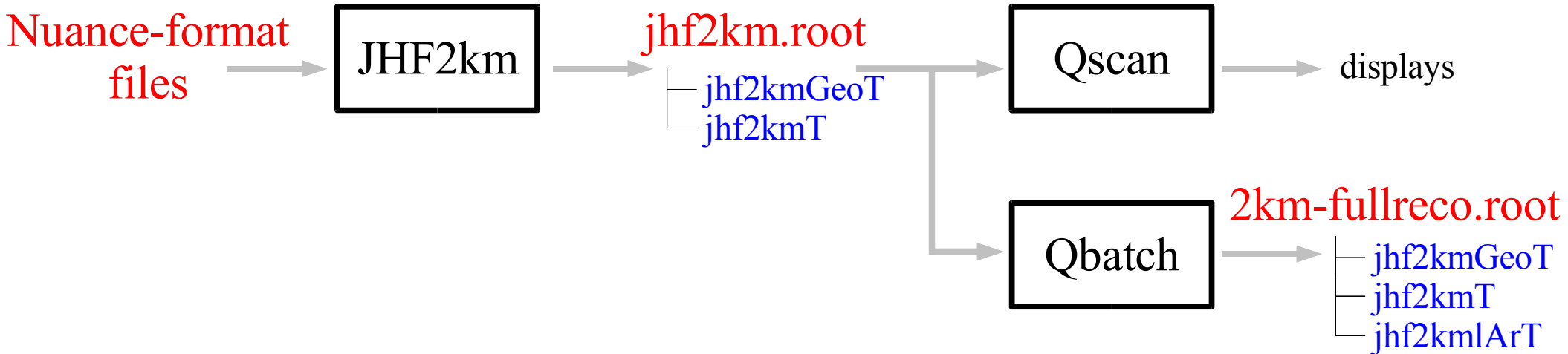
Introduction

- **JHF2km simulates the interaction of neutrinos with the 2km detectors with G4**
- **Fullreco is a library used for performing analysis on liquid argon detectors**
- **Qbatch is a program that uses the fullreco library to process raw information and output processed information**
- **Qscan is a graphical program that processes raw information and creates displays**
- **My goal is to use Qbatch and Qscan to process the raw information from JHF2km**

Requirements for Fullreco/Qbatch/Qscan

- **QTRoot**
 - Root with QT graphics library
- **Cernlib**
- **MYSQL**
 - a database program

How it Works



jhf2kmGeoT:

a tree that holds the specific geometry of the water cerenkov detector.

While not pertinent to lAr studies, it is important that this tree be passed with jhf2kmT in order to properly analyze the WC information contained in jhf2kmT.

jhf2kmT:

a tree that holds all of the raw data from the liquid argon, water cerenkov and muon range detectors.

jhf2kmlArT:

a tree that holds the processed liquid argon information. Currently, the objects in this tree are instances of classes defined in fullreco.

What is Left to Do

- **Create new class to hold processed liquid argon information**

Old: [jhf2kmlArT](#):

