Draft CD-1 Review Jet Performance in Au+Au Plots

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with input from Jet Structure TG & Simulations team

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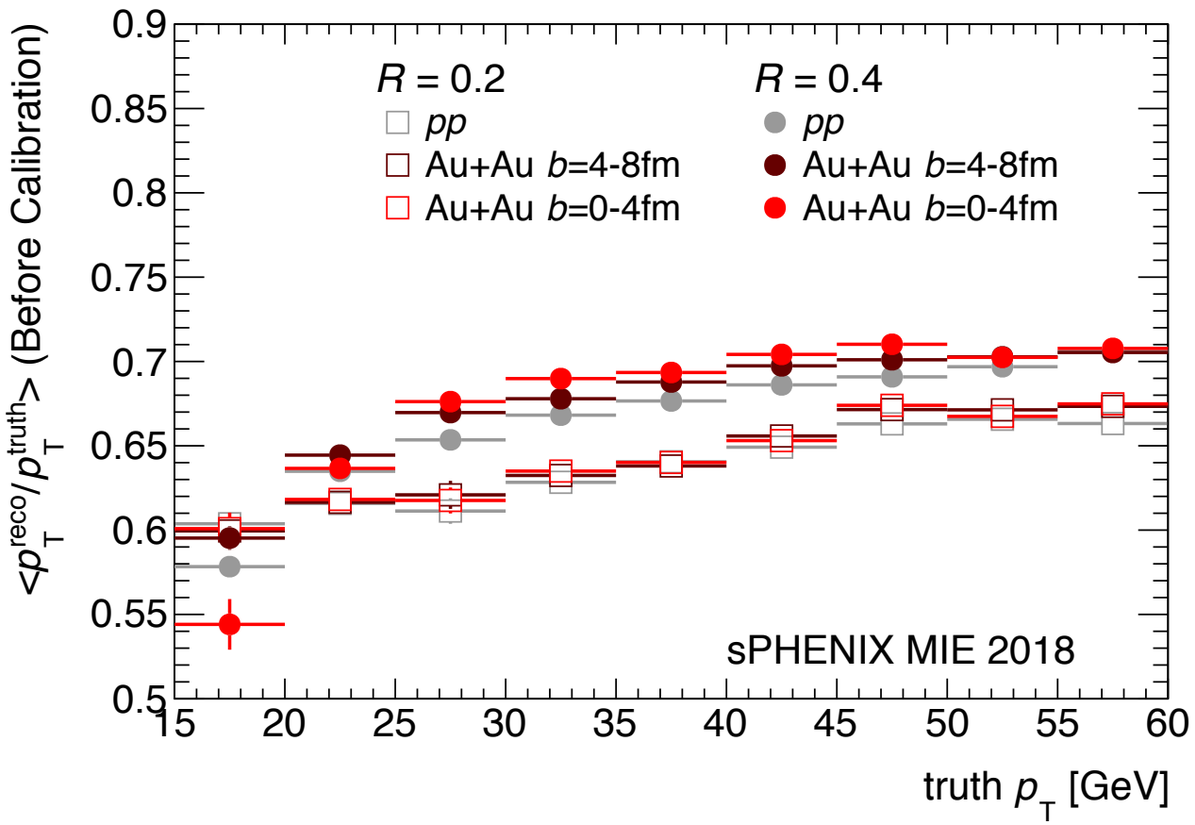
for sPHENIX Collaboration review

note: all draft plots have “sPHENIX MIE 2018” label

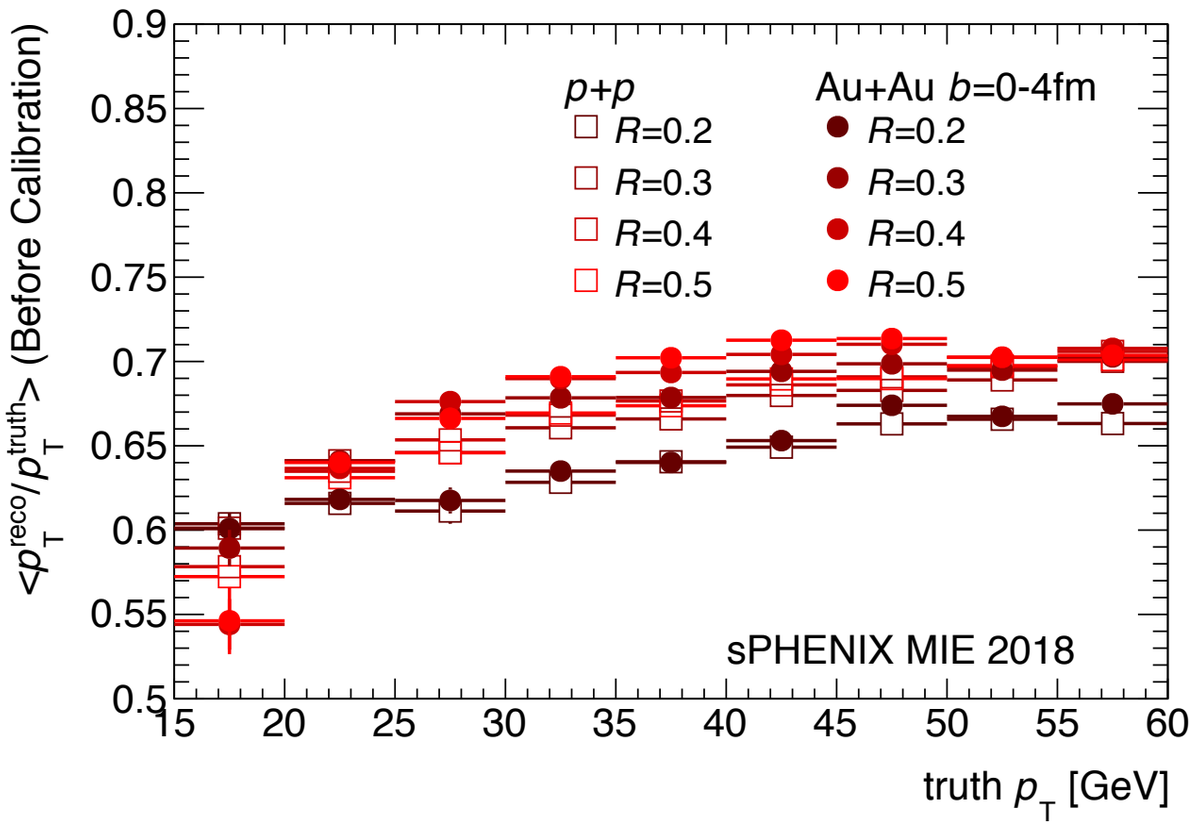
Response Summary plots

- Possible jet p_T response summary plots
  - ➡ note: no jet-level calibration, but see y-axis label
  - ➡ for a full summary of performance & example response distributions, see backup slides 9-10

pick R=0.2 and R=0.4, see centrality-indep. response (compare same markers of different colors)



pick p+p and 0-4fm, show all cone sizes (compare the different markers of same color)

