

# Debugging Backtracking in GArSoft

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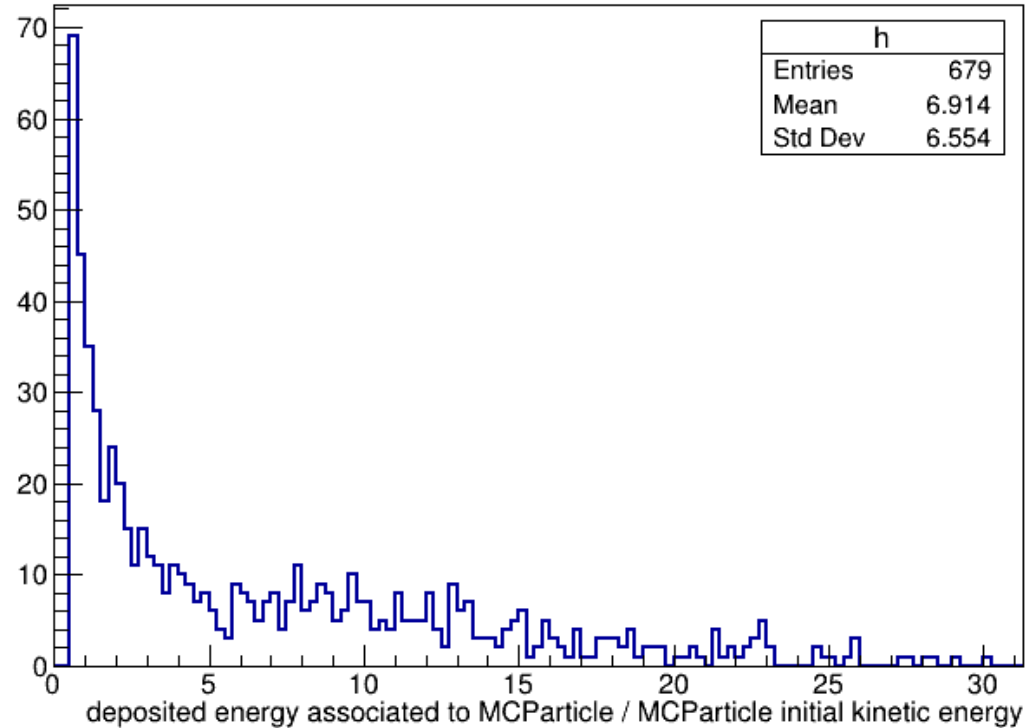
ND-GAr Meeting  
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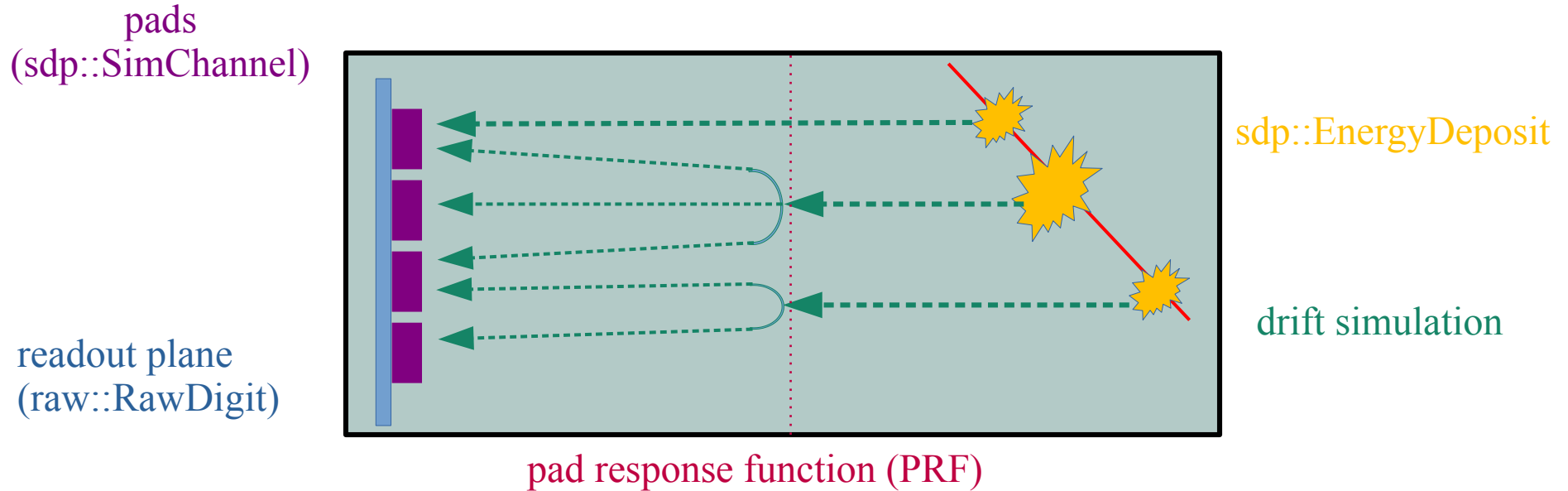
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# Reminder: what's the problem?

