Nuclear Effects on Jet Fragmentation Function

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Jets&HF Working Group

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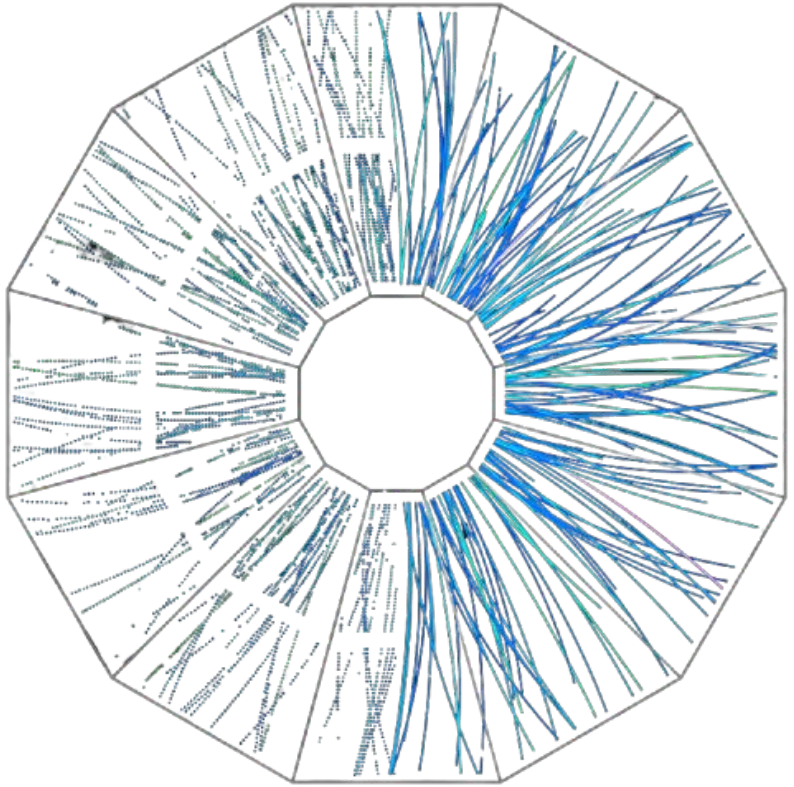
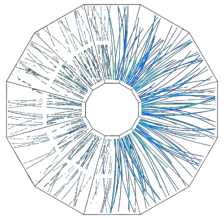
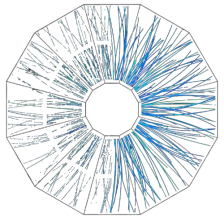


Brookhaven National Laboratory

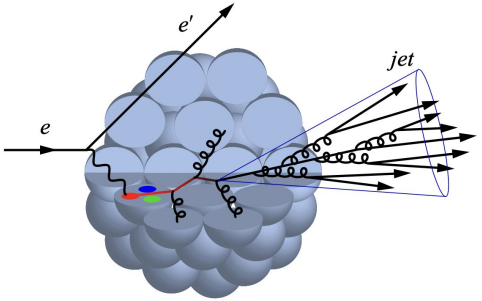


NIM-A paper

- What simulation sample(s) do you need?
  - **DIS samples, already available**
- What is the physics motivation of your study?
  - **Study nuclear effects on fragmentation function**
- What plots do you plan to produce to illustrate the impact?
  - **z, j_T and maybe track p_T dependent plots for h, π , K, p**
    - **We can do statistical projection of MC results directly**
- What's the current status of the analysis, and what still needs to be done?
  - **Jet trees have to be produced for new 9 GeV samples**
  - **Analysis codes are ready, statistical projections can be seen in this slides**



