

# **EPIC detector performance studies - DD4hep and eicrecon -**

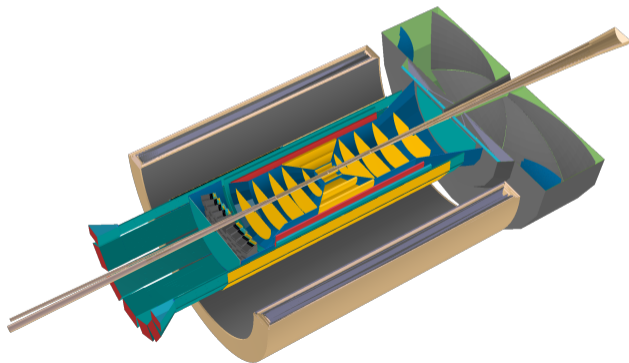
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**EPIC TOF Meeting  
February 14, 2023**

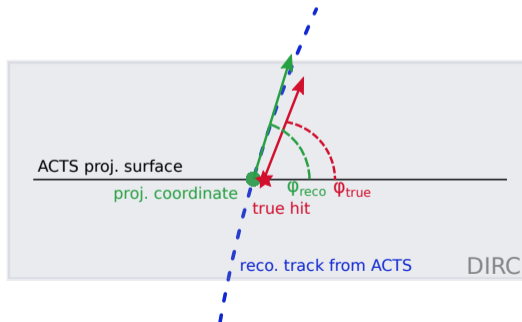
**Nicolas Schmidt**



- 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

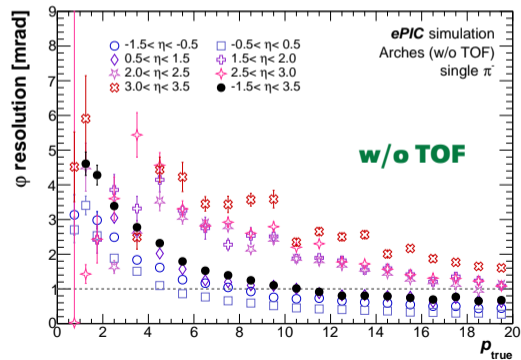
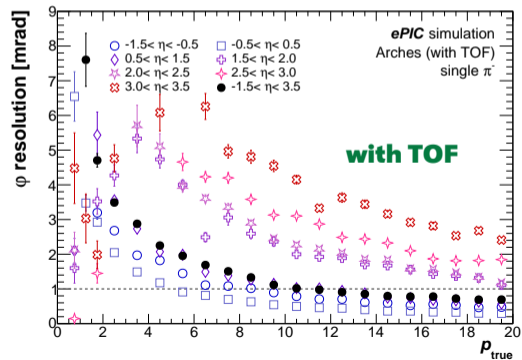


- Reconstructed angle:
  - create ACTS projection surface at entrance of Cherenkov detectors
  - momentum vector of track at projection surface provides position and angles
- True angle:
  - deactivate cherenkov light propagation in npsim
  - use hit closest to projection surface as reference for angle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



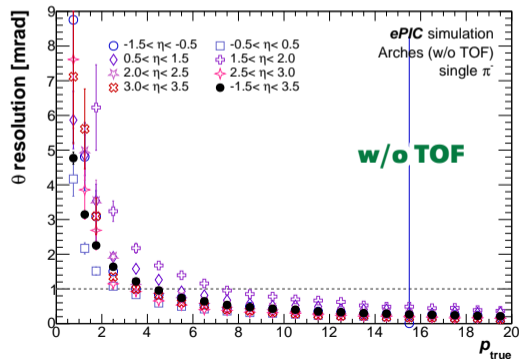
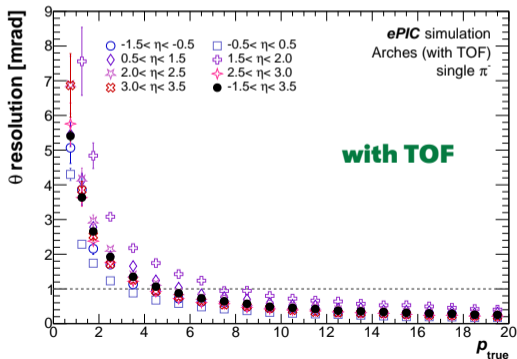
# $\varphi$ resolution vs pseudorapidity

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



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

