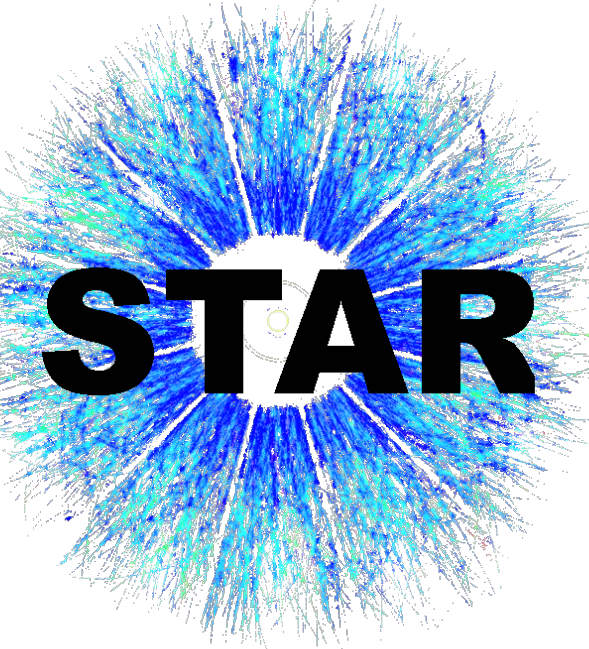


Measurements of D^0 -Tagged Jet Spectra and Radial Profiles in Au+Au collisions from STAR

