Electron Finder 07-10-2023

- Progress in June (for July Sim Campaign)
  - PR #666: Provides association containers + truth associations
    merged into main on June 24
  - PR #751: Implement basic electron finding with truth cluster matching
  - Work in parallel with the RECO approach (see tasks below)
- Major Tasks (July):
  - Utilize the July sim campaign output:
    - Implement a processor to test DIS lepton finder
    - Check purity of selected electrons
  - Track Projection Factory: provide track projections at relevant detectors (Tyler Kutz)
    - ✓ Needed data structure identified
    - ✓ Prototype factory in progress
  - Track Match Factory: Matching of projecting tracks to clusters (volunteer?)
    - Nicholas Schmidt already has some code (processor) to study track matching
    - Provides a starting point for factory
  - Study of E/p cuts to implement (volunteer potentially identified, discussing next steps)
  - Study HCAL info for hadron rejection / electron id
- Plans for July sim campaign
  - Utilize “ReconstructedElectrons” to test-drive DIS lepton finder (should be in EICRecon for Aug)
  - Continue work towards towards fully RECO level (complete track matching / compare to truth level matching)

Truth approach

- PR #751 Add reconstructed electron factory, algorithm utilizing E/p cut
  - https://github.com/eic/EICrecon/pull/751
  - ReconstructedElectrons Factory
  - Input:

```
75          {"MCParticles", "ReconstructedChargedParticles", "ReconstructedChargedParticleAssociations",
76          "EcalBarrelScFiClusterAssociations",
77          "EcalEndcapNClusterAssociations",
78          "EcalEndcapPClusterAssociations",
79          "EcalEndcapPInsertClusterAssociations",
80          "EcalLumiSpecClusterAssociations",
81          },
```

  - Output: “ReconstructedElectrons”
- Utilizes the ElectronReconstruction Algorithm
  - Any track with an ECAL match
  - Accept if 0.9 < E/p < 1.2 (needs to be studied and optimized)
  - TODO: use HCAL
  - TODO: handle multiple matches
- This is meant to be initial skeleton – keep same structure for RECO approach

Electron Finder 06-16-2023

- Goal / Product: Provide identified (DIS) electron info
- Progress in May / early June (for June Sim Campaign)
  - ❌ PR #666: Provides association containers + truth associations (Wouter Deconinck et. al)
    - Did not make it in on time. S&C group still working through unexpected issues when it is included
  - Plan for June: Daniel is working on adding necessary data structures as an “afterburner” for the current simulation campaign
  - Continue in parallel with the RECO approach (see tasks below)
- Major Tasks (June):
  - Electron-pion separation, implementation of E/p cuts using existing association information (volunteer?) (some studies for roughly optimal cuts needed)
  - Track Projection Factory: provide track projections at relevant detectors (Tyler Kutz)
  - Track Match Factory: Matching of projecting tracks to clusters (volunteer?)
  - DIS lepton identification (Andrii Verbytskyi) + implementation
  - Integrated Electron Finder Factory (Daniel Brandenburg)
- These tasks make progress towards two goals for July sim campaign
  - Setup complete framework: utilize existing association + simple electron id + existing DIS lepton finder -> output DIS lepton
  - First steps towards towards fully RECO level (track matching / compare to truth level)