Jets and Heavy Flavor WG

- Conveners
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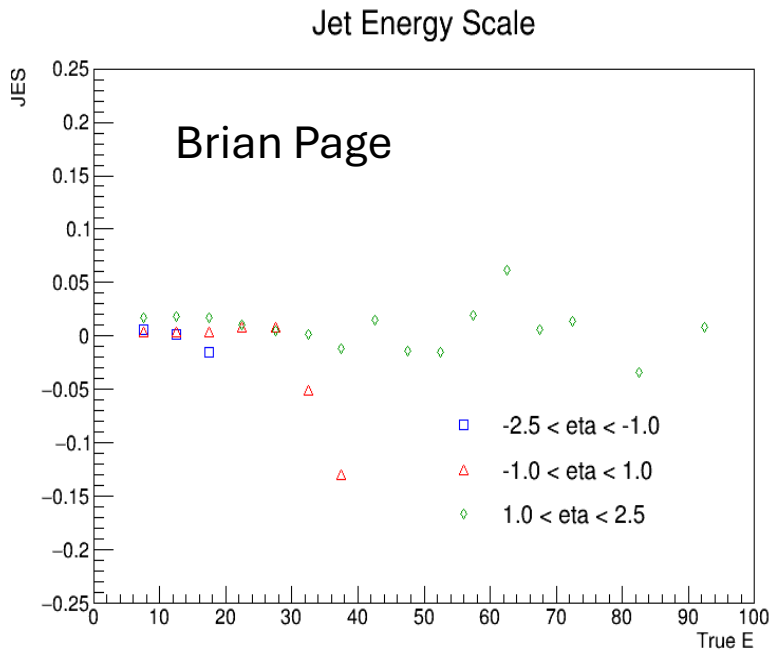
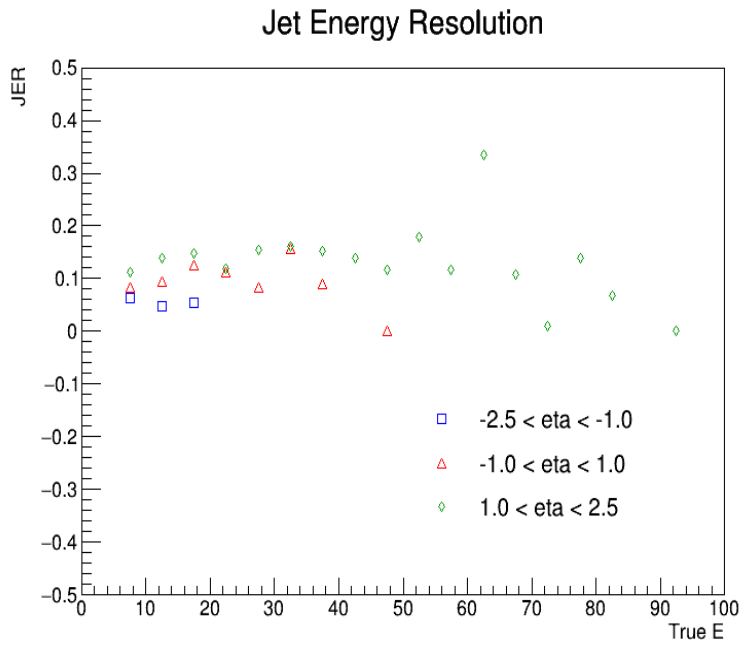
  - Brian Page – bpage@bnl.gov
- Mailing List: eic-projdet-jethf-l@lists.bnl.gov
- Meeting Indico Pages: https://indico.bnl.gov/category/420/
- Wiki Page: https://wiki.bnl.gov/eic-project-detector/index.php/JetsHF
- Meetings:

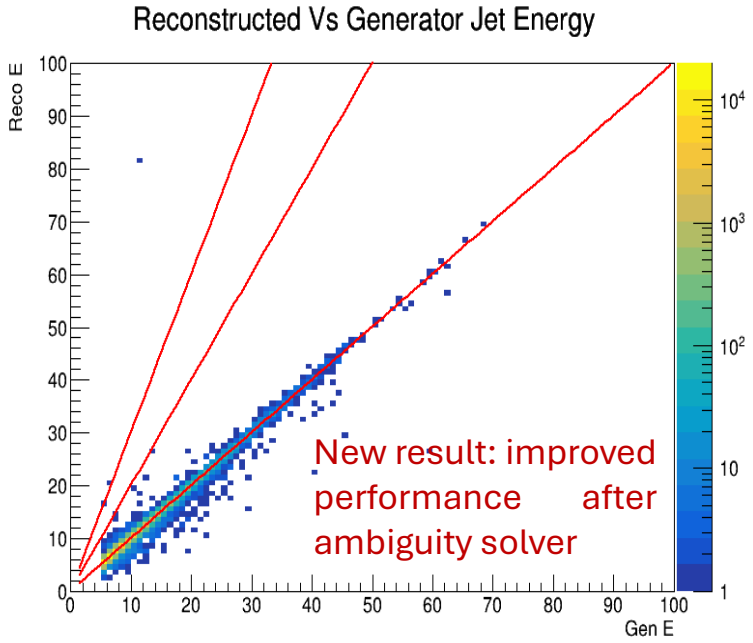
  Wednesdays 12 pm time slot - Biweekly

Jets & HF: TDR plots proposed

- Jet reconstruction performance:
  - Jet energy scale and resolution; jet energy reco vs. gen
  - Full simu; jets are clustered from the Reconstructed Charged Particles (truth seeded tracks) and Generated Charged particles





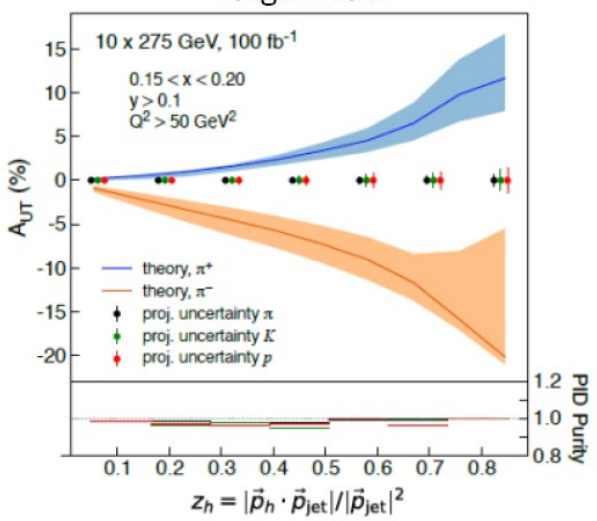


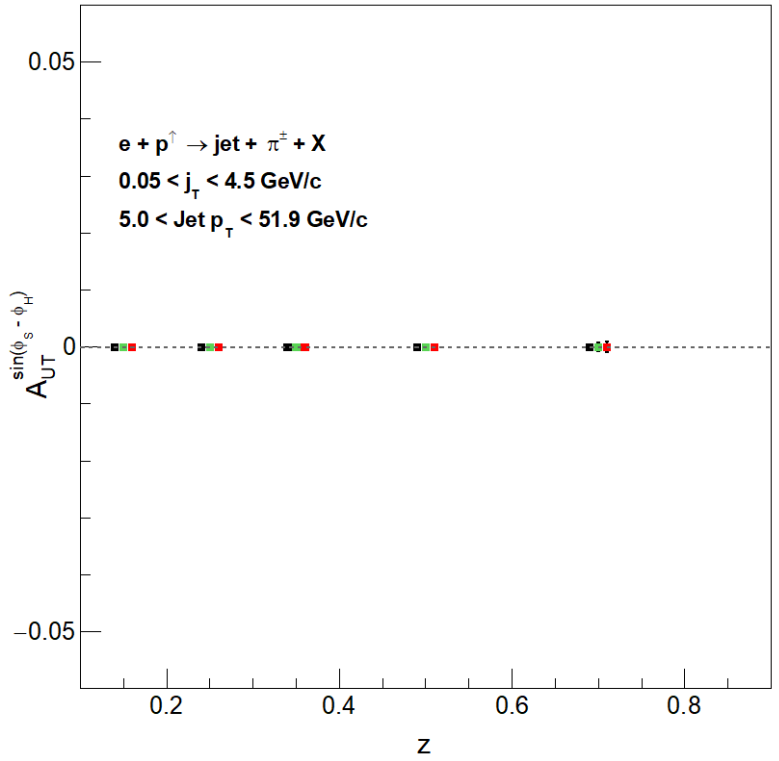
- A set of jet benchmark plots is now being generated with each monthly production and can be accessed via a web interface: https://eic.jlab.org/epic/image_browser.html# (navigate to Physics -> Jets and Heavy Flavor)