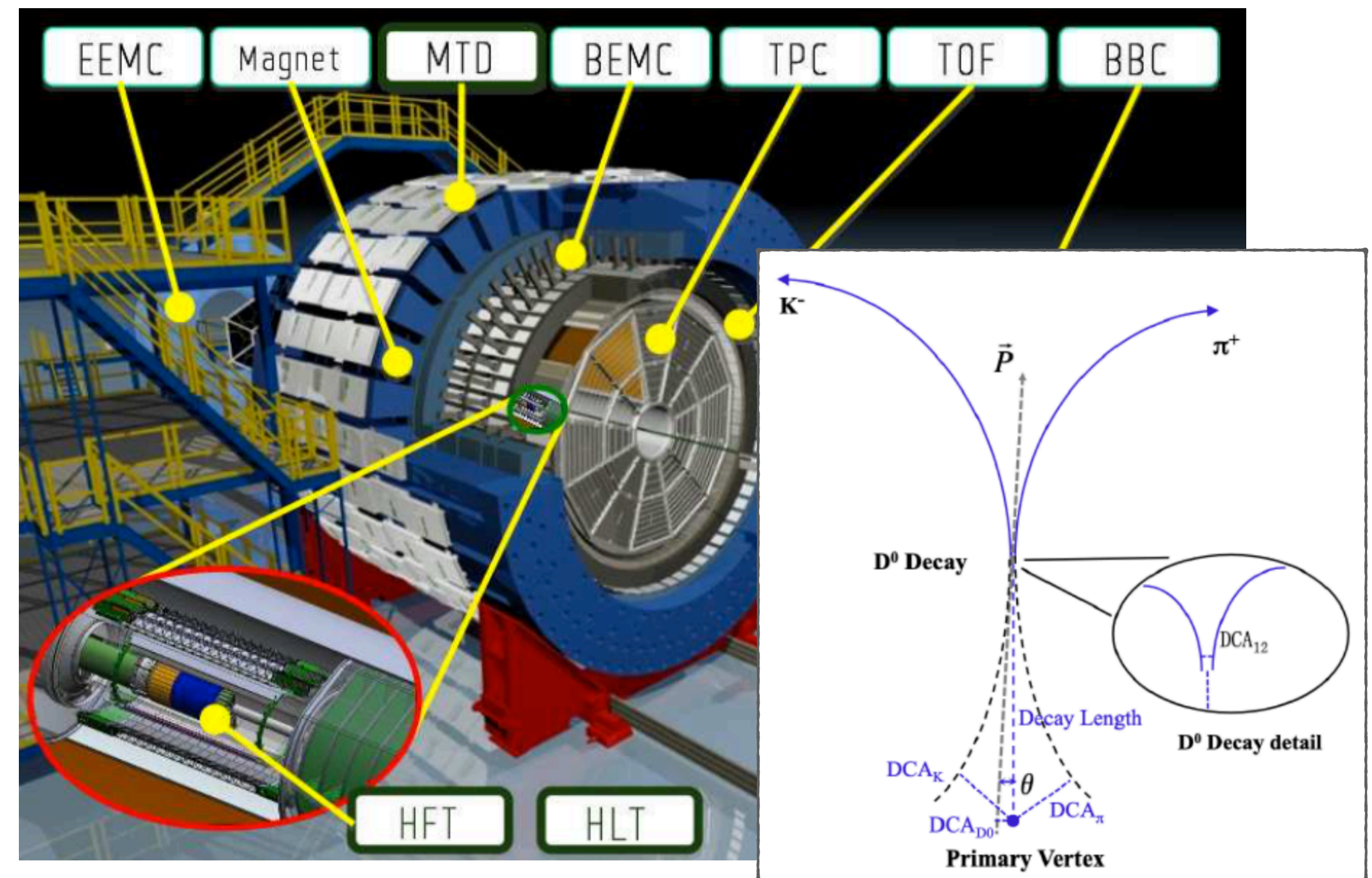
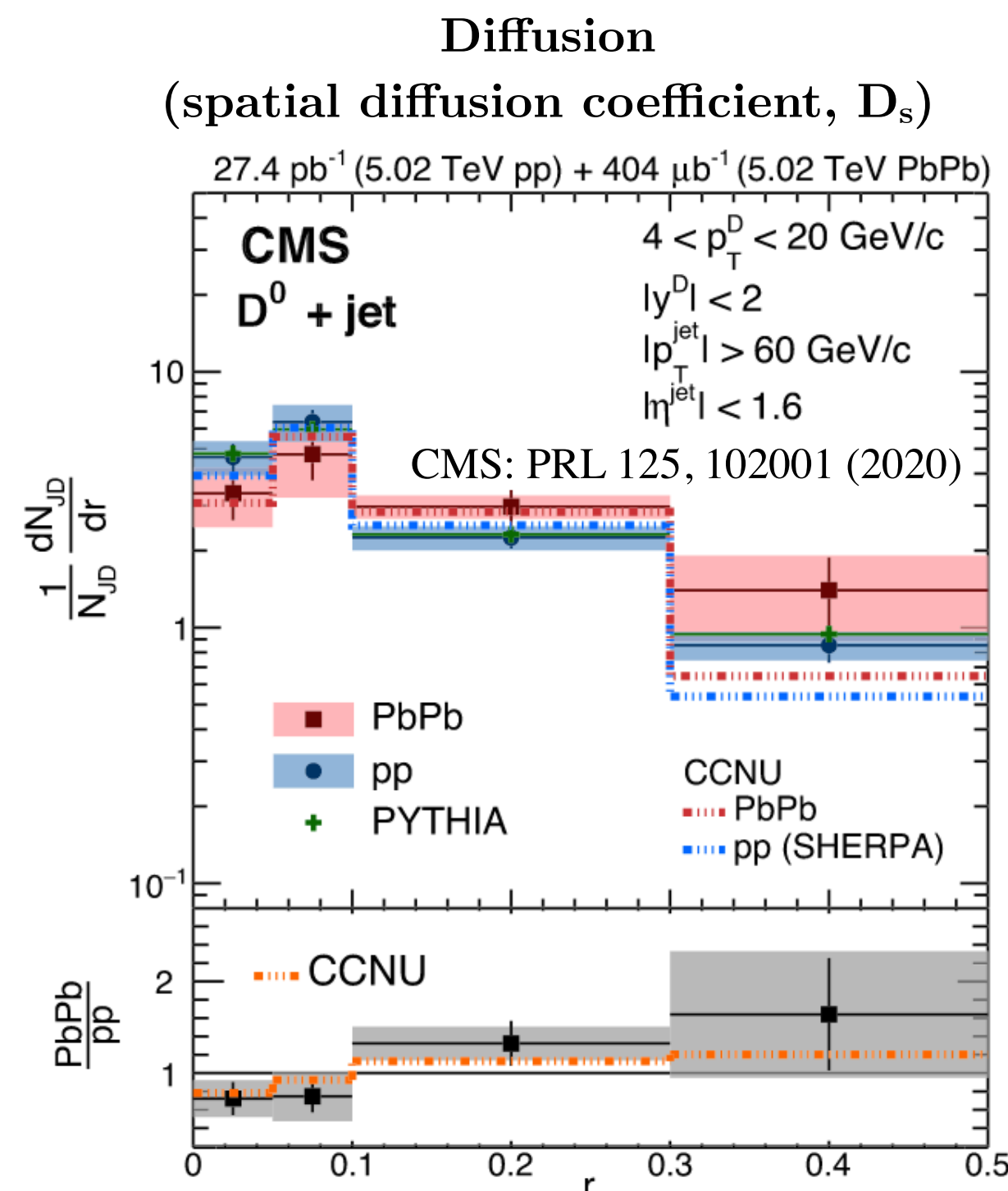
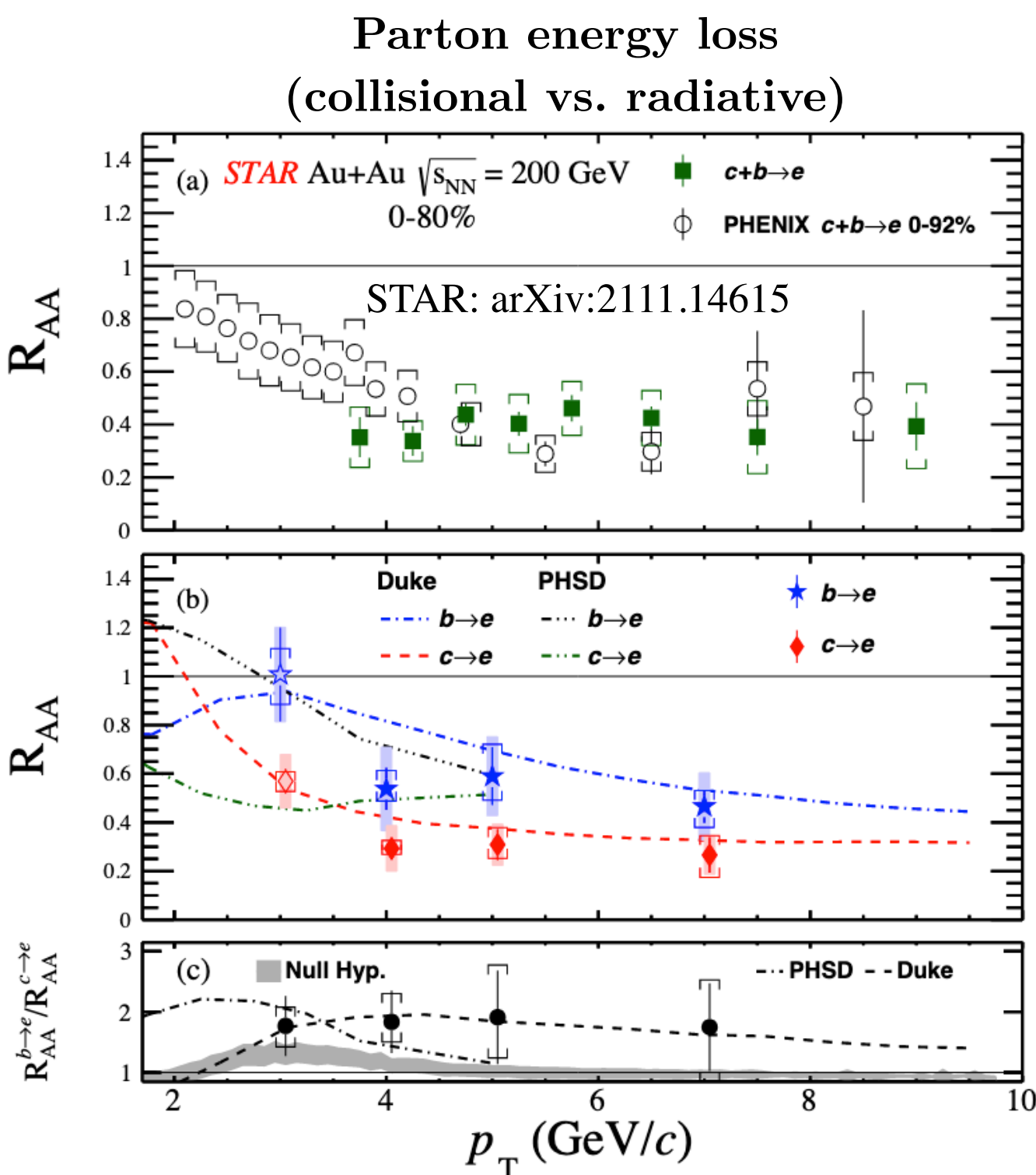


Au+Au collisions from STAR

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 (for the STAR Collaboration)
 Wayne State University



- Heavy-flavor tagged jets are unique probes of heavy-quark energy loss and diffusion in heavy-ion (HI) collisions
- STAR 2014 data with **H**eamy **F**lavor **T**racker (**HFT**) enables clean reconstruction of charm-hadron decays