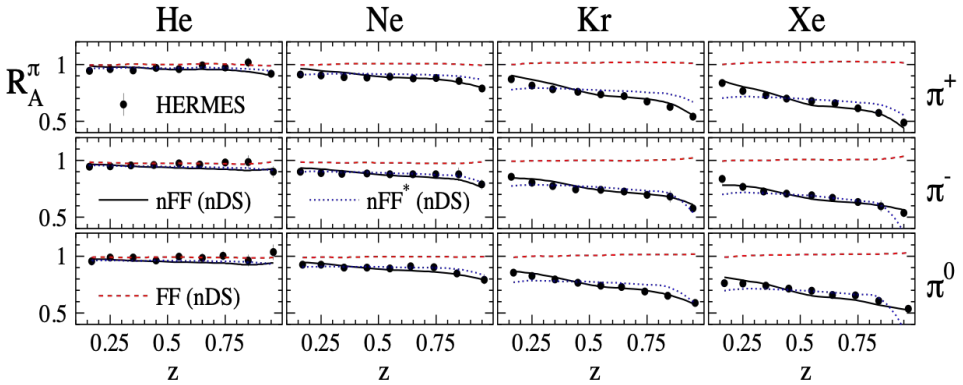
Motivation



- Study nuclear effects on fragmentation functions

From Hermes (fixed-target mode):