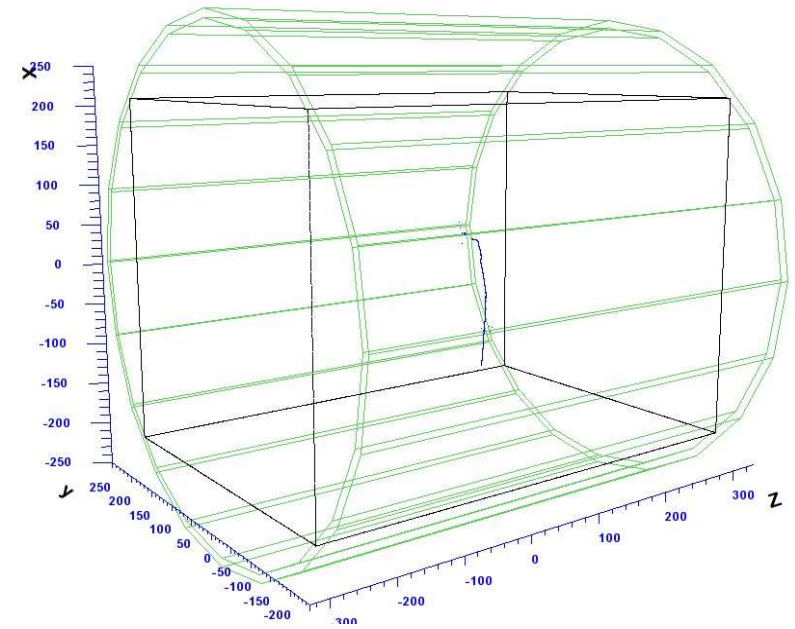
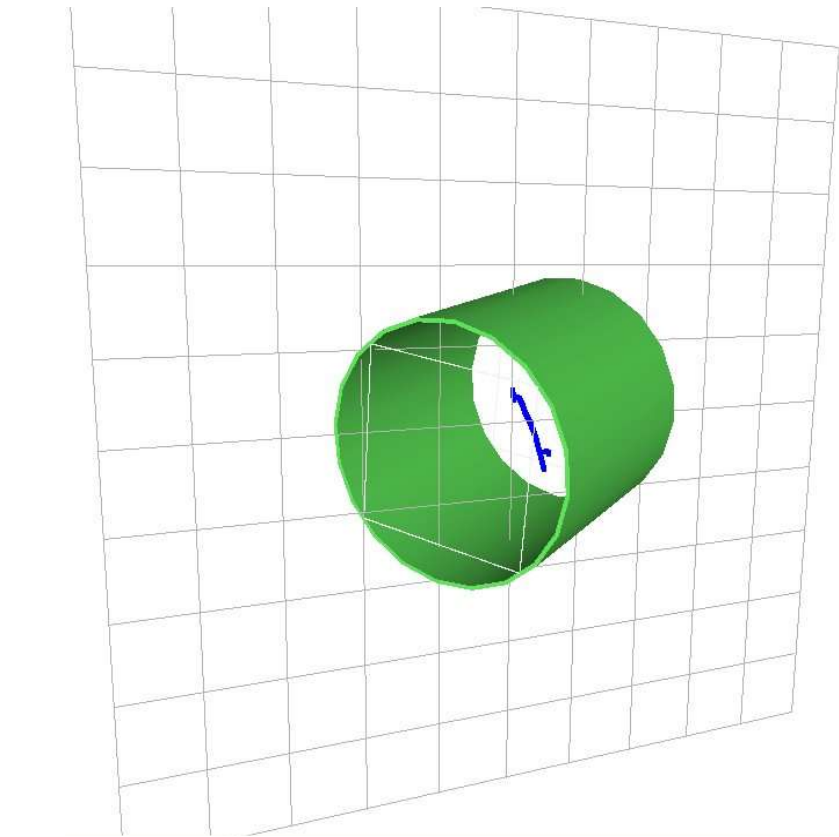
a tree that holds the processed liquid argon information using fullreco's classes. This necessitates linking against the fullreco library to access processed data. The classes are also not optimized for Root TTrees and hold raw data that we do not need.

New: [jhf2kmNewlArT](#):

a tree that holds the processed liquid argon information in a new class. This class will be free of fullreco dependencies, optimized for Root TTrees and will only contain salient processed information.