D^0 -Tagged Jet Yield Determination



$s\mathcal{P}$ lot event weights (Nucl. Instrum. Methods Phys. Res., A 555 (2005) 356-369)

$$s\mathcal{P}_n(m_{K\pi,i}) = \frac{\sum_{j=1}^{N_T} V_{nj} f_j(m_{K\pi,i})}{\sum_{k=1}^{N_T} N_k f_k(m_{K\pi,i})}$$

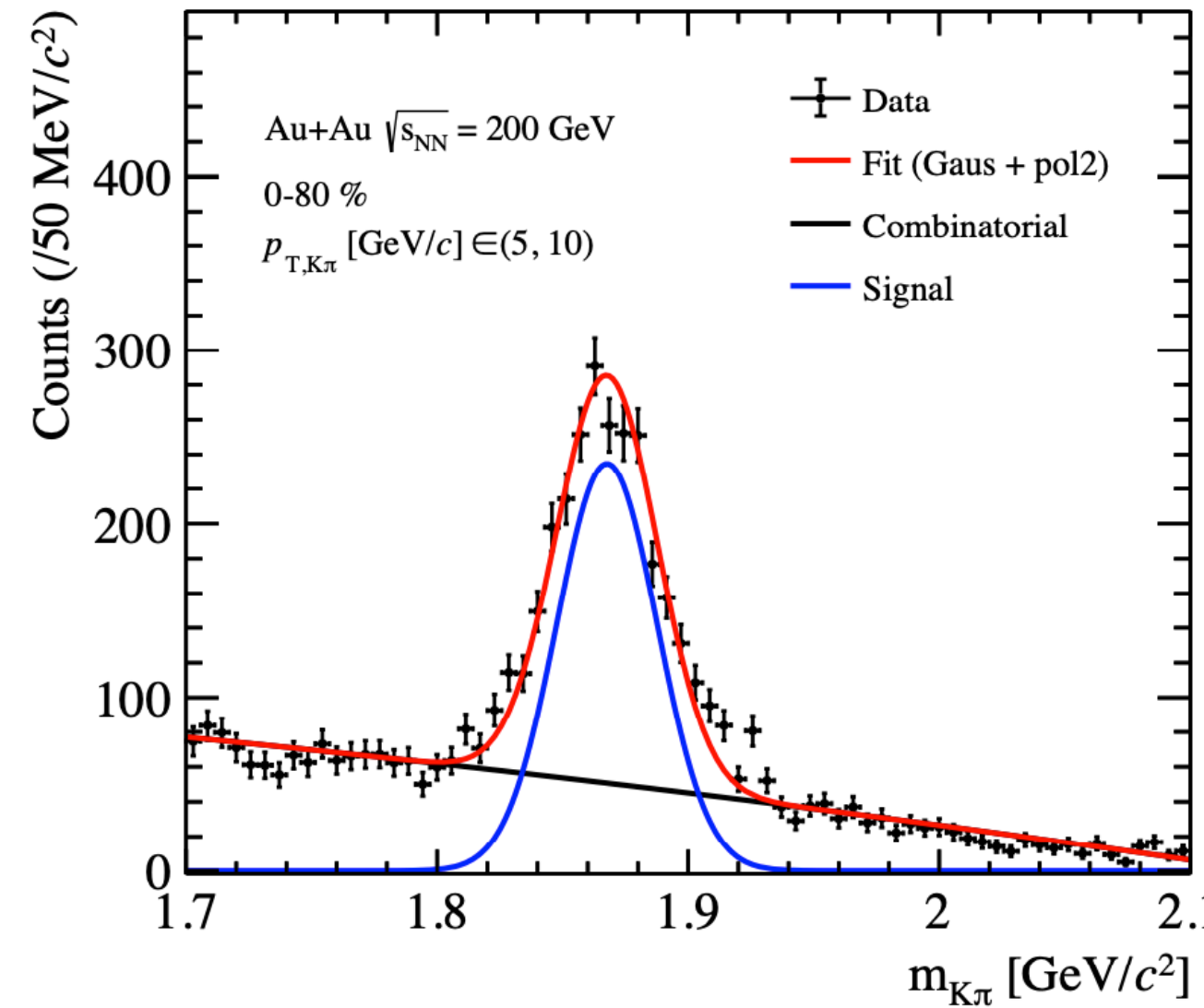
Unbinned max. likelihood fit

n = n -th fit component (sig/bkg)

N_k = k -th yield ($T=2$)