Production differs between ep and eA

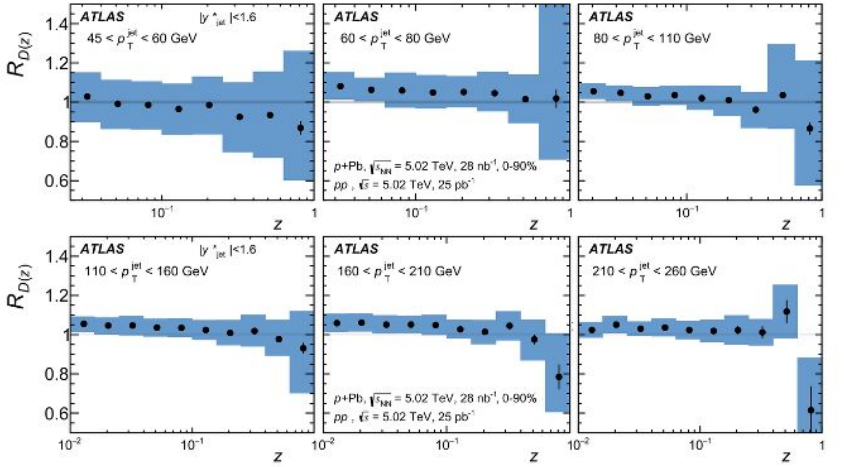


Hadron-level observable

$R_A = (N_h / N_{DIS})^{-1}_{ep} (N_h / N_{DIS})_{eA}$

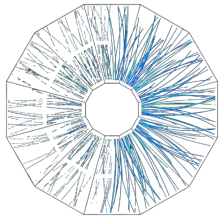
From ATLAS/LHC: Consistent with 1

(within uncertainties) for pA/pp



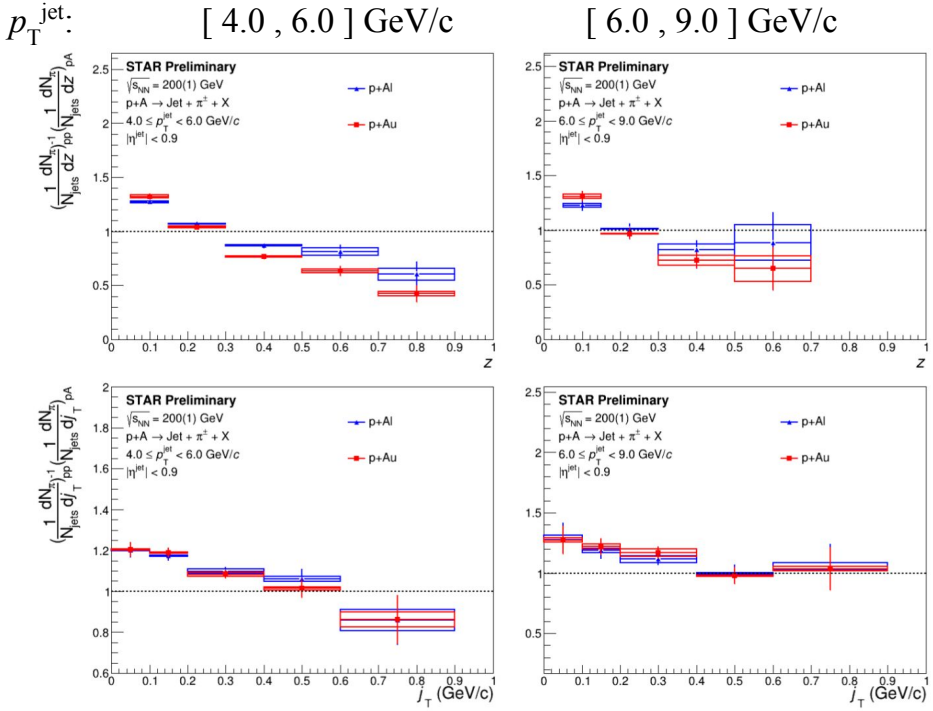
Hadron inside jet observable

$R_D = (N_h / N_{jet})^{-1}_{pp} (N_h / N_{jet})_{pA}$

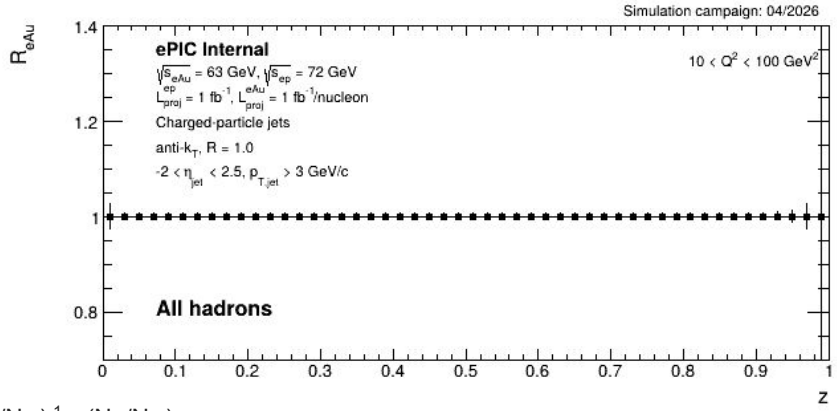


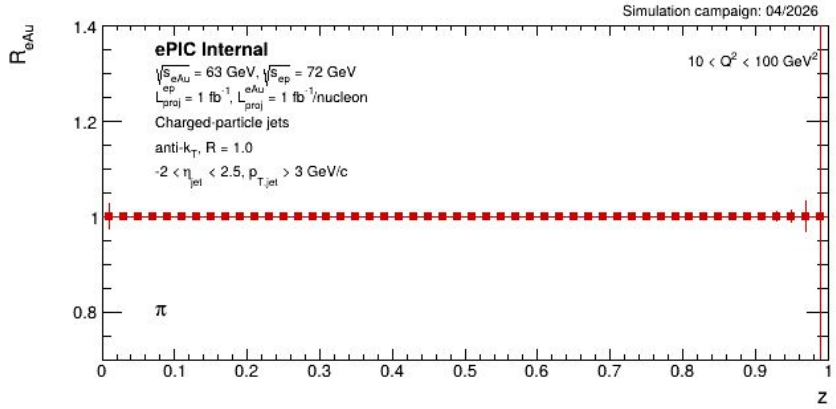
Recent STAR Results

- ★ Enhancement at low z suppression at high z
  - Effect stronger in p+Au than p+Al
  - Consistent pattern across p_T^{jet}
- ★ Enhancement above unity in j_T
  - Similar effect in p+Au and p+Al

