EPIC detector performance studies
- DD4hep and eicrecon -

EPIC TOF Meeting
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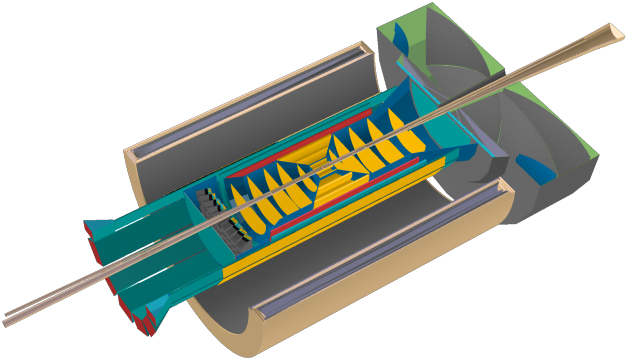
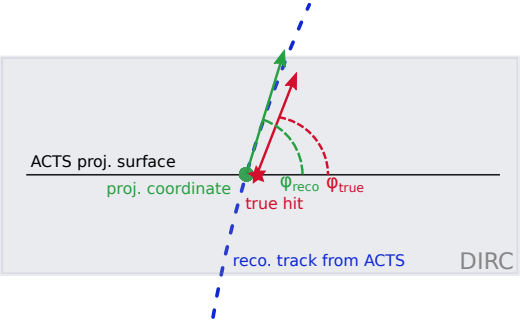
Simulation setup

- Arches with only tracking systems
- Single particle simulations:
  → flat in $0.1 < p < 10$ GeV, $0 < \varphi < 2\pi$ and $-4 < \eta < 4$
  → 4M events per detector setup generated on ORNL Cades
- Reconstruction with latest eicrecon software
  → truth seeded ACTS tracking



Angular resolution studies - concept

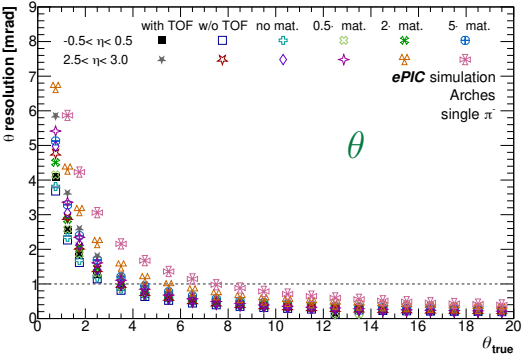
- Reconstructed angle:
  → create ACTS projection surface at entrance of Cherenkov detectors
  → momentum vector of track at projection surface provides position and angles
- True angle:
  → deactivate cherenkov light propagation in npsim
  → use hit closest to projection surface as reference for angle and position (angle obtained from hit momentum vector)
- Tracking studies processor finished ([link])

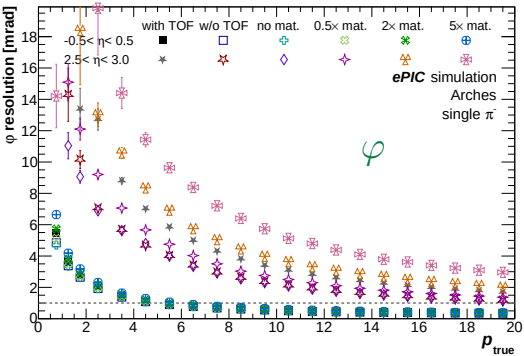


φ and θ resolution vs material budget

- Angular resolutions (θ and φ) determined
- Multiple material budget variations:
  $\rightarrow$ only sensors (no mat.) to factor 5 in overall material
- θ resolutions less affected (only in extreme case fwd)
- φ resolution unaffected in barrel
- Strong material budget dependence for φ in fwd!

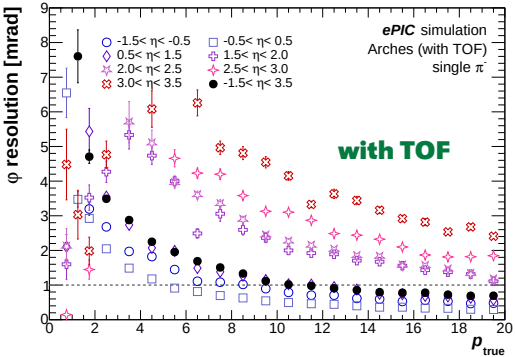
NEW!

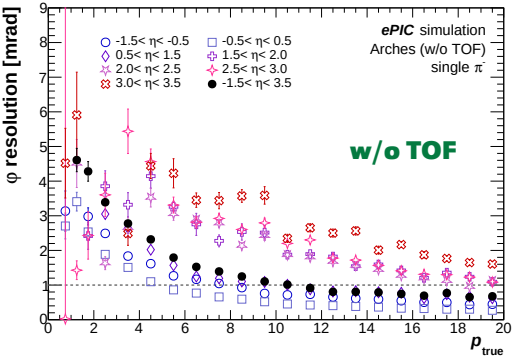




φ resolution vs pseudorapidity

- Angular resolutions (θ and φ) determined
- distinct differences between barrel and forward for φ
- θ resolution approximately the same in barrel and fwd
- Less than 1 mrad only in certain regions





θ resolution vs pseudorapidity

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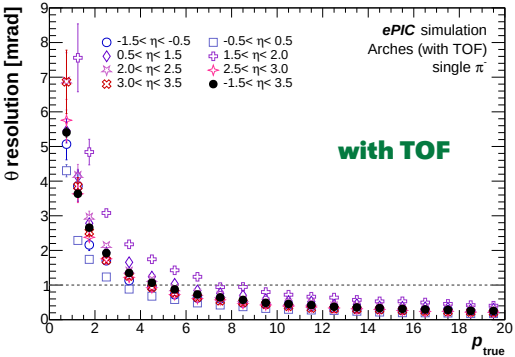

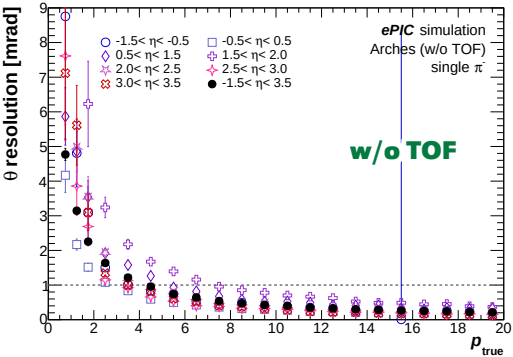

Comparison of Resolutions with and w/o TOF

- Resolutions worse with TOF
  → are track quality cuts needed?
  → is material the culprit?
- Open questions to be answered in next iteration