Ricochet Update

Electronics Simulations

Nick Decheine

UW-Madison

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Roadmap for electronic response

- Get simulated data
  - Write macro for bolometer hit events
- Use analysis framework to implement electronic response
- Figuring out the output file (will depend on what we want to look for)

Simulation

First I must write a macro. Looking to

- Run isotropic neutrons just in front of the cryocube (5MeV)
- Also need gammas, because the detector response is very different.
- Will go digging in the `ricochetSim` source code for macro definitions to ensure it's simulating what I think it is.

Analysis

We want to study the resolution of the bolometers. To know this I'll need to

- Know position of hit inside bolometer (surface and volume)
- Separate nuclear and electronic recoil
  - Use `processID()` to categorize each event.
- Then apply **smearing**, not smeared energy, but reproduce the smearing effect real-world electronics would produce.
  - Hit energy
  - Ionization
- With a measure of Ionization, must apply bias voltage to bolometer $\rightarrow$ electron drift $\rightarrow$ heat. Discussed in thesis by Silvia Scorza on Edelweiss.

Analysis continued

By diffusion, the charges created in these interactions can be collected on the *wrong* electrodes, producing an ionization signal of about half of the real deposited one. This is discussed in Silvia's thesis 2.1.2.

In addition, want to find recoil energy and ionization energy of each particle and each event.

- A characteristic parameter is ratio between ionization energy and heat measured
  - For gamma it's 1
  - For neutrons the yield is lower, each measurement is less efficient.

Working towards 4 plots for electronic and nuclear recoils for surface and fiducial measurements.