BERKELEY LAB
Bringing Science Solutions to the World

U.S. DEPARTMENT OF ENERGY
Office of Science

Track Reconstruction Updates

Shujie Li @ ePIC Reconstruction meeting

Feb 09, 2026

News

material map:

- Fixed material map (and script to generate it) in eic-shell 26.02.0-stable:
  - Improved (recovered) tracking resolution, especially the dp/p at low momentum.
  - Correct covariance estimation at each detector surfaces.
- The detector xml file provided to EICrecon should have the exact tracking volume (tracking surfaces and any materials in between) as in the material map.
- **To do:**
  - Enforce consistency check in EICrecon (e.g. volume ID)
  - Longer term: adapt the ACTS gen3 geometry model

From the recent SVT review:

Recommend to *“establish in simulation the tolerable level of dead channels for sensor acceptance.”*

- **To do:**
  - Work with physics WG to implement this in EICrecon

Priority: tracking with background

Tracking performance is validated for the 18x275 beam configuration:

- Use decent vertex cuts, as well as >= 4 hits per track for good purity/efficiency.

Ongoing development for 10x275 beam:

- Too many seeds per event, slow and low purity
  → improve seed quality check (framework ready)
  → longer term: better seed finder and filter

- Too many fake tracks from random combination of background hits:
  → Tune CKF (chi2 cuts etc)
  → identify necessary analysis cuts

Priority: tracking with background

10x275 beam:

- Two beam pipe configurations:
  - Default (5um gold coating), or 10um gold coating
  - available in simulation (v26.02 should be ready soon)
    /volatile/eic/EPIC/RECO/25.12.0/epic_craterlake/Bkg_Exactly1SignalPer2usFrame/GoldCoating/

To physics analysis:

- Sim file with individual background source will be available
- What reconstruction algorithms still need to be developed to study:
  - signal/background separation,
  - source (mis)identification,
  - kinematic (mis)reconstruction… ?