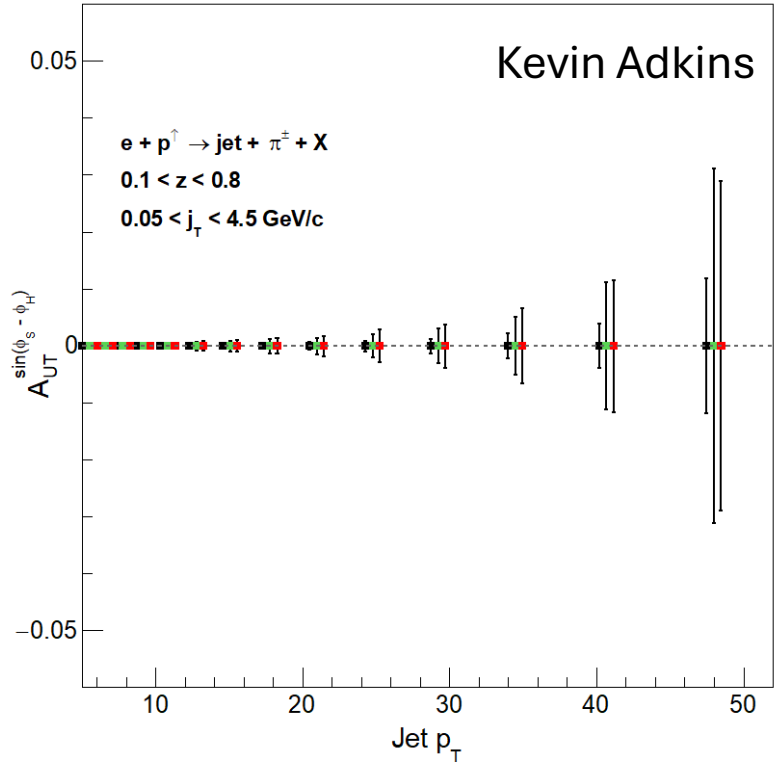
Jets & HF: TDR plots proposed

- Hadron-in-Jet Collins Analysis:
  - Collins effect connects initial proton spin to final state azimuthal distribution of hadrons in a jet (pions, kaons, protons)
  - Full simu; same selection criteria as in the original YR plot
  - Todo: Update electron finding method to ensure proper qT imbalance cut; add theory curves

Target Plot:



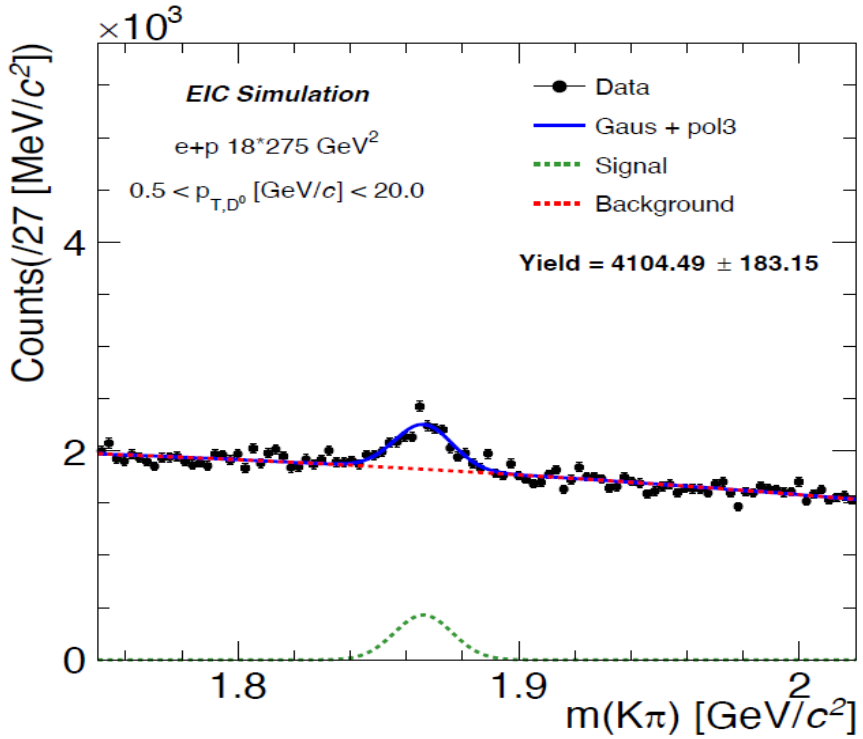




Jets & HF: other work toward TDR

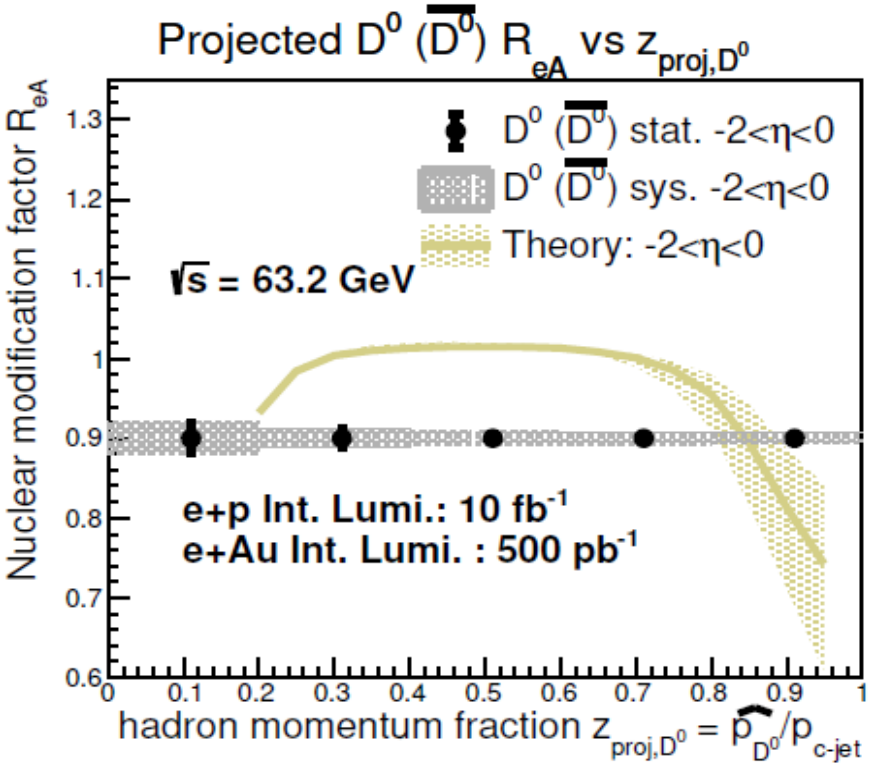
- Heavy Flavor Hadron reconstruction:
  - Left: Invariant mass peak for D0 in full simu, kinematic and PID selections only, no secondary vertexing (enhanced sample, higher signal/background levels)
  - Right: Hadron-in-Jet nuclear ReAu projections (standalone simulation with performance projections)

  - Ongoing work on D0-in-jet in full simu (Diptanil)