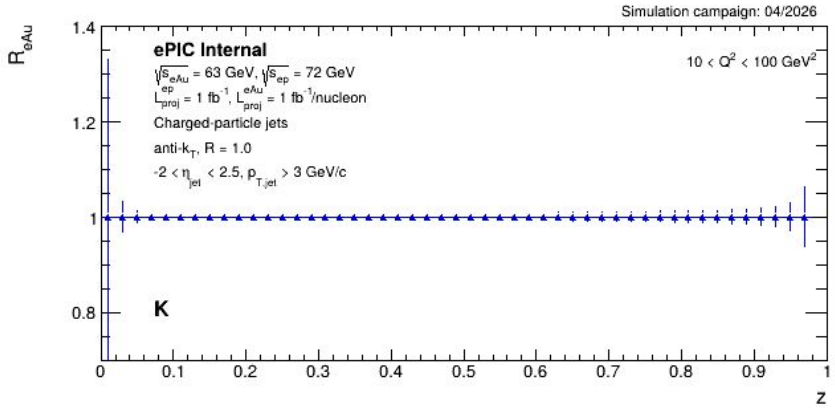


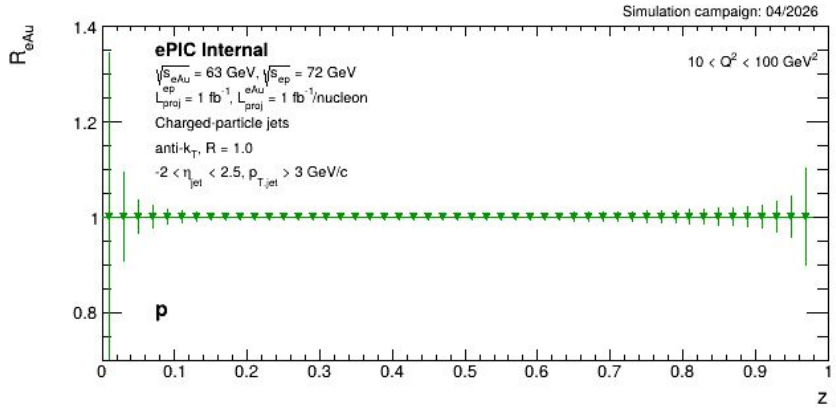
Fragmentation Functions: z-dependency



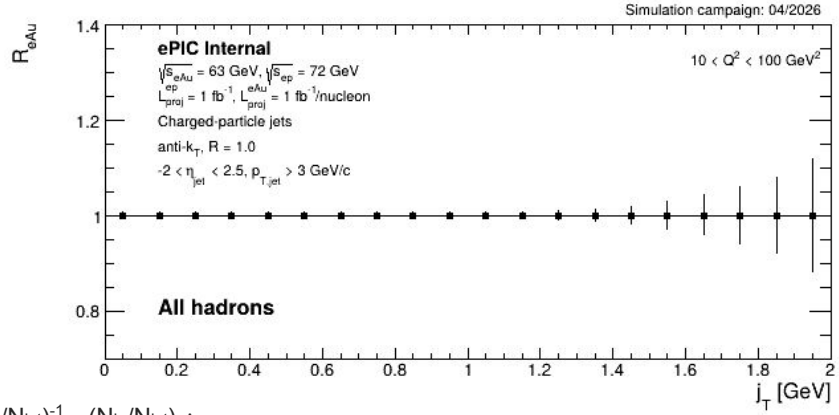


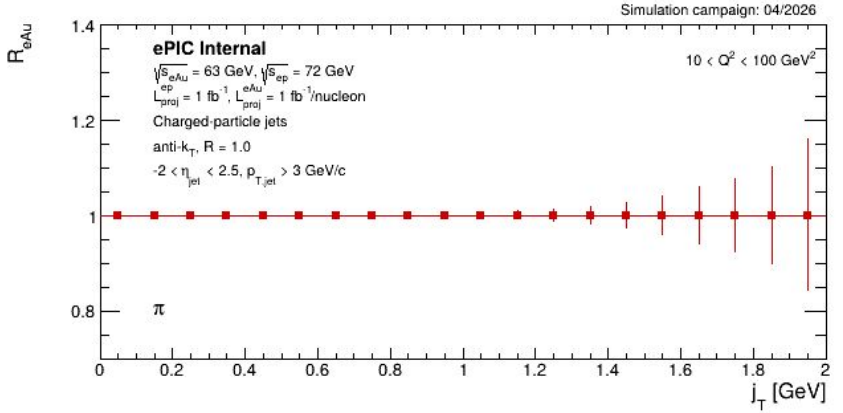
$R_{eAu} = (N_h / N_{jet})^{-1}_{ep} (N_h / N_{jet})_{eA}$