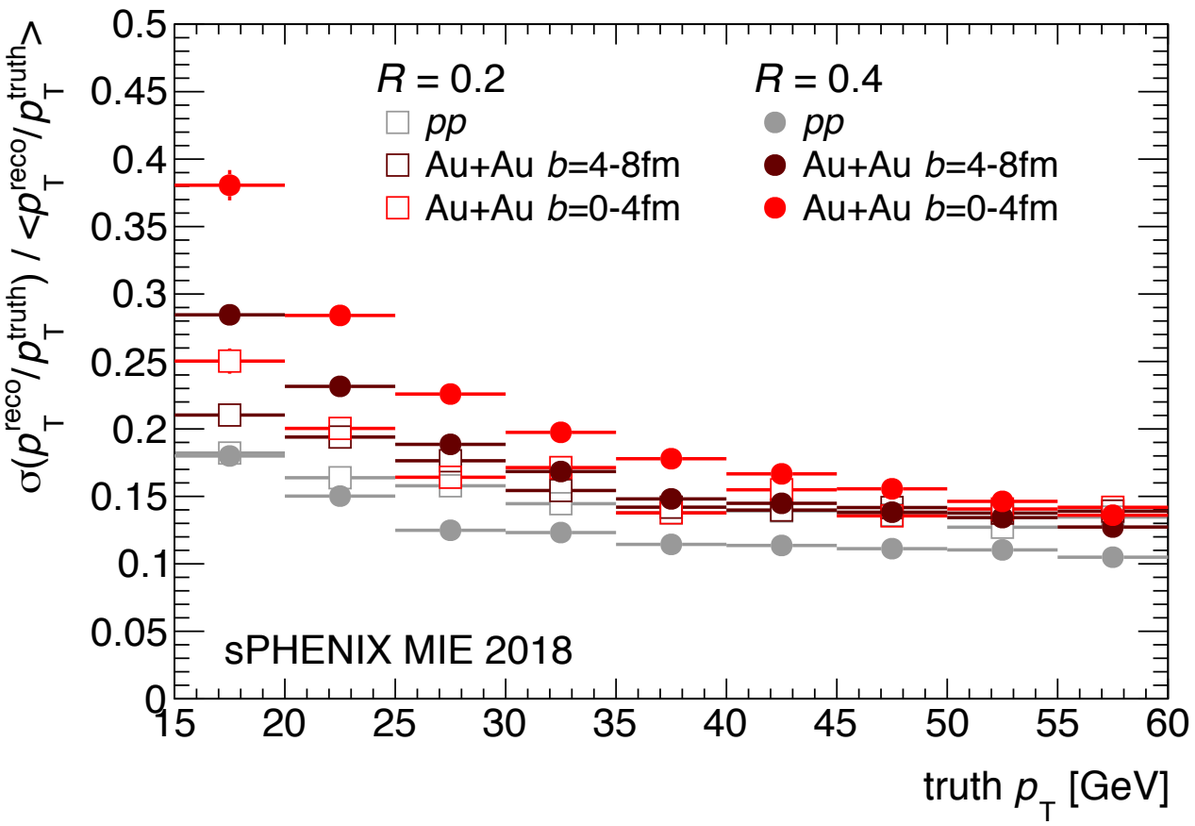


Resolution Summary plots

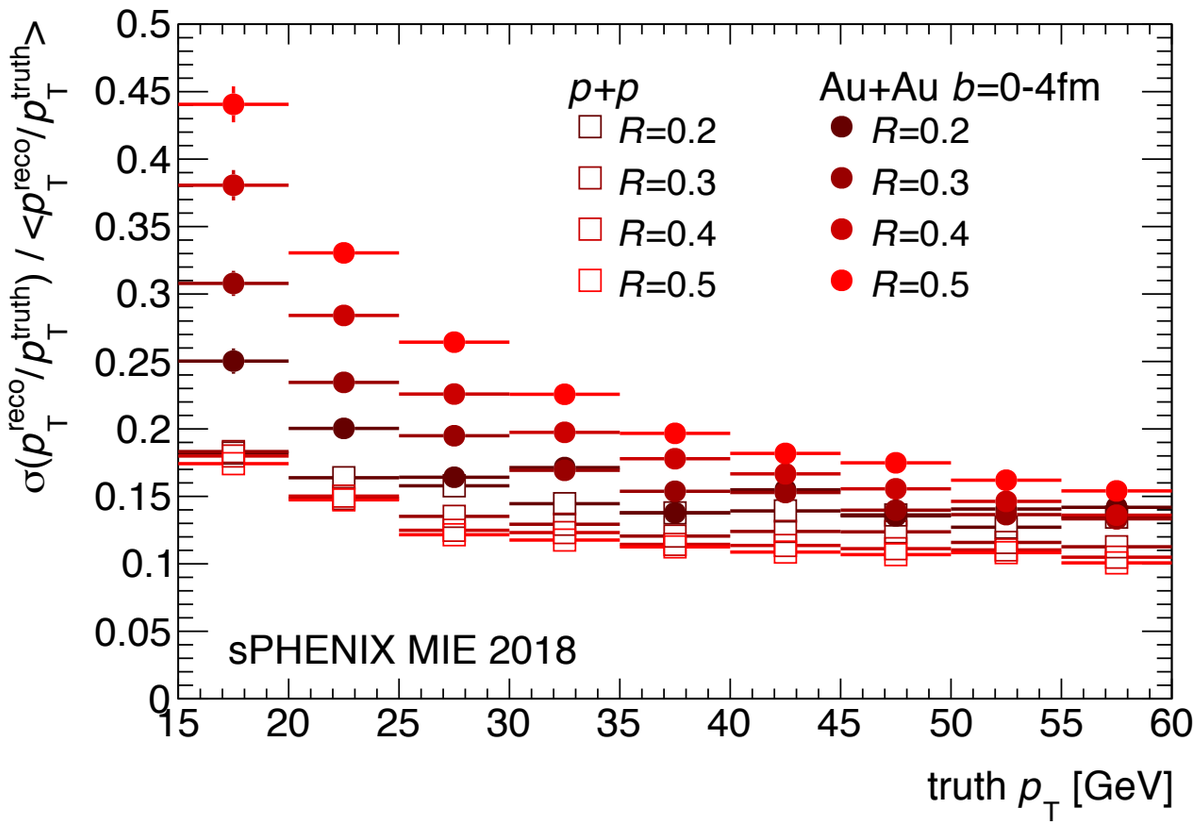
- Possible jet p_T resolution summary plots