$f_k(m_{K\pi,i})$ = per-event PDF value with k -th hypothesis

V = cov. matrix

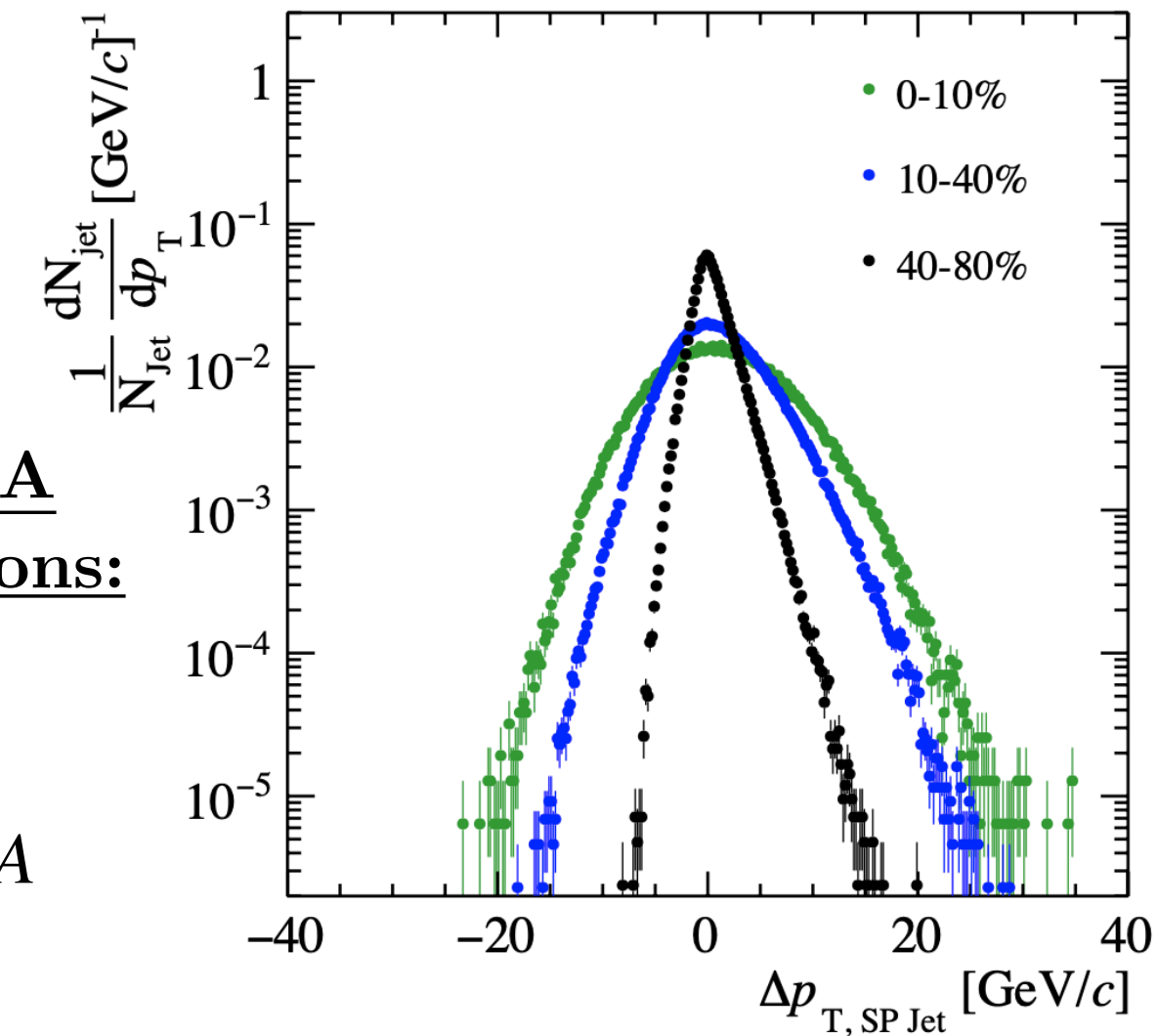
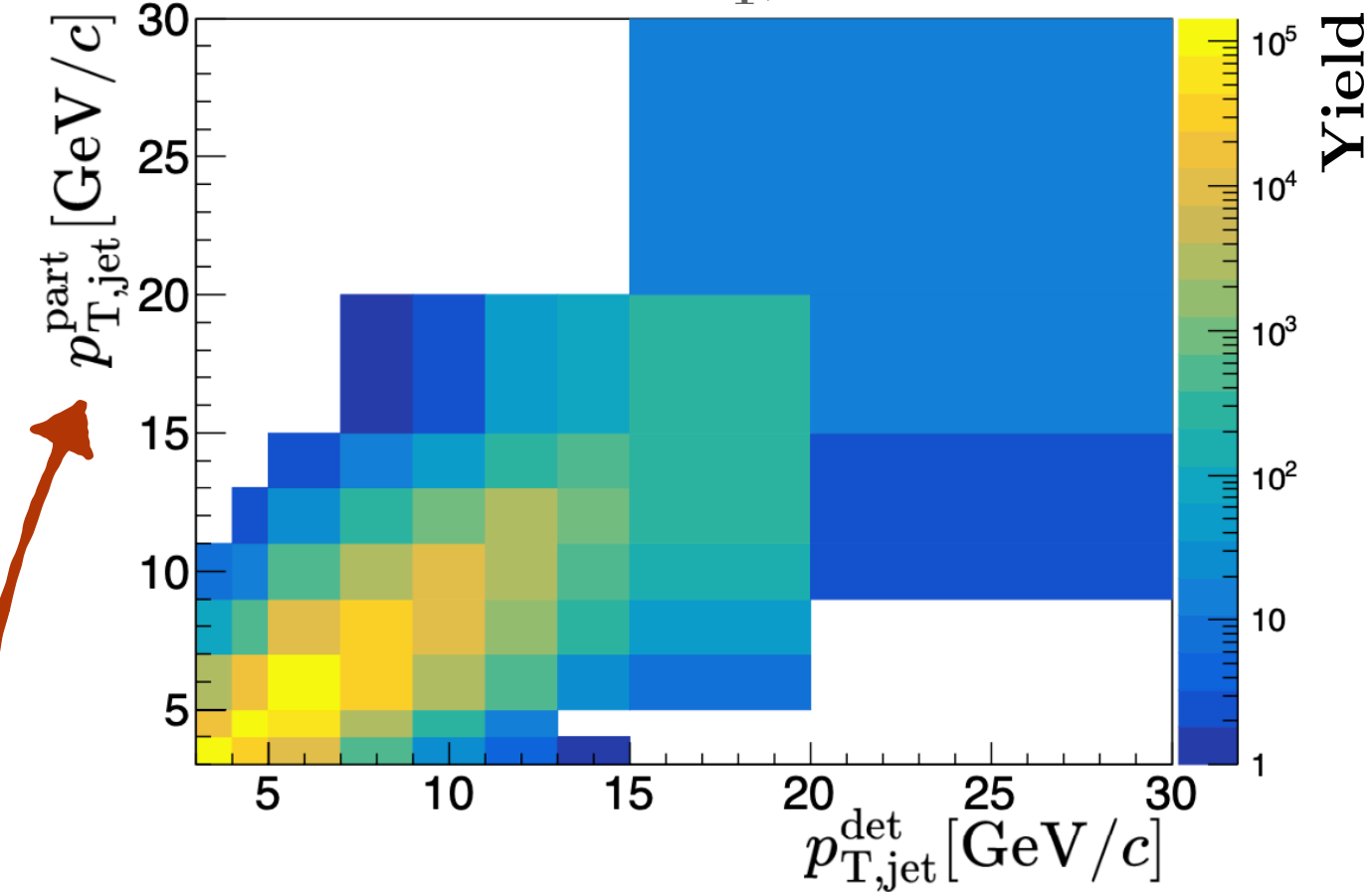


Signal Distributions:
Fill jet p_T and r histograms with all event weights

Instrumental Response:
PYTHIA 8 +
GEANT3 +
HI background

Full response matrix includes both effects

Anti- k_T $R=0.4$
 D^0 $p_T > 5$ GeV/ c
Charged const. $p_T > 0.2$ GeV/ c
Neutral const. $E_T > 0.2$ GeV

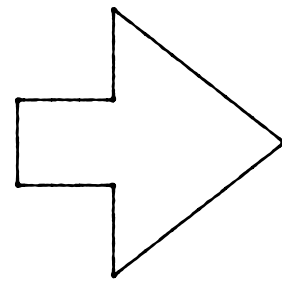


p_T fluctuations after ρA subtraction in HI collisions:

Single-particle jet embedded in data

$$\Delta p_{T,SP\text{ Jet}} = p_T^{\text{reco}} - p_T^{\text{gen}} - \rho A$$

Inclusion of reconstruction efficiency



$$s\mathcal{P}_n(m_{K\pi,i}) \rightarrow \frac{s\mathcal{P}_n(m_{K\pi,i})}{\epsilon(m_{K\pi,i})}$$