- Found by B. Irwin using GArAna back in July
- Track  $\leftrightarrow$  MCParticle associations
- Cases where associated deposited energy  $>$  initial KE



# Association building in GArSoft



Association: `raw::RawDigit` → `sdp::EnergyDeposit` is many-to-one  
Feature: the same deposit can be associated with multiple pads

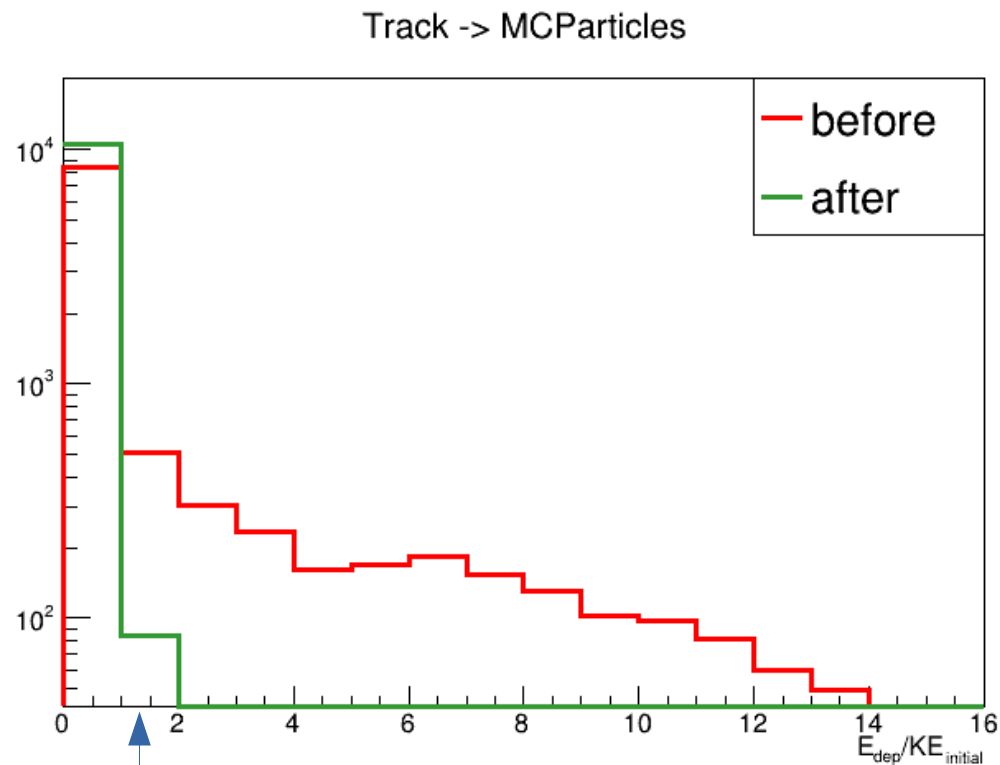
# Solution?

- Squeeze more info into the `art::Assns`
  - `art::Assns< L, R, D >`
  - By default, `D=nullptr`
- `D` = fraction of total `sdp::EnergyDeposit` energy
- Energy fraction from PRF
- Modify `ReadoutSimulation/`
  - `IonizationReadout_module.cc`
  - `TPCReadoutSimAlg.h`
- Modify `MCCheater/`
  - `BackTrackerCore.*`
  - `BackTracker_service.cc`



# Before & after comparison

- Same GENIE/G4 input file w/1000 single  $\nu$  interactions
- Before: no changes to readout sim or BackTracker
- After: PRF weights added
- Changes available on `feature/chilgenb_AddToBackTracker`



100's keV- 10's MeV nuclei, electrons, protons