  ➡ note: y-axis is sigma / mean

pick R=0.2 and R=0.4, see how JER grows with event activity



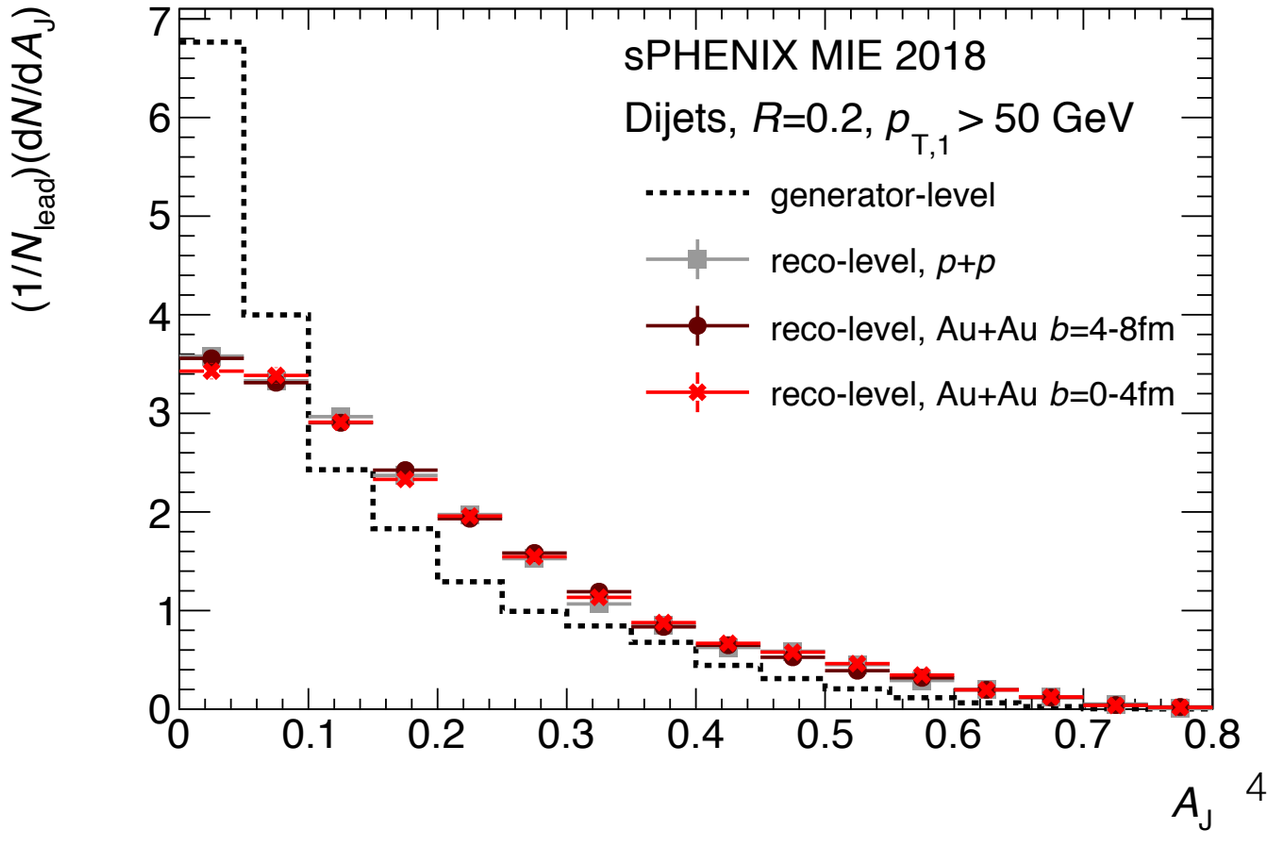
pick p+p and 0-4fm, show how JER grows with cone size



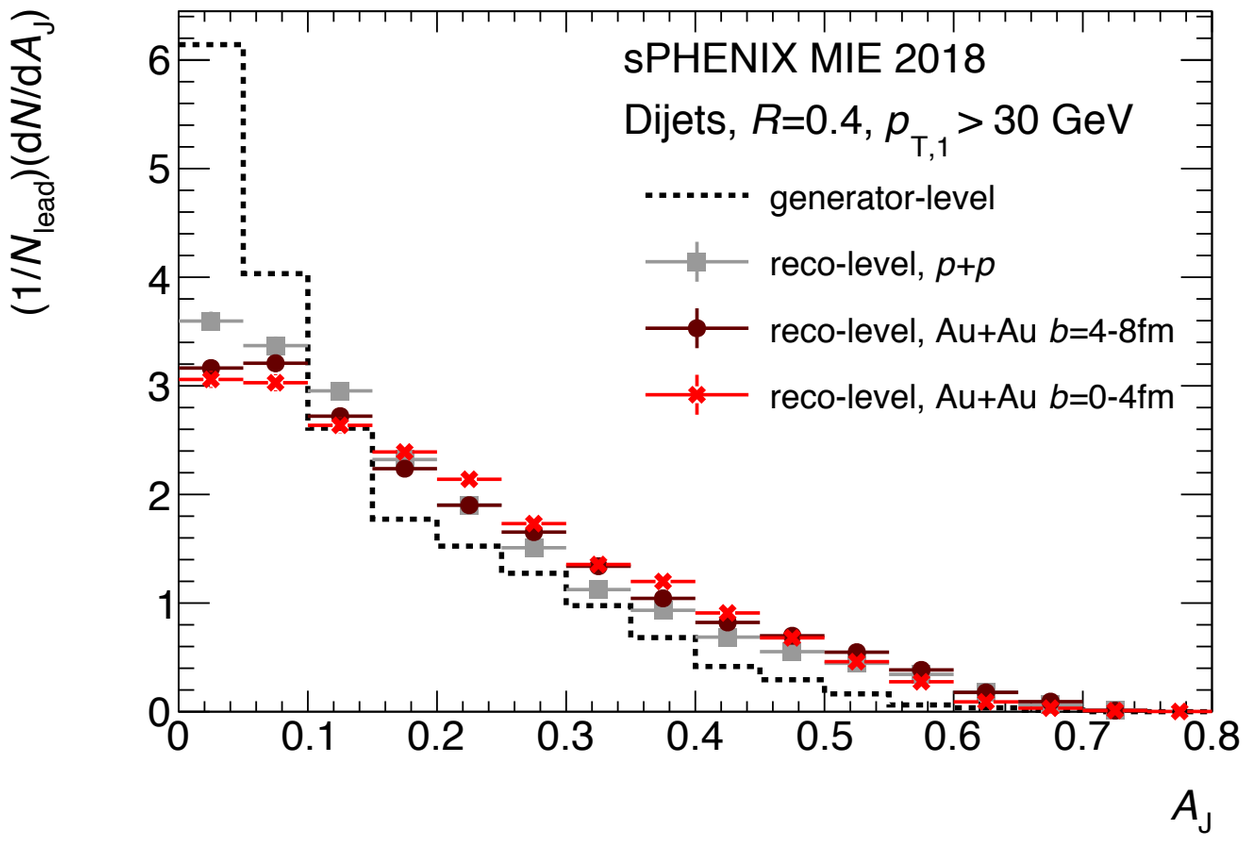
Dijet A_J distributions

- Compare generator-level with reco-level $A_J = (p_{T,1} - p_{T,2}) / (p_{T,1} + p_{T,2})$ distribution in all collision systems
- Two cone size + p_T selections to illustrate a point:

R=0.2, $p_{T,1}$ > 50 GeV: essentially no centrality-dependence at reco-level



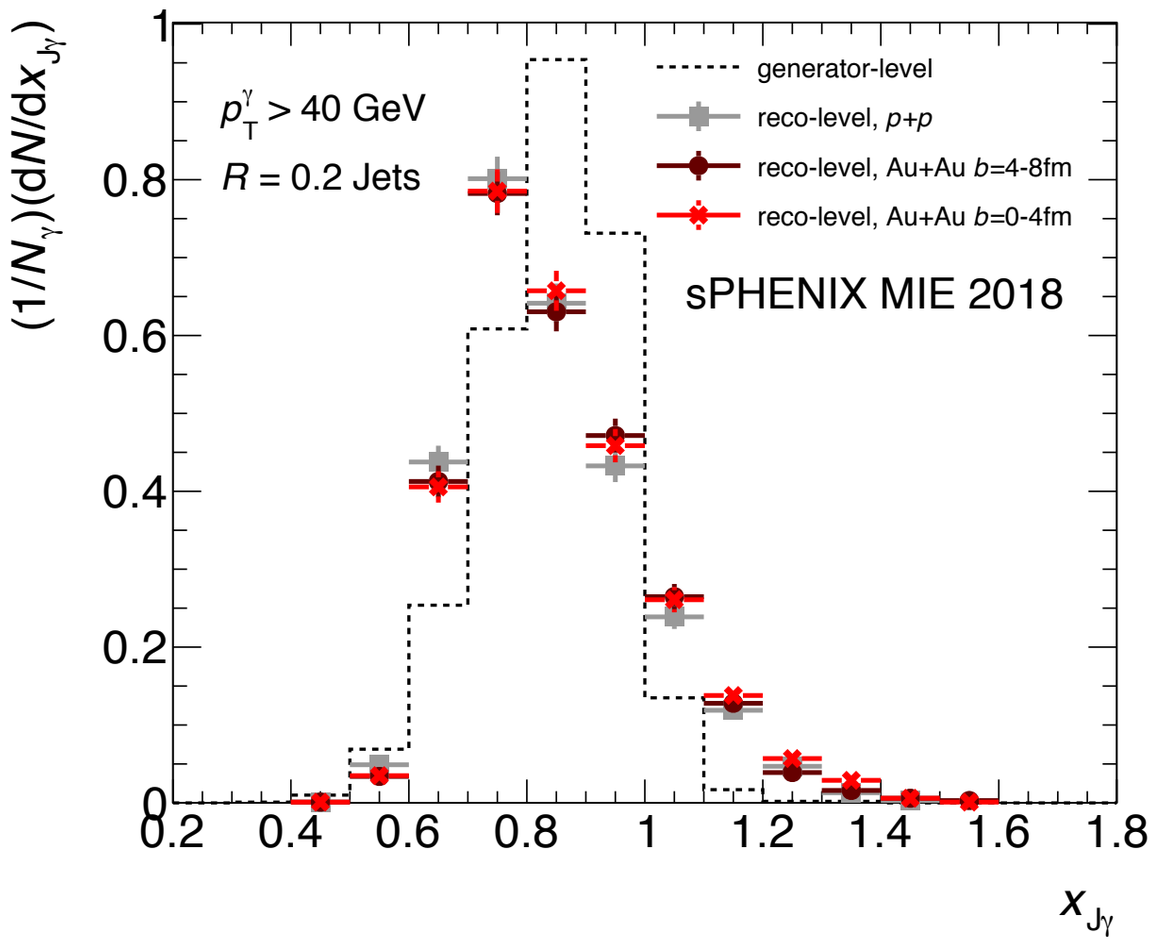
R=0.4, $p_{T,1}$ > 30 GeV: visible but "small" centrality dependence



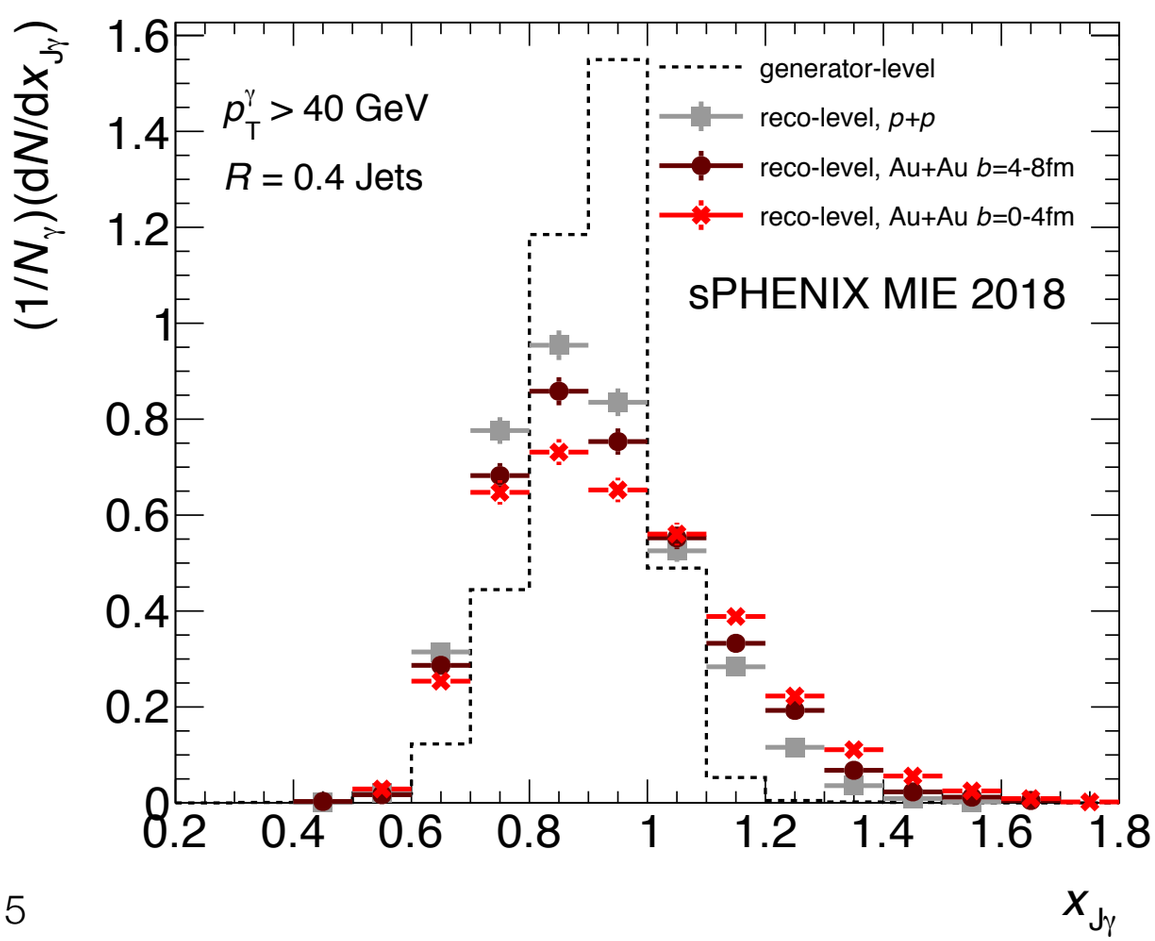
Photon+jet x_{Jg} distributions

- Compare generator-level with reco-level $x_{J\gamma} = p_T^{jet} / p_T^{\gamma}$ distribution in all collision systems, two subtleties in these plots:
  1. Use truth photon (assume γ E res. subdominant to that for jet)
  2. Apply multiplicative "calibration" such that $\langle x_{J\gamma} \rangle^{pp\text{-reco}} = \langle x_{J\gamma} \rangle^{truth}$