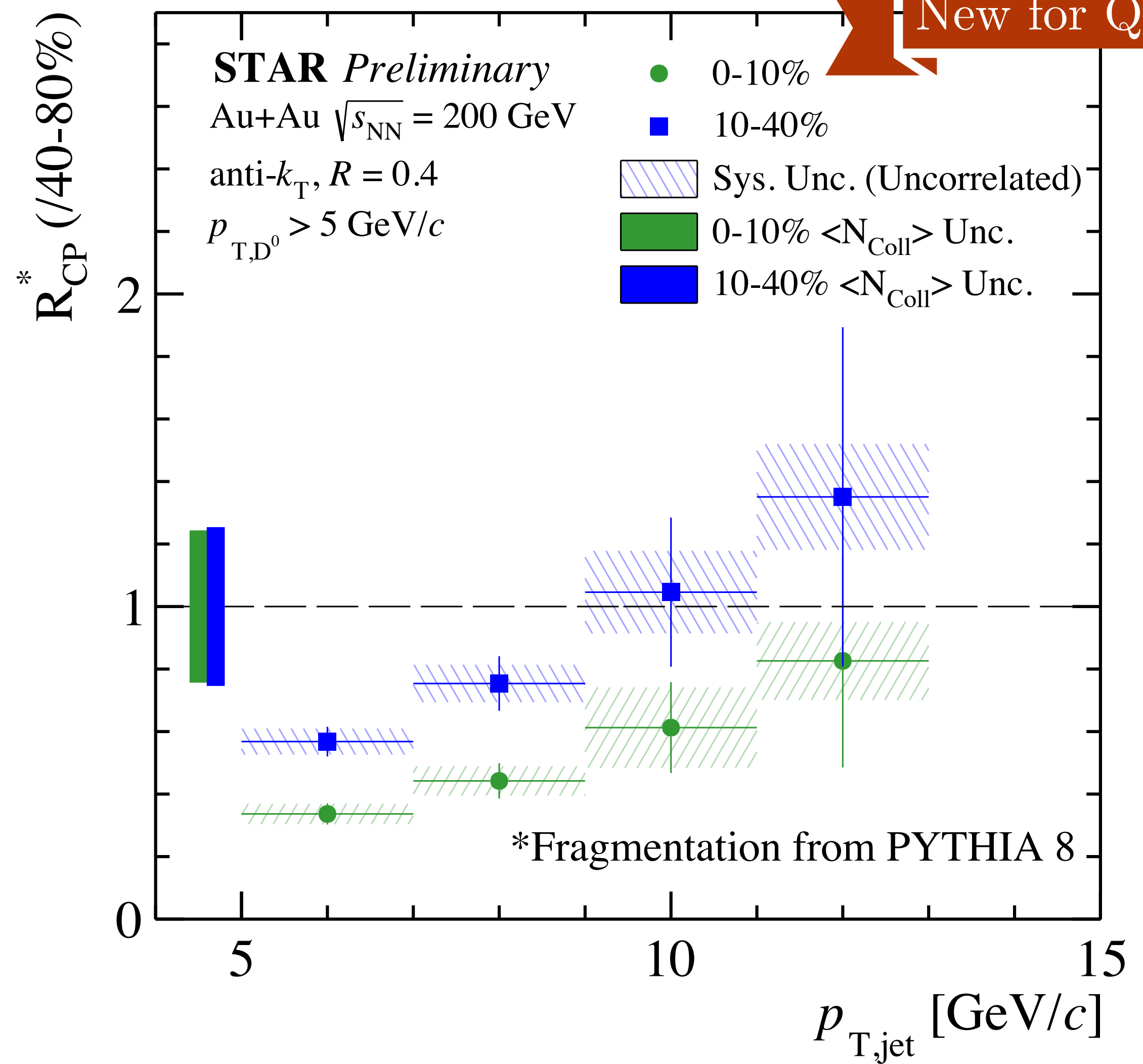
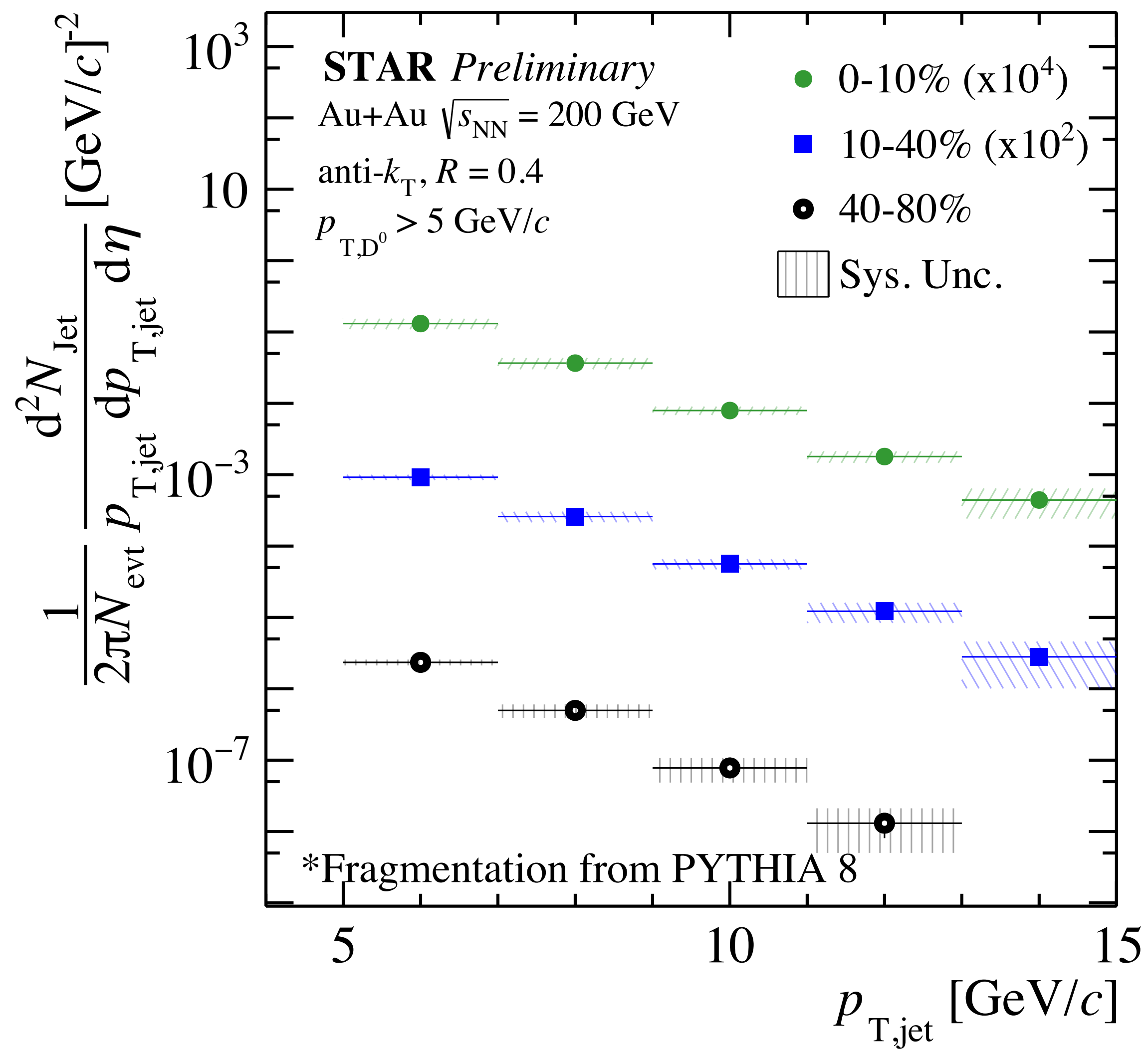
Anti- k_T (full) jets with $R=0.4$, tagged with $D^0 \rightarrow K^- \pi^+ (+c.c.)$

