



# GArSoft Update

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# GArSoft Documentation



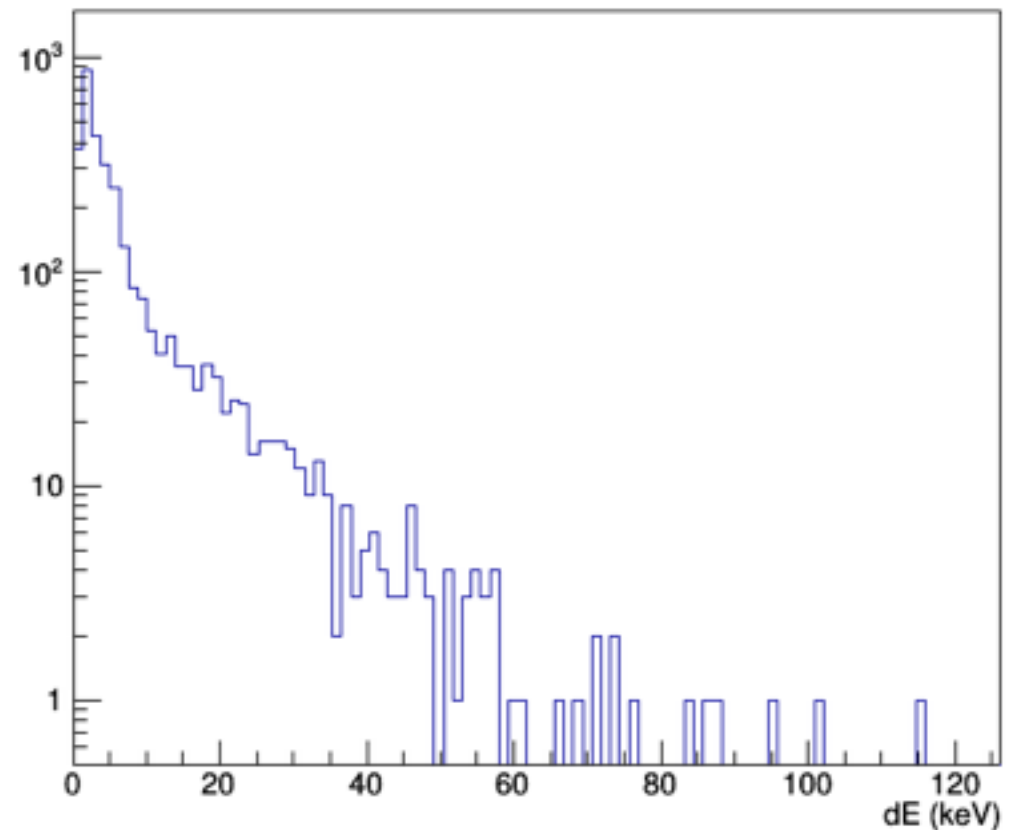
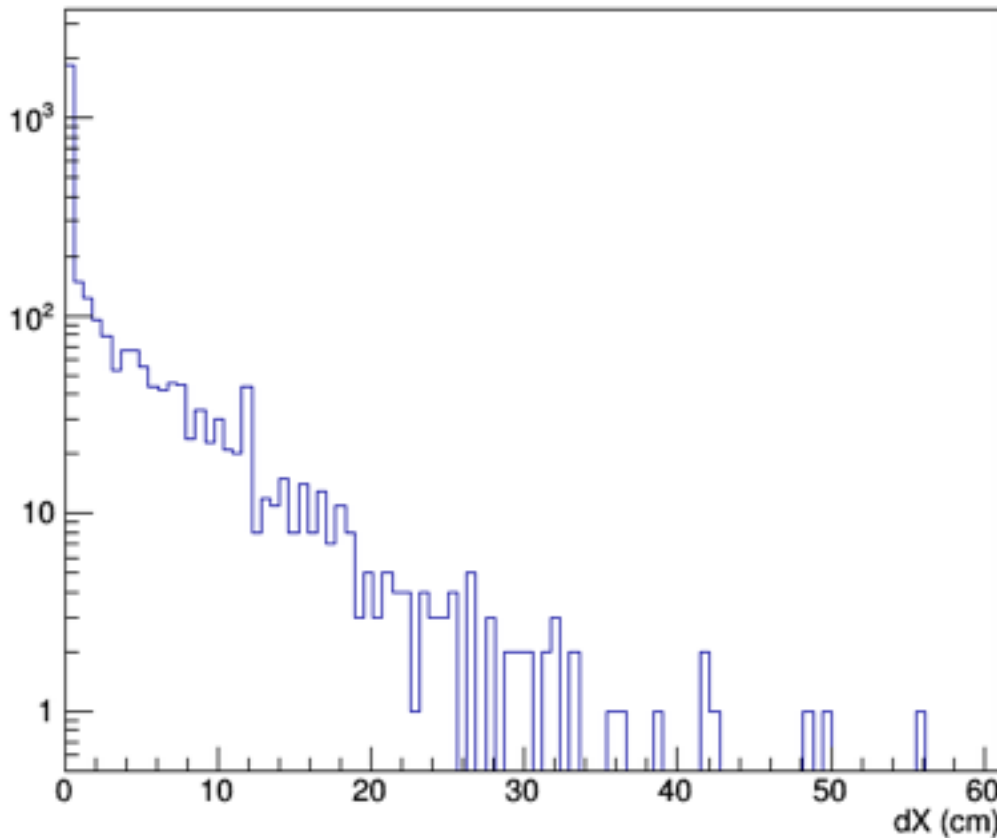
- All documentation for the effort is available on the Redmine page,
- [https://cdcv.s.fnal.gov/redmine/projects/garsoft/wiki/ART-based\\_Software\\_Information](https://cdcv.s.fnal.gov/redmine/projects/garsoft/wiki/ART-based_Software_Information)