R=0.2: essentially no centrality-dependence at reco-level



R=0.4: visible but "small" centrality dependence



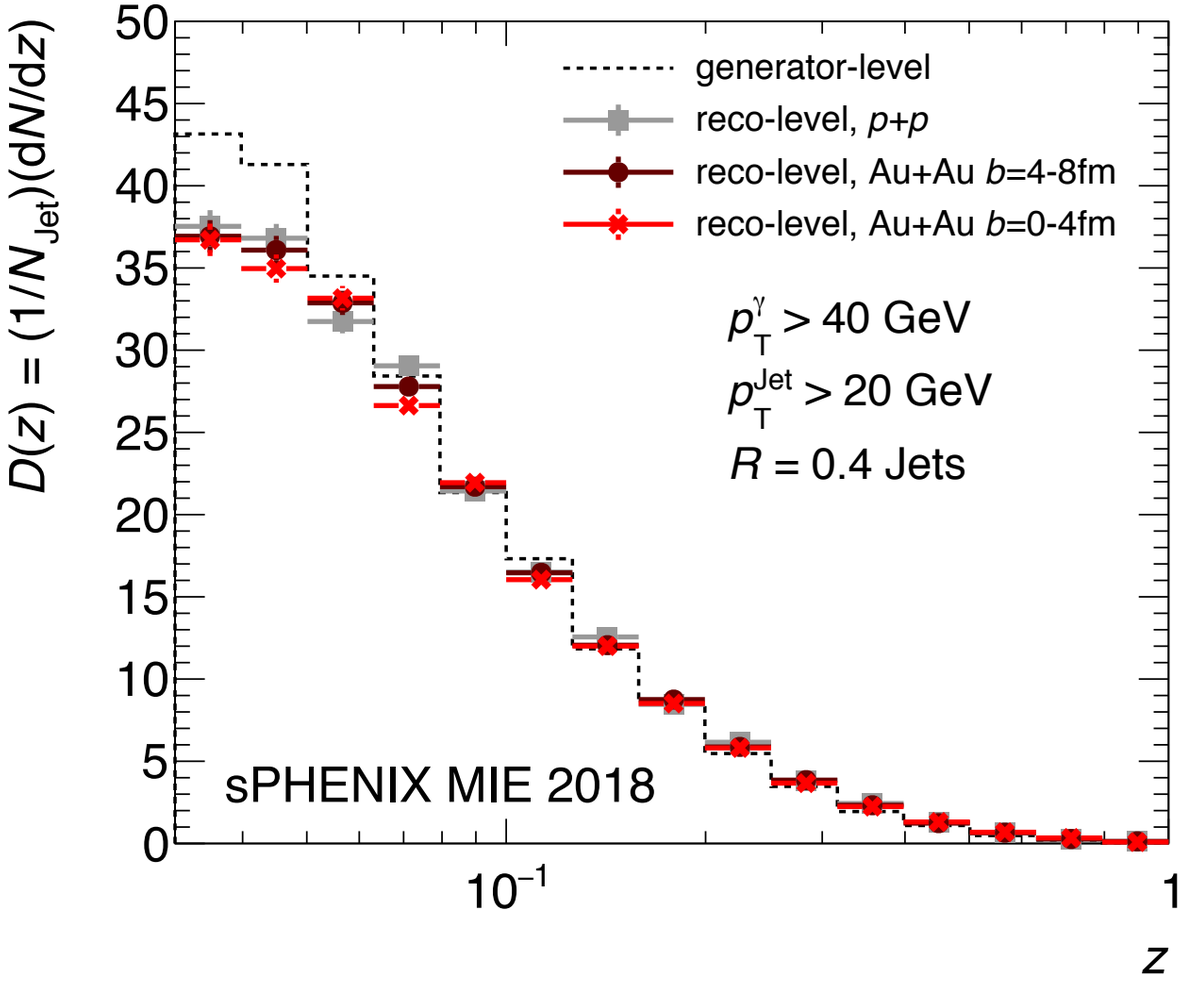
Fragmentation functions

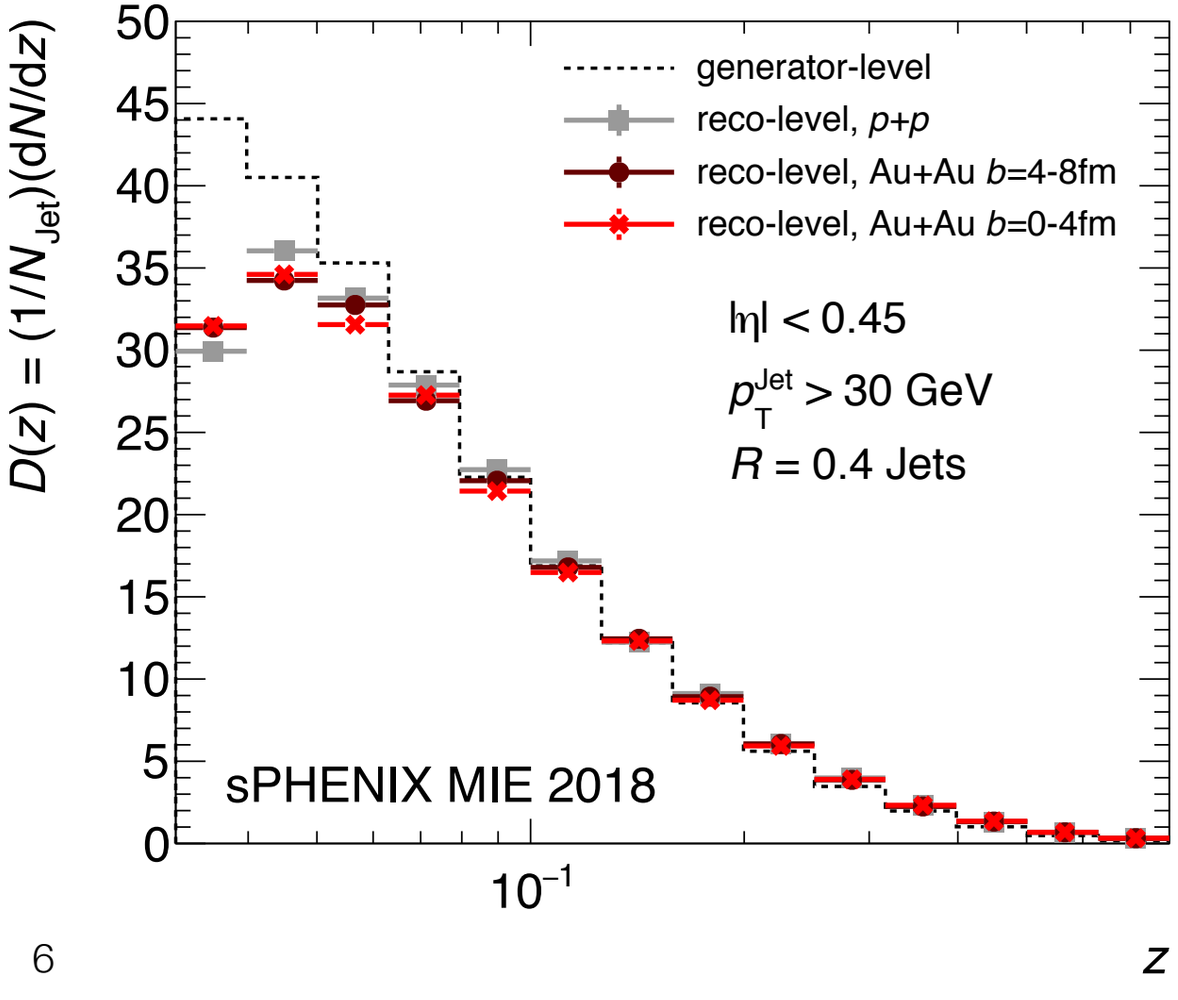
- Compare generator-level with reco-level $z = p_T^{trk} / p_T^{jet}$ distribution in all collision systems, one subtlety in these plots:

  ➡ use truth charged-particle kinematics (assume one can measure p_T^{trk} much more precisely than p_T^{jet}, and correct by $1/\epsilon$)

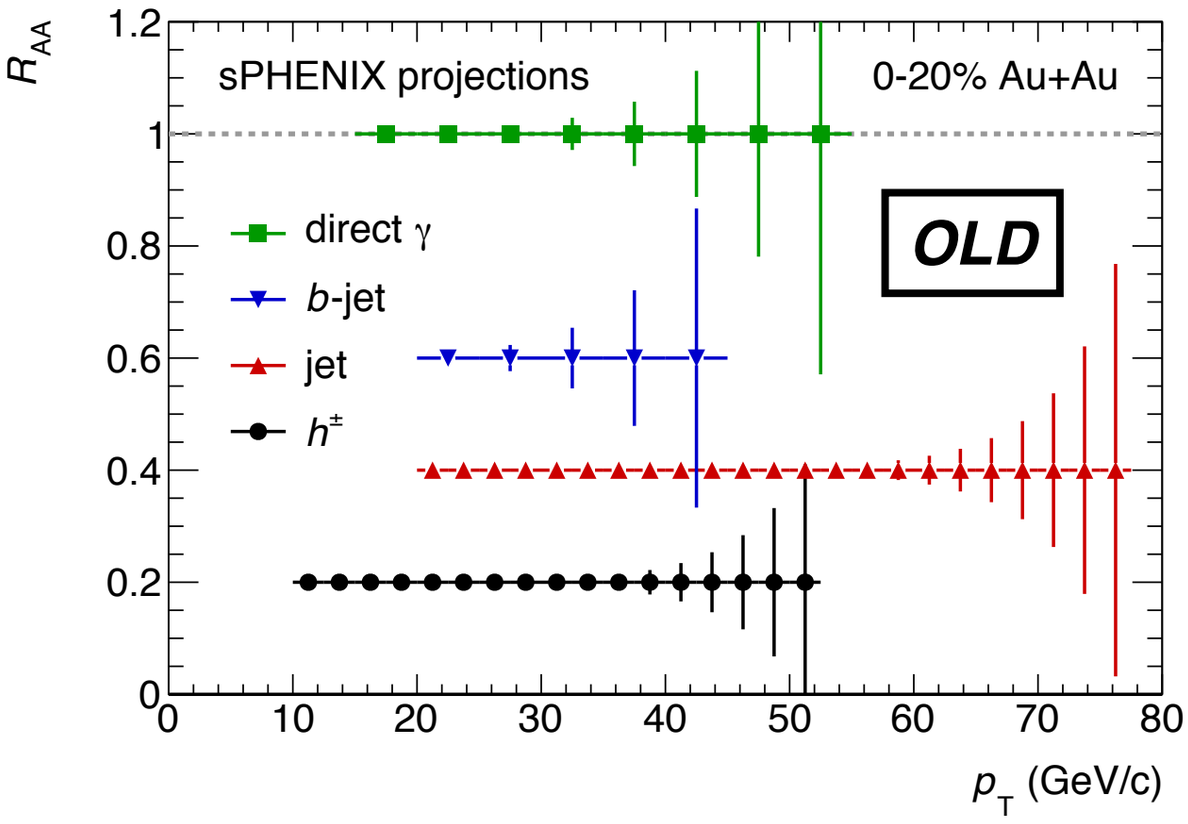
R=0.4, photon-tagged jets *R=0.4, dijets in similar p_T range*

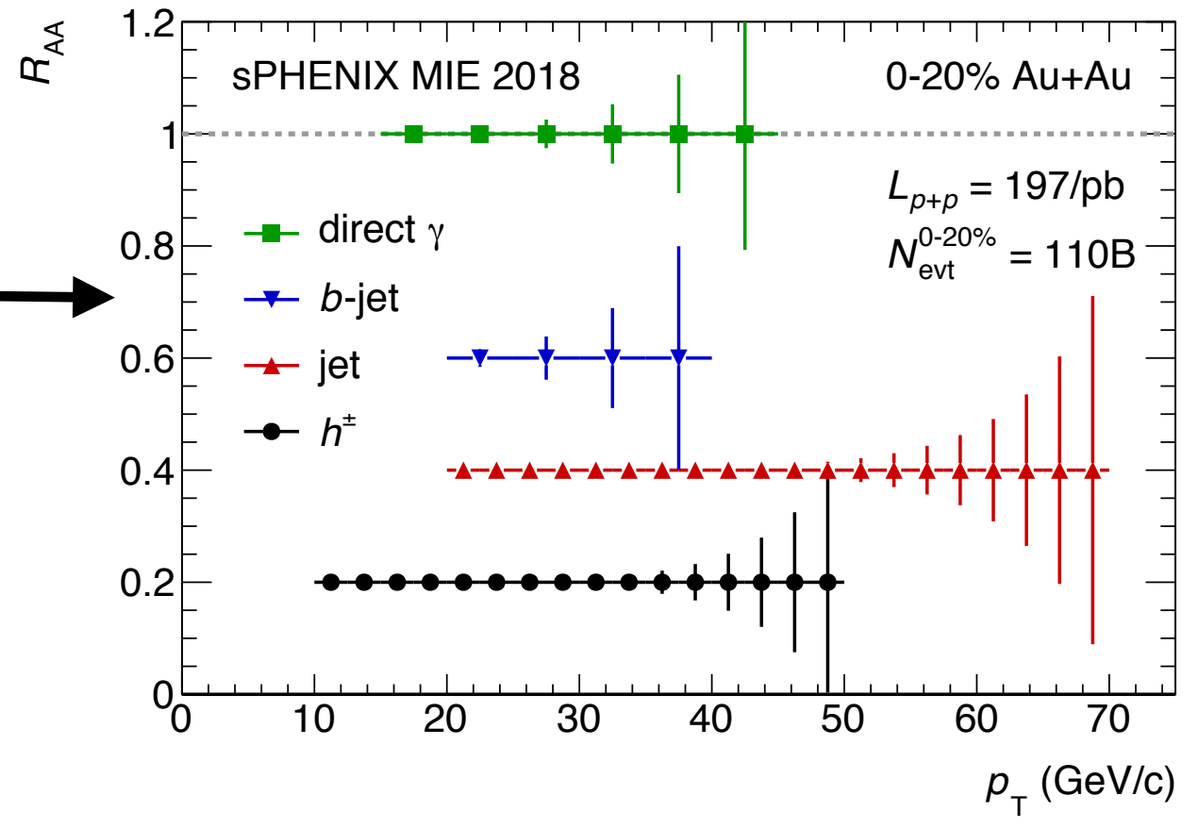
(minimal centrality dependence in this kinematic region)





R_{AA} projections ("T-shirt" plot)