- Two alternative methods to subtract combinatorial $K^\mp \pi^\pm$:

$s\mathcal{P}$ lot vs. $K^+ \pi^+ + K^- \pi^-$ subtraction (like-sign subtraction)

Jet p_T and r corrected via Bayesian unfolding

Results: D^0 -Tagged Jet Spectra and R_{CP}^* **STAR**



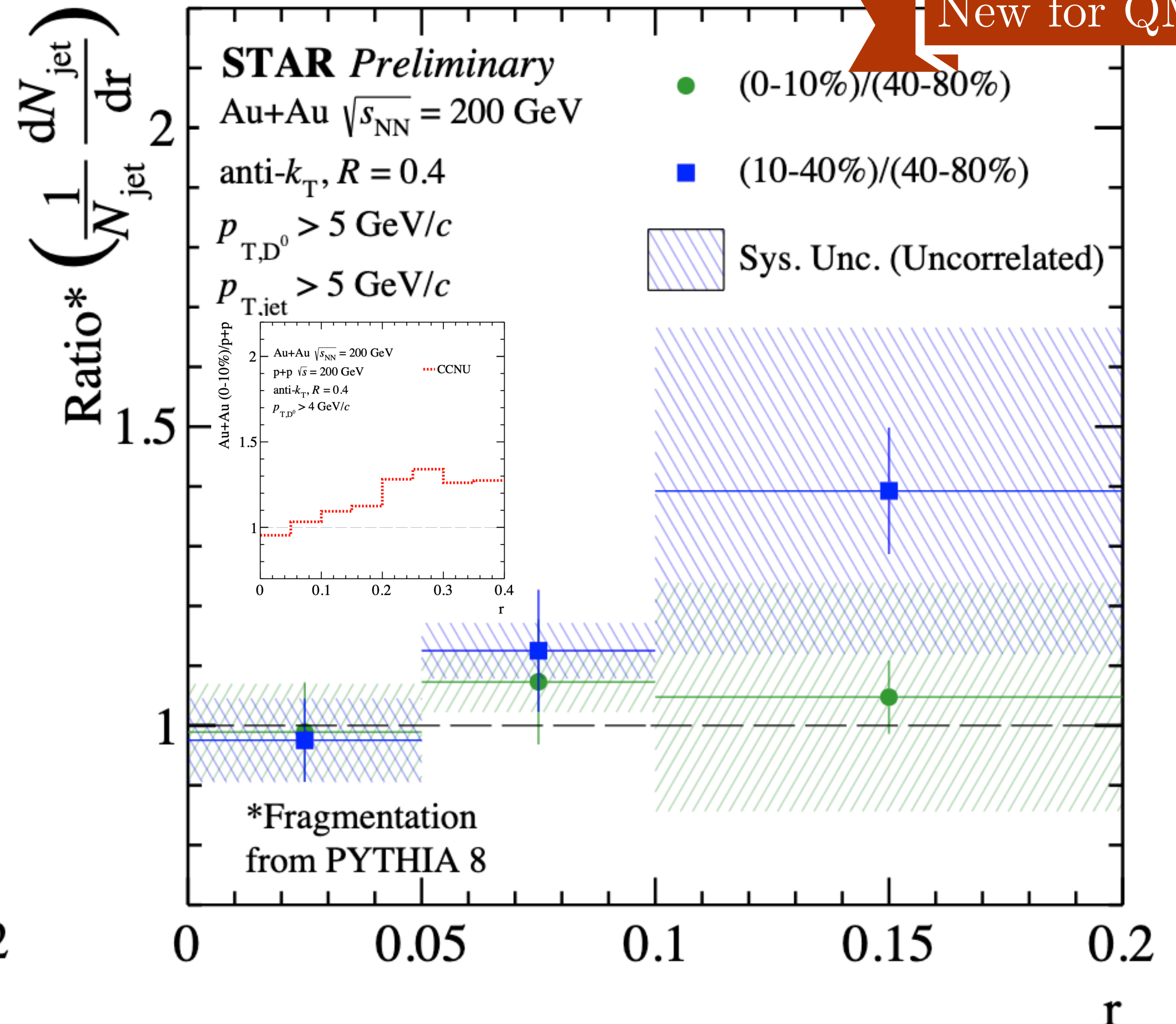
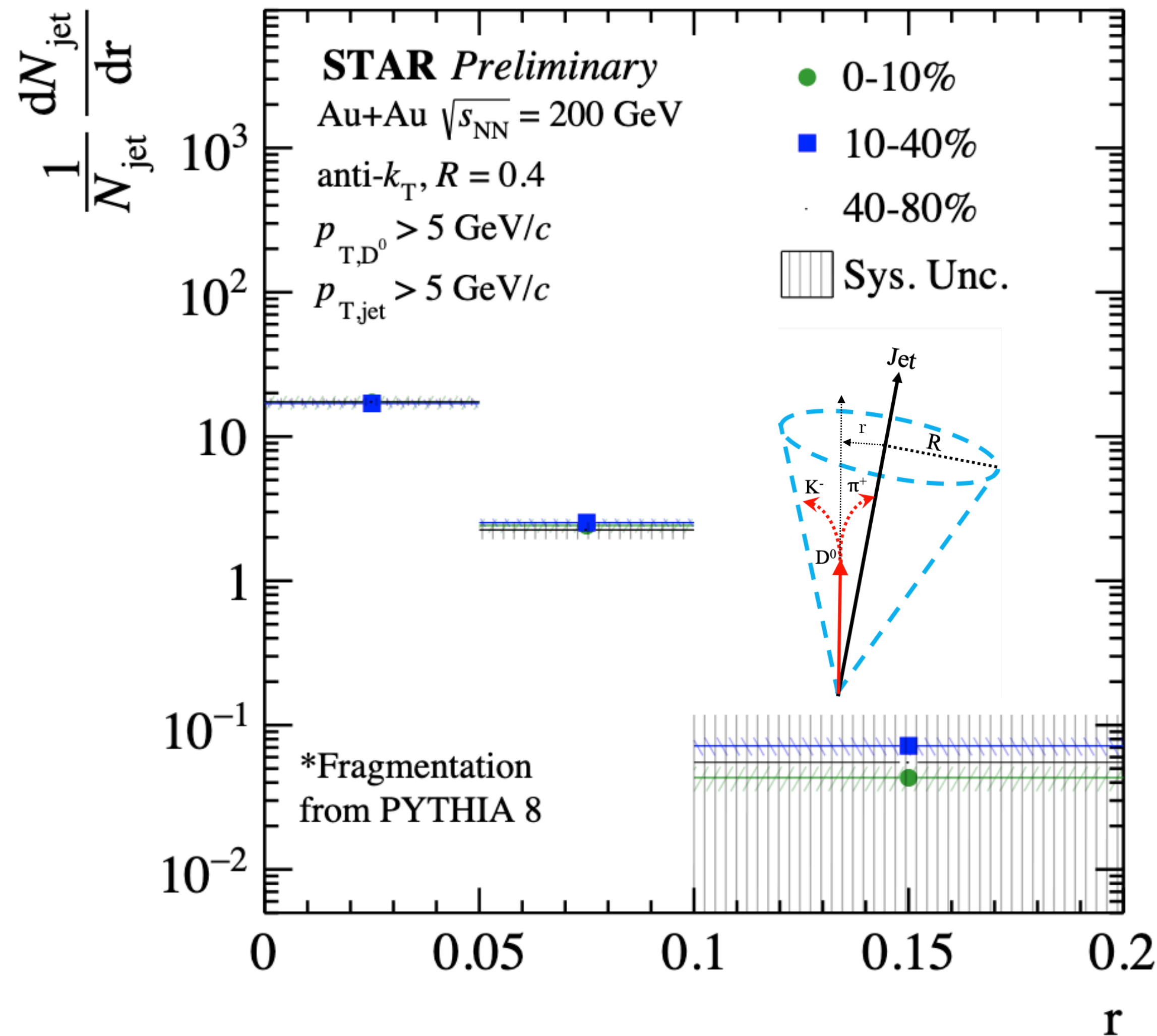
(Mid-)central spectra suppressed w.r.t. peripheral spectrum

