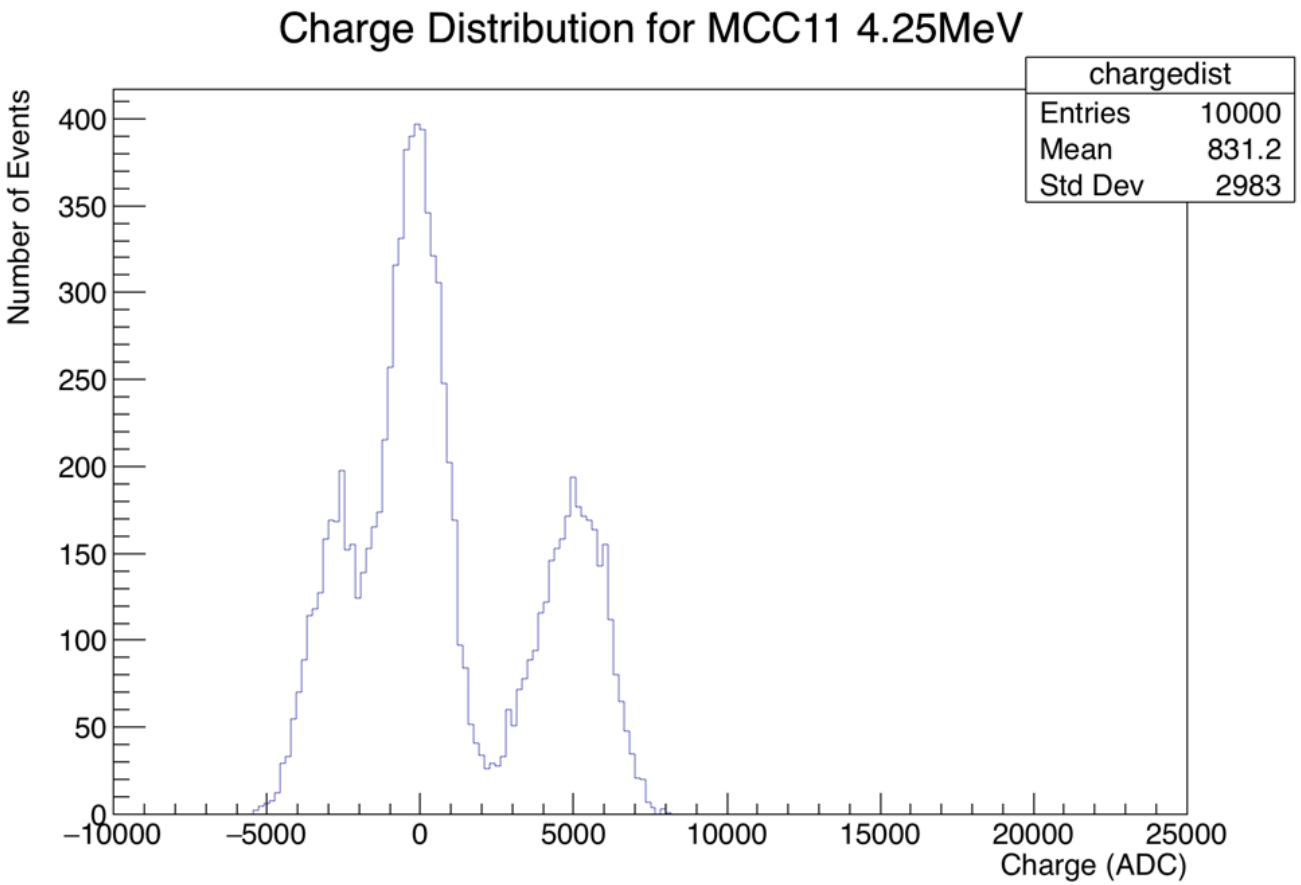
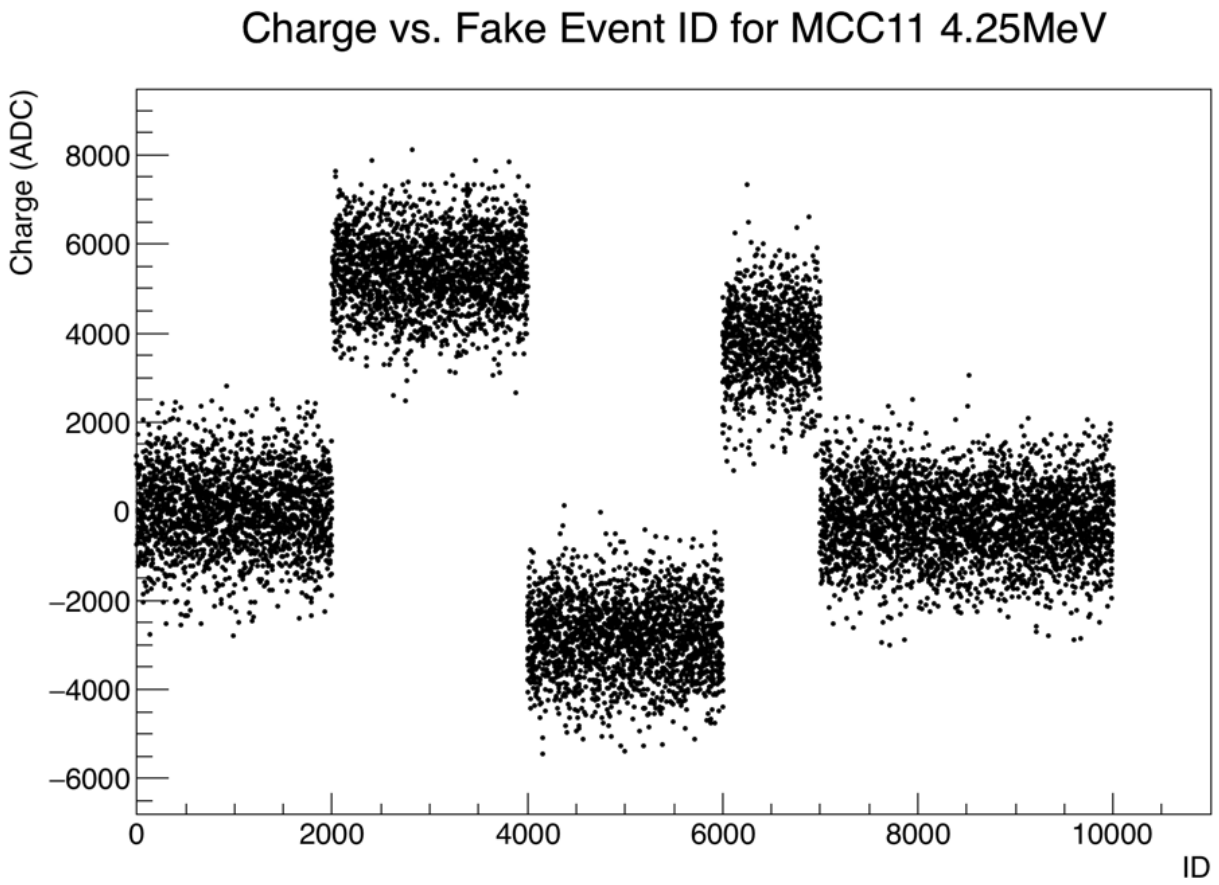
Introduction: Charge distribution issues

- SAM definition: mcc11_snb_monoenergetic_marley_clean
  - Monoenergetic MARLEY simulations of ν_eCC interactions for ν_e energies [4.25, 99.75] in 0.5 MeV steps