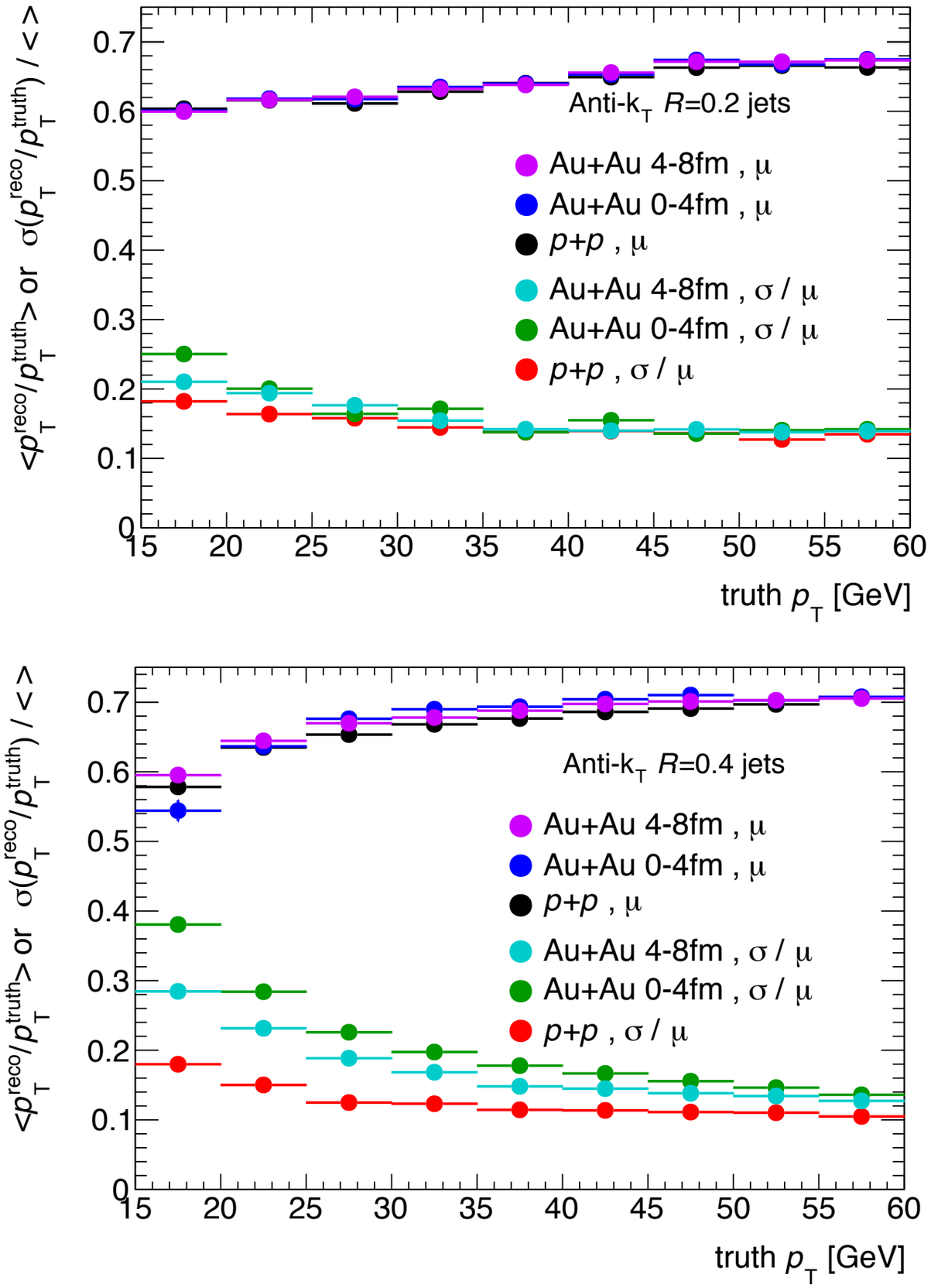


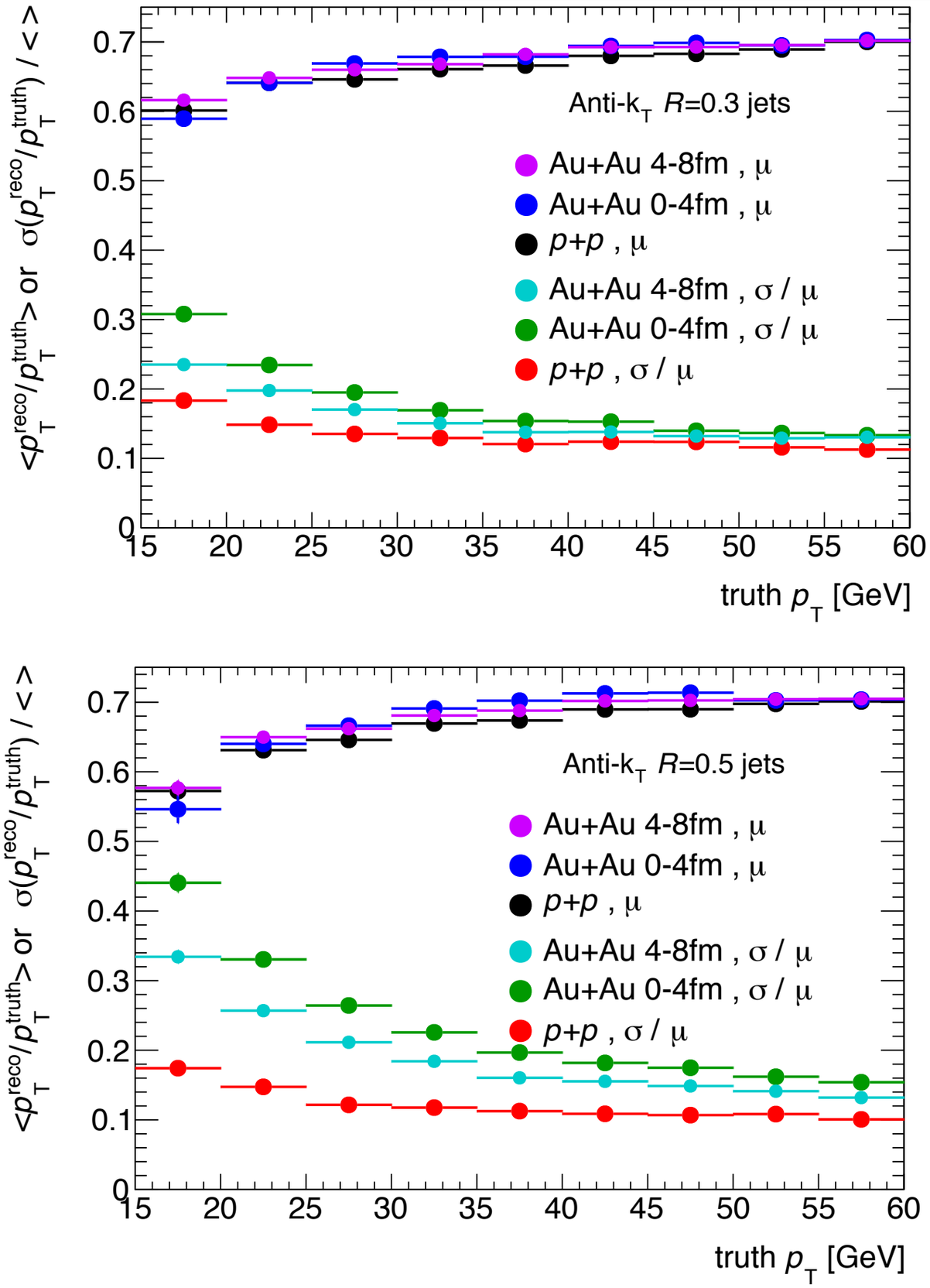
- Updated for 5-year run plan luminosity projections & reduced acceptance of MIE 2018 configuration
  - ➡ see GM or JS slides for more details
- Summary of results:
  - ➡ *x*-axis now extends to 75 GeV (c.f. 80 GeV in old plots)
  - ➡ all R_{AA} series "lose" 1-2 points w/ large statistical error at the end

backup

Reconstruction performance (2/2)

