Draft: Software Progress

Increasing the level of detail and correctness of the ePIC detector geometry description

- Full changelog: https://github.com/eic/epic/compare/22.12.0...main
- Automatic population of website with detector views, https://eic.github.io/epic/
- Implemented asymmetric tracking region where secondaries are stored
- Implementation of cladding in fibers of barrel imaging ECAL
- Improved modeling of fiber placement in barrel imaging ECAL
- Improved detail in barrel sciglass ECAL families
- Addition of the lumi direct photon calorimeter in the far backward system
- Enable import of components through gdml (used for review of pfRICH)
- Reduce the forward ECAL insert block sizes from 2 x 2 cm to 1 x 1 cm
- Improved modeling of the backward ECAL at high eta, near the beampipe
- Improved ability to run with different far forward and far backward beam energy settings

Improve simulations of the ePIC detector

- Ability to embedded background from synchrotron radiation and beam gas in detector simulations.

Improve user experience with eic-shell environment containers

- Implement running at native speeds for users on Mac M1/M2 systems
- Traced back source of spurious geant4 volume overlaps to vecgeom library

Increase the ability of EICrecon reconstruction based on first campaign input

- Full changelog: https://github.com/eic/EICrecon/compare/v0.4.0...main
- PODIO integration in JANA2: Support of the direct read and write of PODIO collections. Even when vector-of-pointers style references are used, PODIO objects are always registered to a collection and that collection is registered to a frame. JANA understands and abides by PODIO's memory ownership semantics, including supporting subset collections.
- PODIO associations in EICrecon due to PODIO integration in JANA2. This in turn allows for matching clusters with tracks (and finding unmatched clusters).
- Faster build times.
- Calorimeter clustering implemented.
- Flexible methods for cluster finding based on adjacency matrices are now used in various calorimeters.
- Barrel ecal fiber z-position clustering based on timing resolution from GlueX.
- Jet finder implemented (documentation)

- Indirect Ray Tracing (IRT) particle identification for dRICH implemented.
- The orthogonal seed finder (flexible algorithm) was introduced as an alternative to the previous seed finding algorithms.
- Roman pots reconstruction is now implemented.
- Inclusive kinematics are determined and stored for 5 different methods.