- Trying to find charge distributions for these files; lower energies (e.g., 4-20 MeV) show double bumps, negative charge
- Wanted to determine if issues arising from specific files:
  - Plotted charge vs. “fake event ID”
  - The real event IDs, art::Event.id().event(), are not enough to distinguish the files because multiple files have the same event IDs
  - The “fake event ID” is simply a counter – LArSoft module fills TTree file-by-file, so the charge variable respects that order

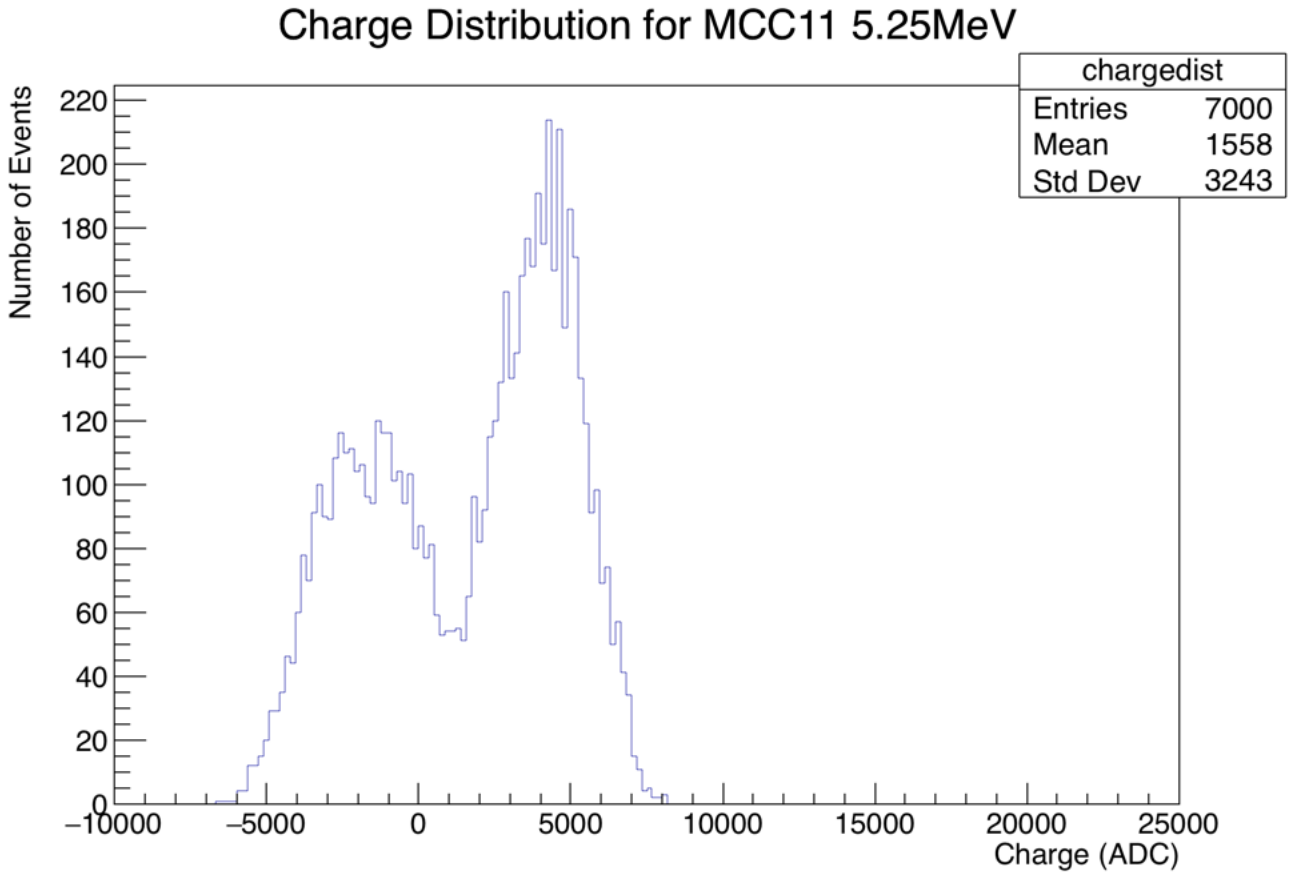
MCC11 4.25 MeV – 6 files, 10k total events

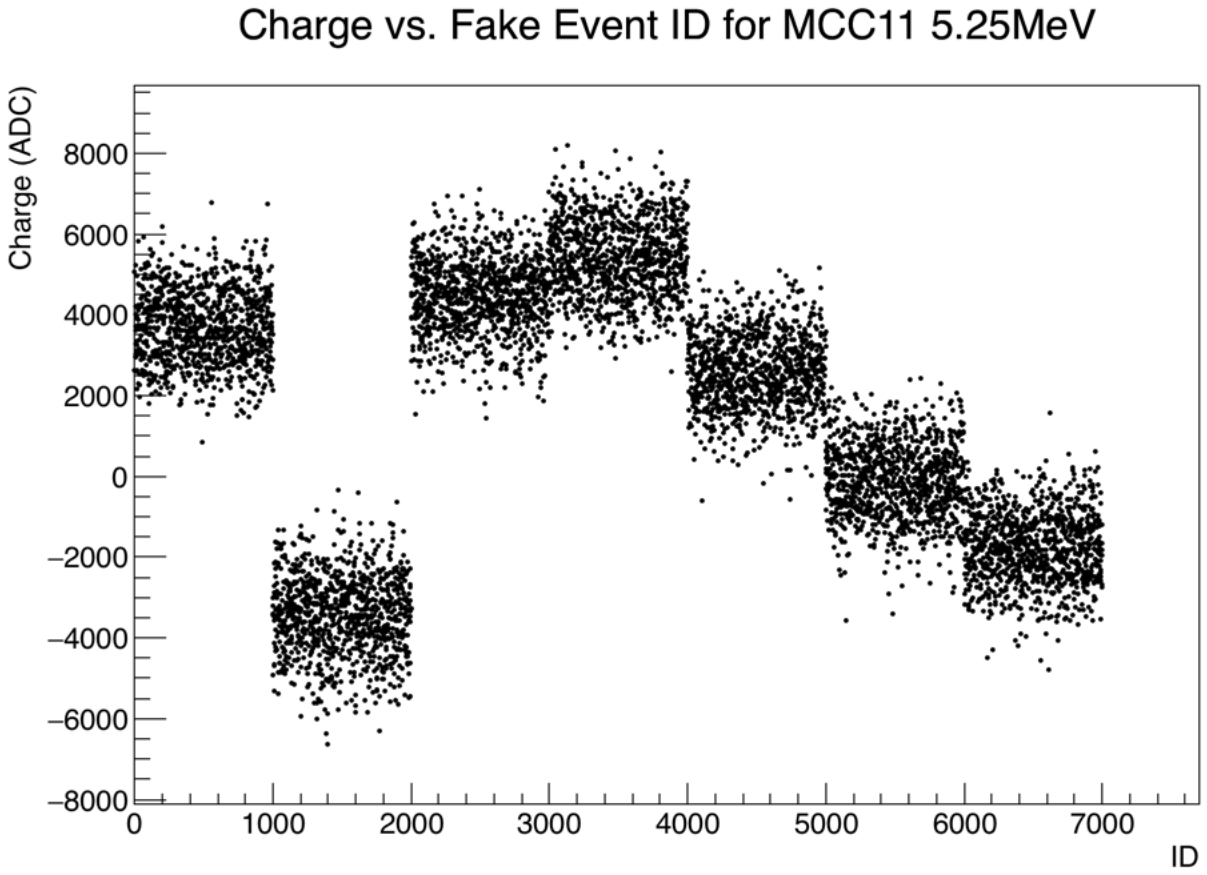




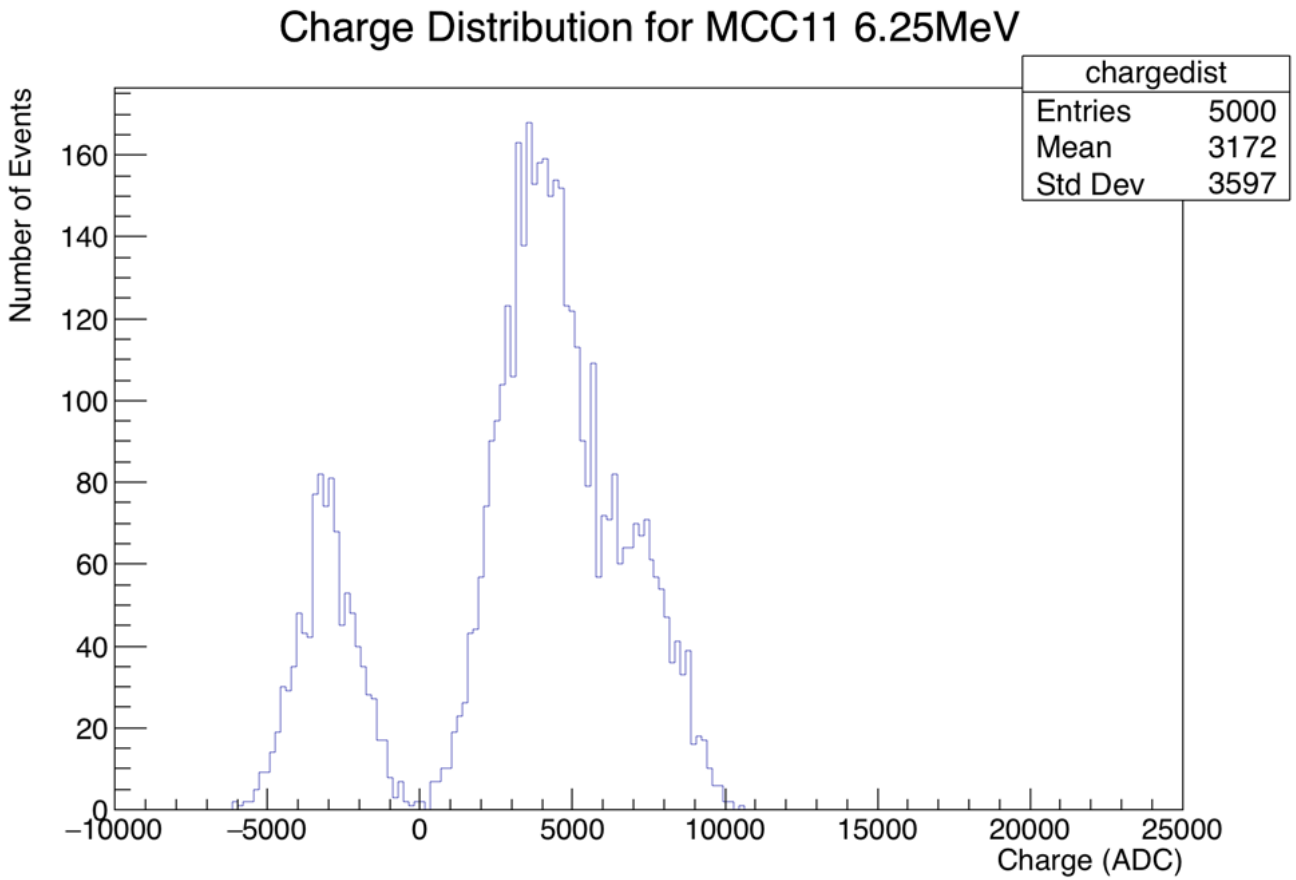
Shows that some files have higher average charge depositions compared to others

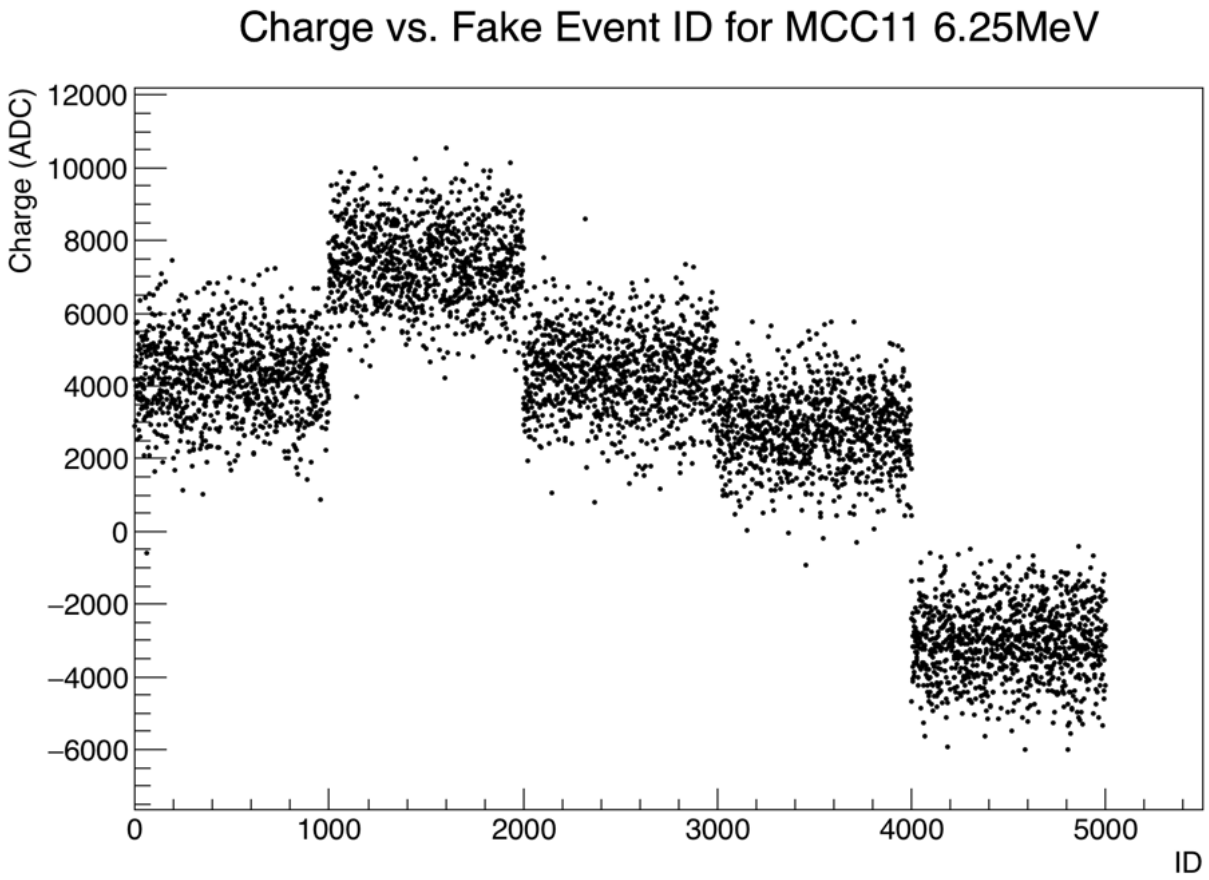
MCC11 5.25 MeV – 7 files, 7k total events





MCC11 6.25 MeV – 5 files, 5k total events





Takeaways + Questions

- Exploratory studies lead to following conclusions:
  - MARLEY generator isn’t the issue
  - Pedestal isn’t the issue
  - Something in detsim stage + production might be the issue
- Questions:
  - Are there detsim parameters (e.g., noise) that are randomly selected?
  - Are there detsim parameters that are set for an entire file of events?
  - How to access noise information in LArSoft module?