Diptanil Roy
Enea Prifti

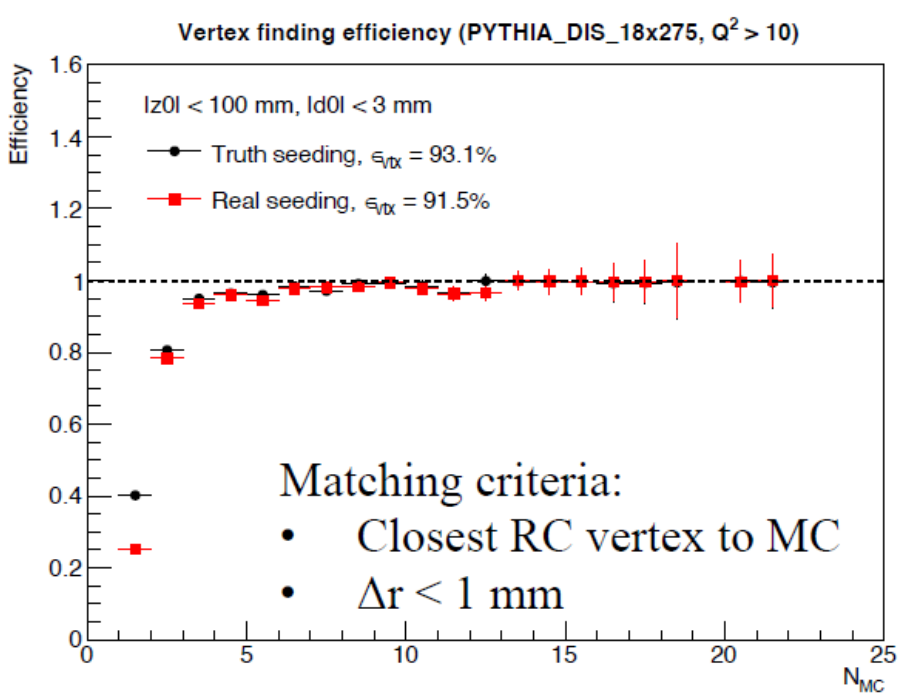
Xuan Li

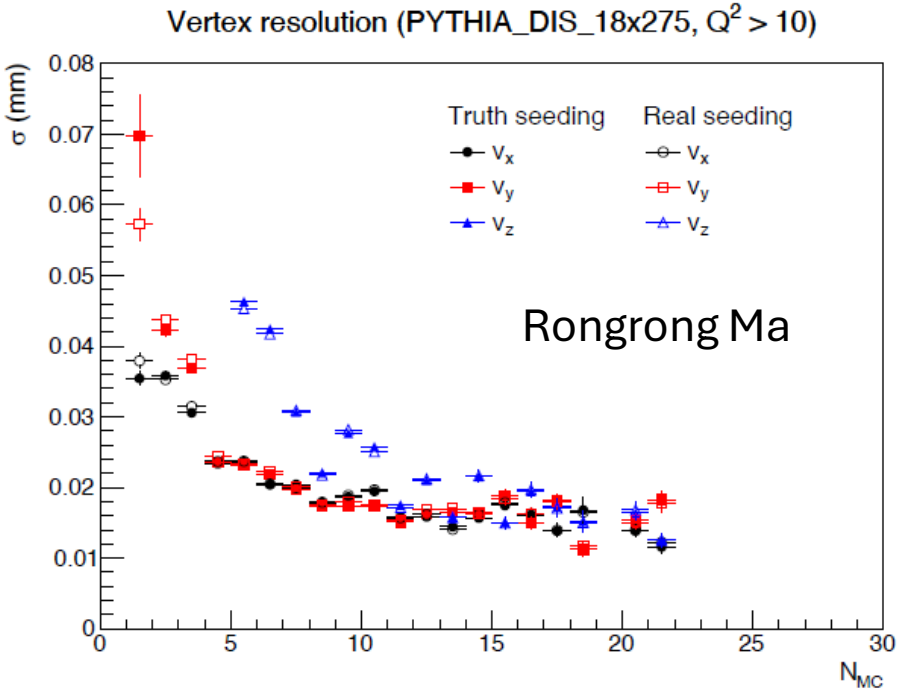


Jets & HF: other work toward TDR

- Vertex reconstruction performance studies
  - Primary vertex reconstruction efficiency and resolution for tracking with truth and real seeding
  - PYTHIA DIS ep 18x275 (EIC geometry: epic-24.06.0; EICrecon: 07/20/24); Vertex position: afterburner to apply beam effects

  - Workfest this meeting to advance secondary vertex reconstructions

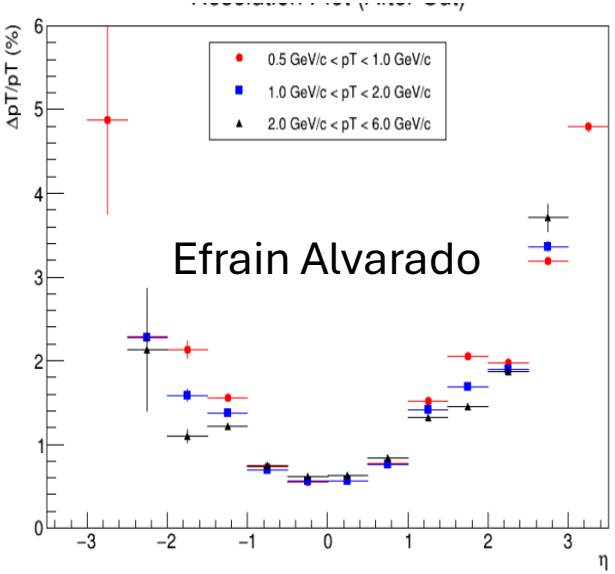




Jets&HF: work in progress /updates

- Additional contributions from members of Jets&HF group
  - Onboarding new people: more people are getting familiar with the ePIC software.
  - Variety of tracking resolution studies preformed /plots in hand
  - Preliminary PID capability/performance studies
  - Jet unfolding developments

Track momentum resolution for different kinematic regions
Full simu; truth seeding



Unfolding stability check for jet kinematics. Multifolding with Dense Neural Networks (DNNs) is trained on full simu sample