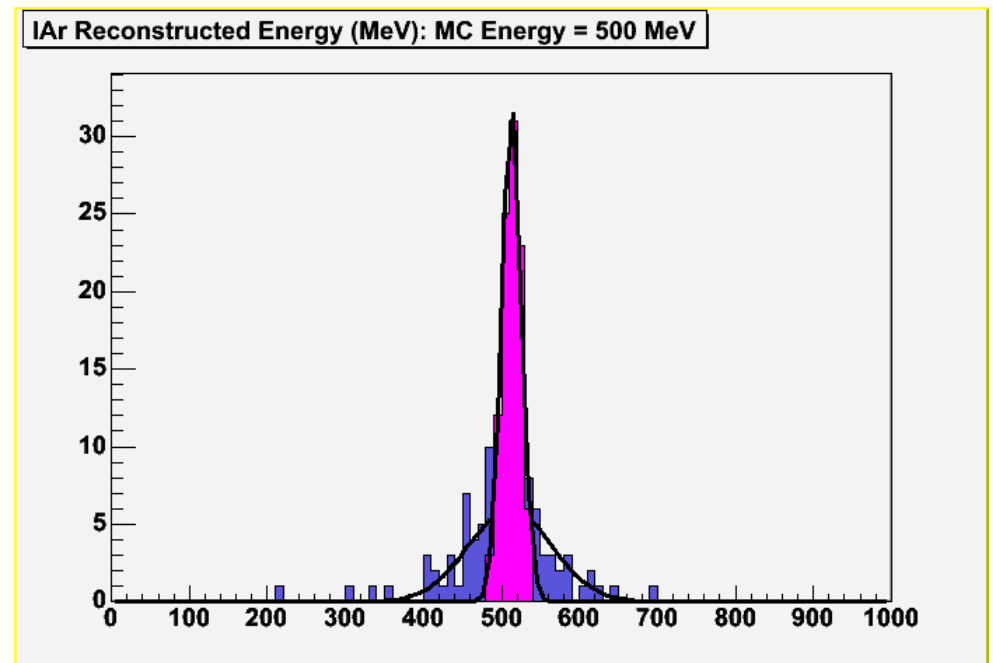
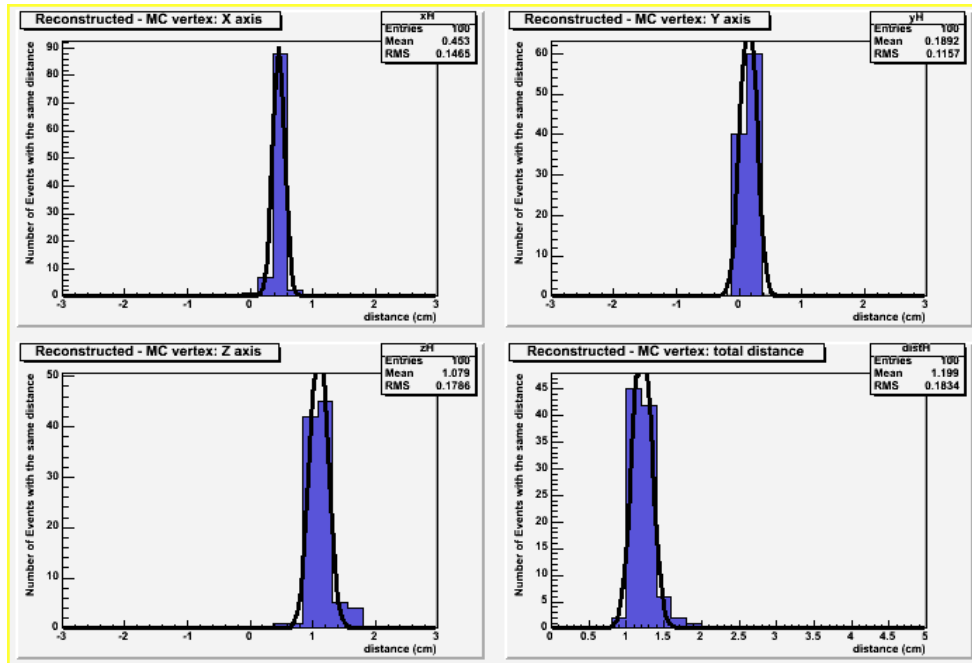
- **Update 2km-specific code to keep up with fullreco updates**

Results



Output of Qscan, the graphical program that uses fullreco, for JHF2km events

Results (contd.)



Root output of Qbatch. Now studying reconstruction algorithms.
Example: vertex distribution, energy distribution

Conclusion & Plans

- **fullreco is fully integrated into 2km liquid argon analysis**
- **Now using results to study reconstruction code**
- **Goal: study reconstruction resolution of events that start in the liquid argon detector and stop in the water cerenkov detector**