Fragmentation Functions: j_T-dependency





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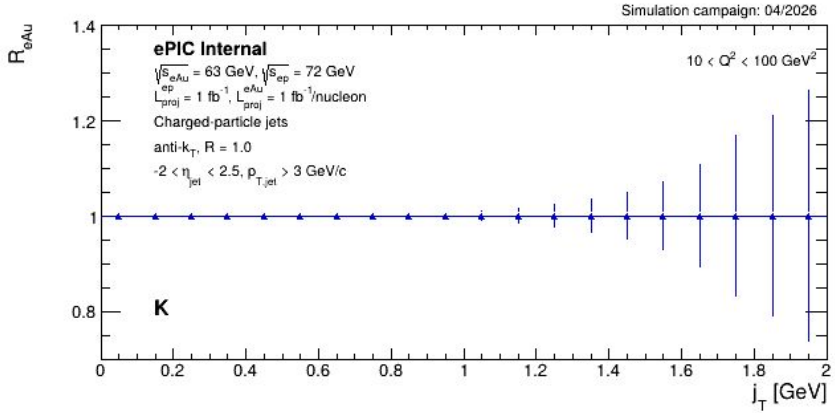
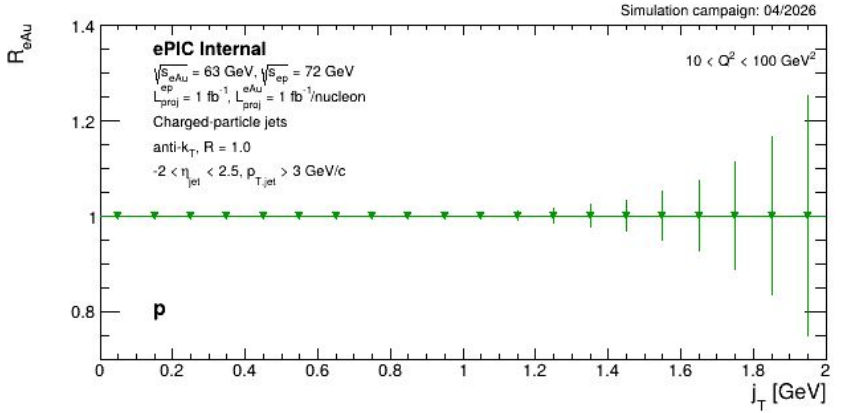
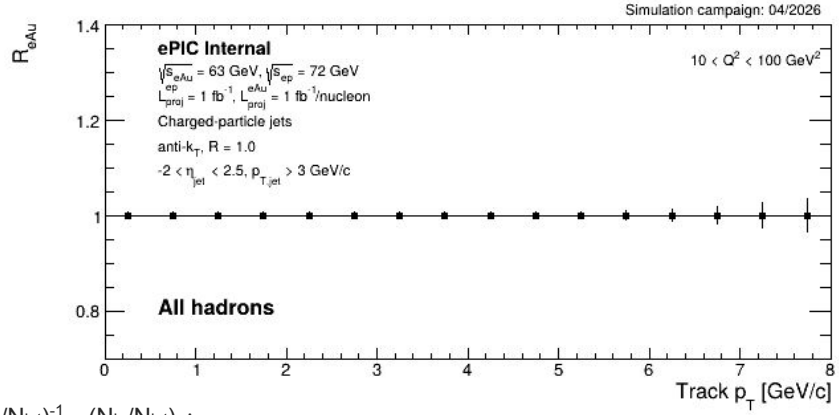
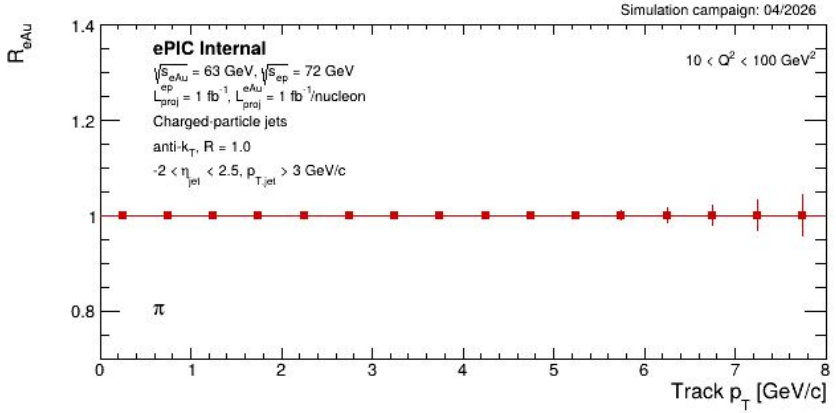




Fragmentation Functions: track p_T-dependency





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