Results: D^0 Radial Profiles in Jets

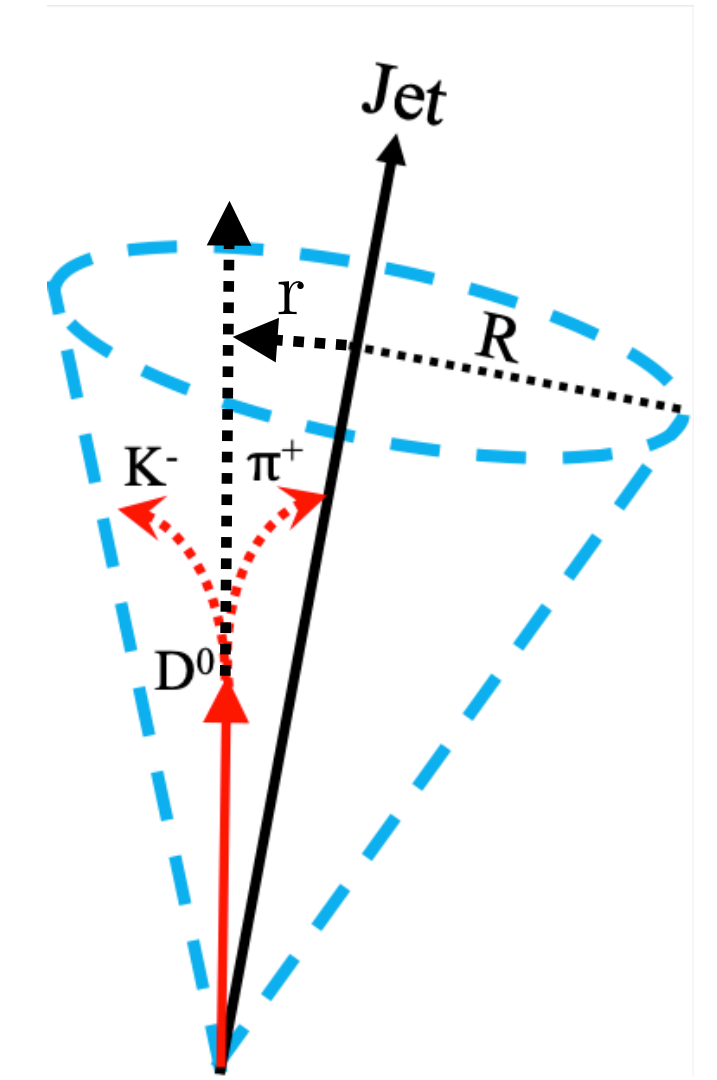
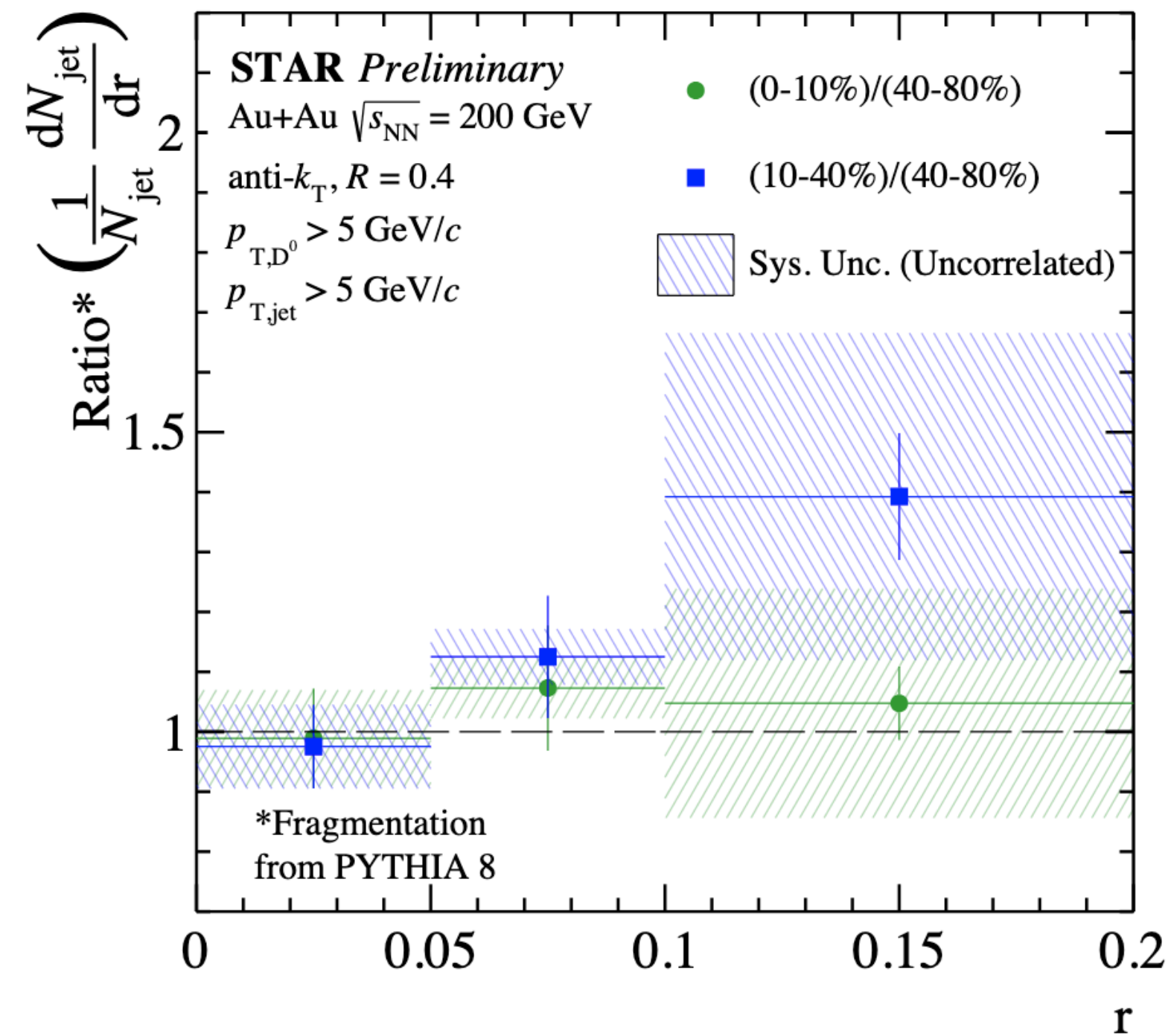
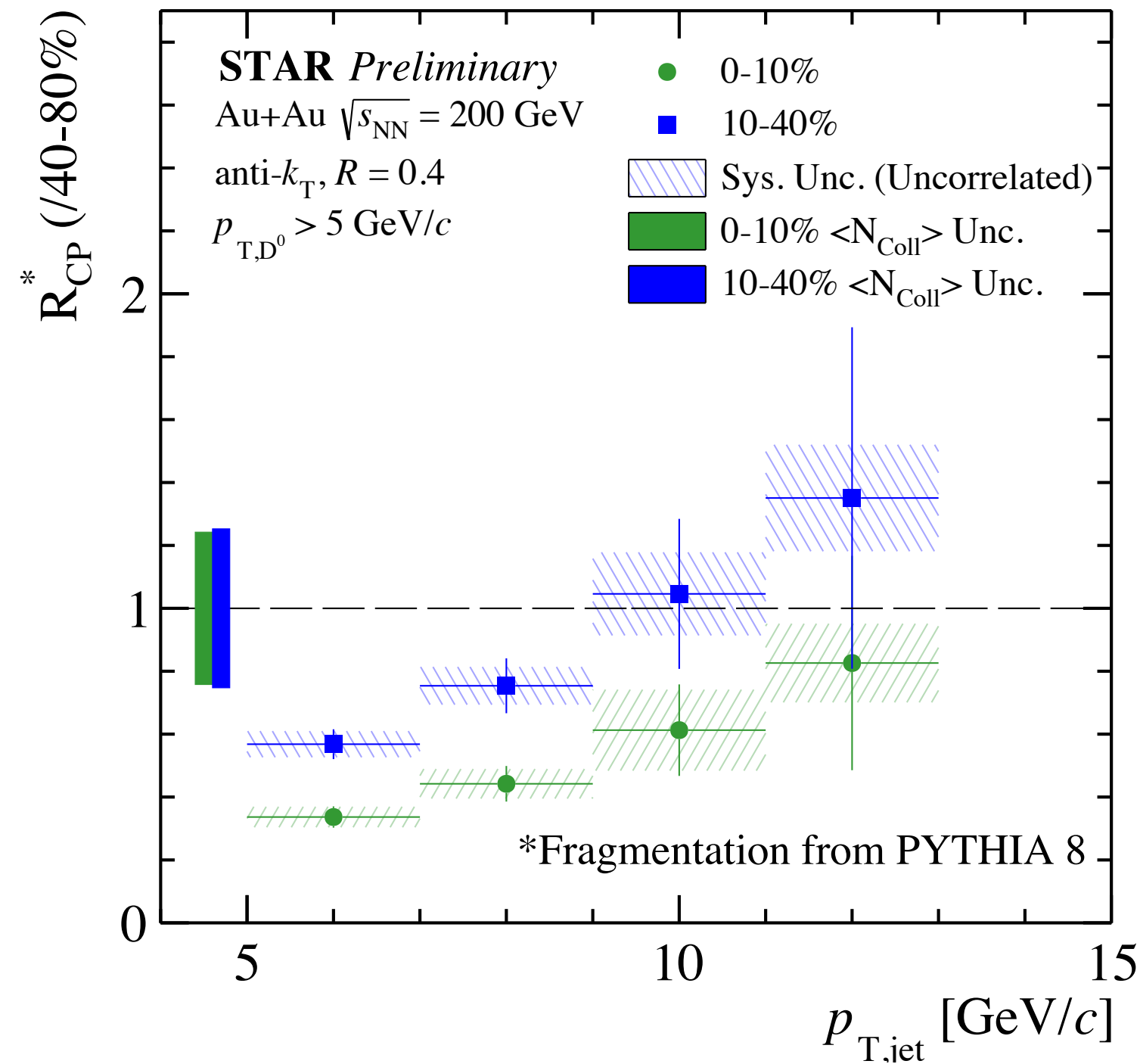


CCNU: Eur. Phys. J. C79 (2019) 789

New for QM22!



Ratio consistent with unity. Slight trend in ratios also similar with measurements at the LHC and theory predictions with diffusion



First measurement of D^0 -tagged jets in heavy-ion collisions @ RHIC

- (Mid-)central spectra suppressed w.r.t. peripheral spectrum
- D^0 radial profiles in (mid-)central consistent with no modification, relative to peripheral, within uncertainties

Outlook

- Further studies of D^0 -tagged jet fragmentation in heavy-ion collisions at RHIC
- Extend measurement to low D^0 p_T region to improve kinematic acceptance