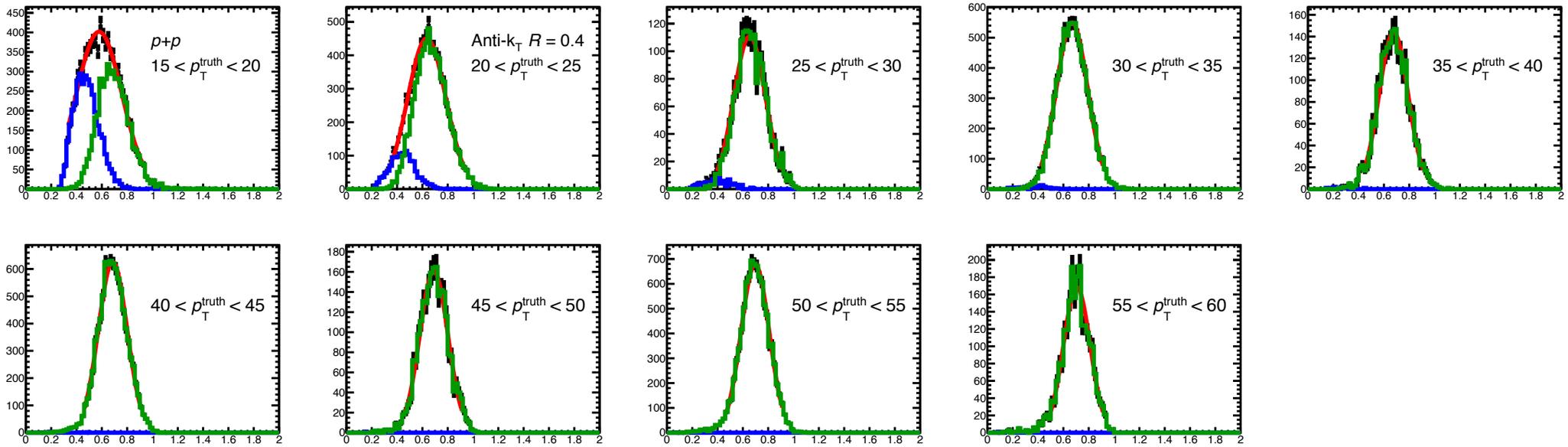
plots by Jeff Ouellette (Colorado)



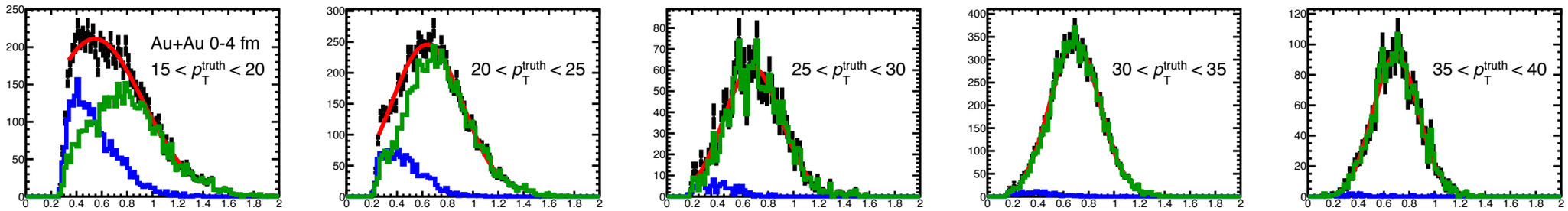


Example of response distributions, R=0.4

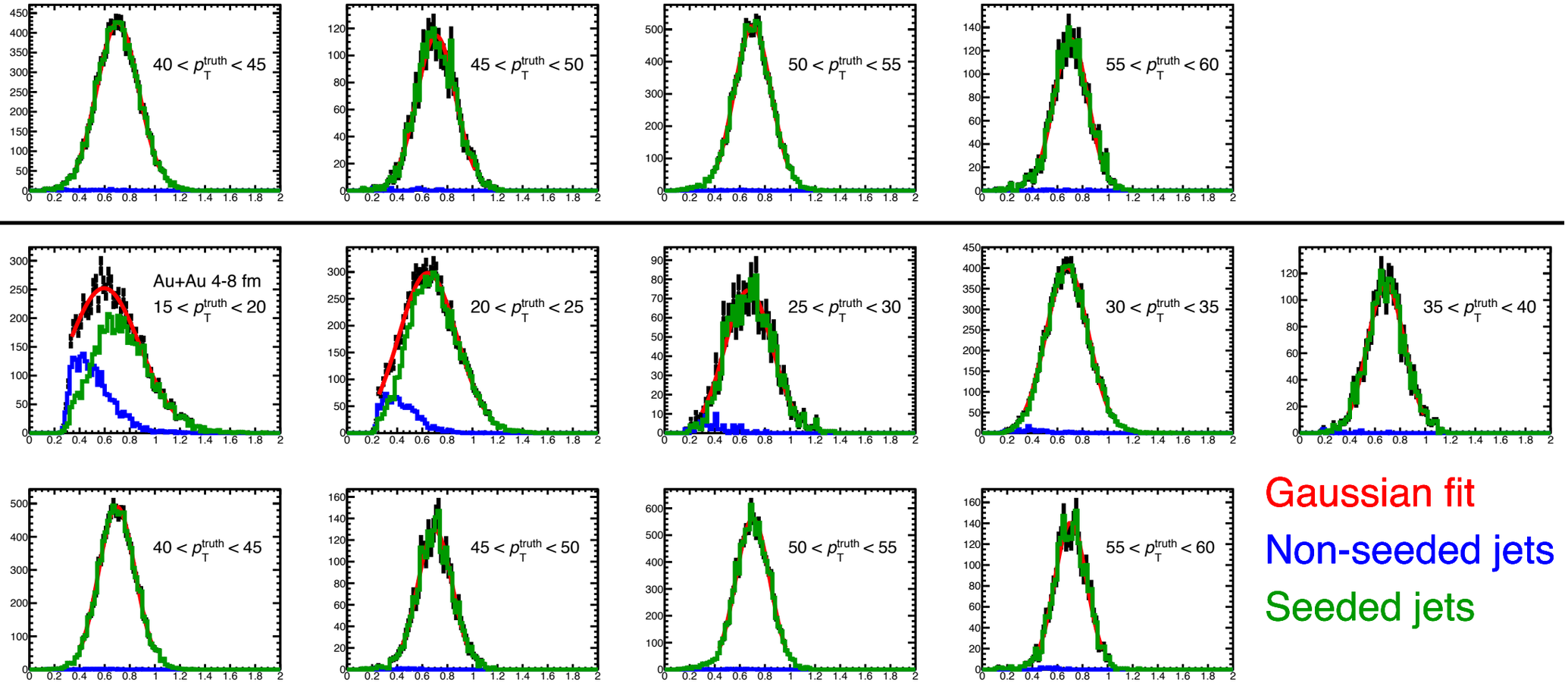
pp



b=0-4fm



b=4-8fm



Gaussian fit

Non-seeded jets

Seeded jets