# Status of the Simulation



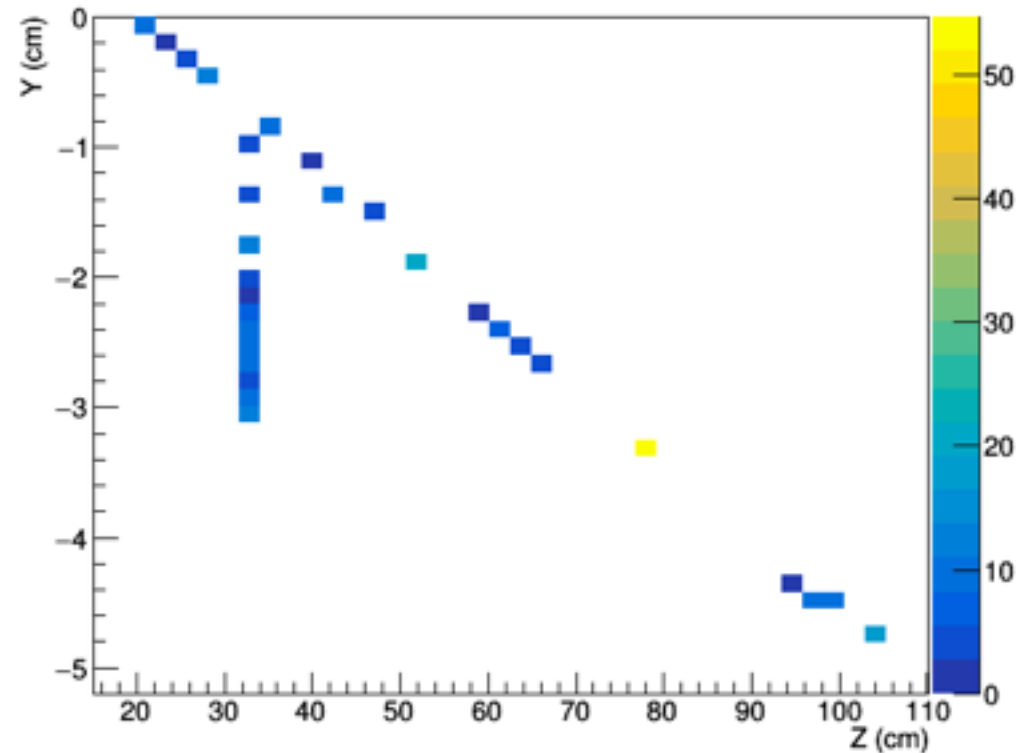
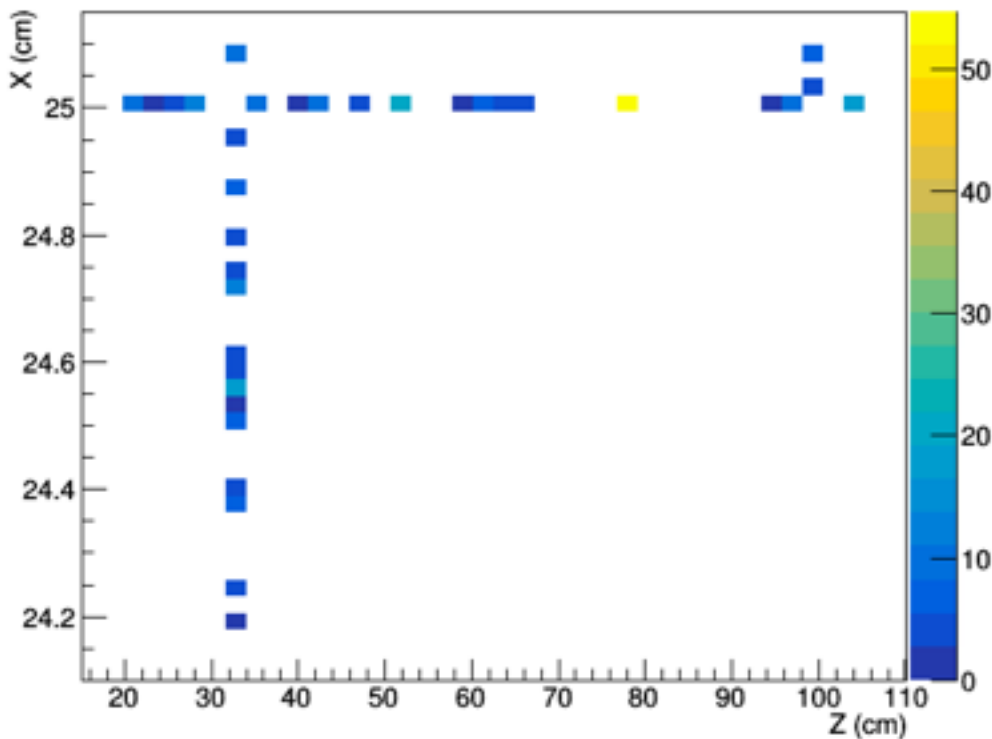
- The basics for the art-based simulation are all now in place
  - Detector geometry
  - Particle gun, cosmic ray and GENIE based event generators
  - Ability to track particles through G4 and save a set of energy depositions that can then be turned into raw signals
  - Associated mechanisms for configuring and producing timing, detector properties, gaseous argon properties, etc
- Still a long way to go though
  - Need a better GDML description of the geometry
  - Need to understand why G4 step size limiting is not working
  - Need to verify the energy deposit to ionization model
  - Need a readout electronics simulation to produce raw signals
  - Need to provide back tracking from raw signals to energy depositions and particles (some hooks are in place, but need to be fleshed out)

# Proof of Principal



- Generated 100 single muon events, 6 GeV/c each, started in the middle of the TPC with a 3 degree downward orientation
- Left plot shows the step size for each step of the muons, should be limited to 0.2 cm
- Right plot is the energy deposited in each step in keV

# Proof of Principal



- These plots are an “event display” of one of the muons. Left is the XZ view, right is the YZ view
- The depositions are weighted by the energy deposited (z-axis of the plot)
- Can see clearly that the step size limiting needs work

# Outlook



- The basic setup of the GArSoft framework for simulation is in place, but still needs to be improved
- It is at the point where another person could really help push progress in a short amount of time
- Need a better event display, perhaps something based on the ROOT Eve display