

JET PERFORMANCE WITH SEPD SECOND ORDER EVENT PLANE ANGLE USED IN THE UE SUBTRACTION (SIMULATION)

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Jet Structure Topical group meeting

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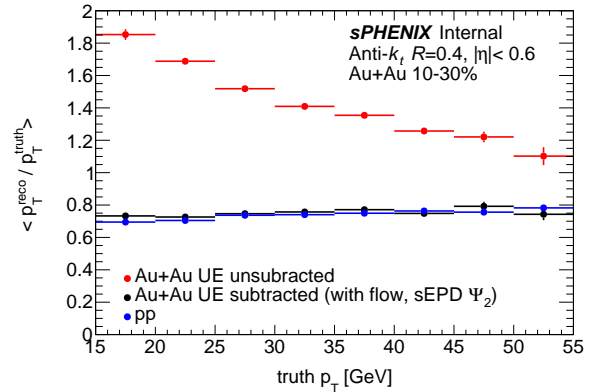
A RE-INTRODUCTION OF THE MATERIAL

Albeit some time ago, this material has been presented several times at the jet TG meeting.

Jet/sEPD related analysis timeline:

- ▶ **Yr 2020 - 2021:** sPHENIX EPD event plane studies presented at jet TGM. sEPD NSF MRI submitted (2021).
- ▶ **Yr 2021:** sPHENIX jet UE subtraction checks: [1] [2].
 - **Conclusions:**
 - ▶ Pythia jets needs UE subtraction as well
 - ▶ Auto-correlation (in the calorimeter used for jet measurement and ψ_2 determination leads to event plane dependent JES (see next slide for plot from 2021)).
- ▶ **Yr 2022:** Another look at the UE subtraction using sEPD ψ_2 and the MDC2 samples (right figure)

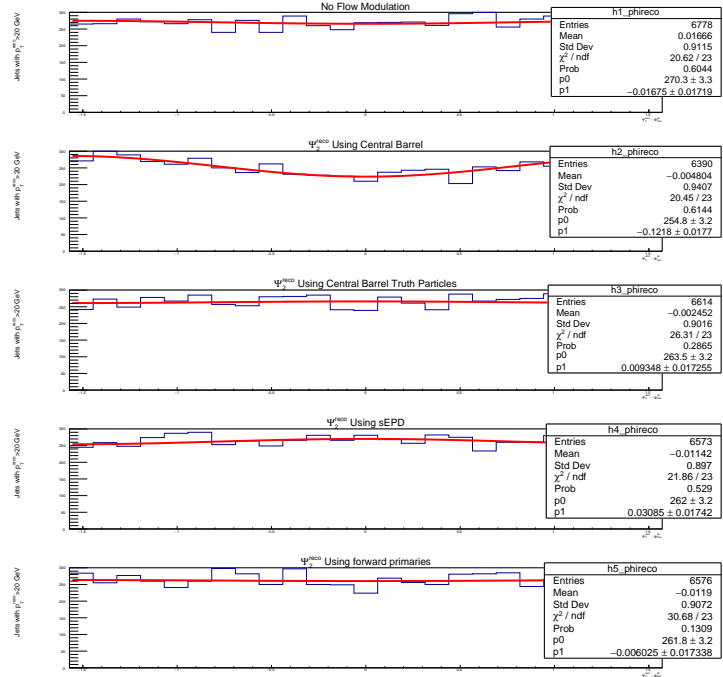
Presented at jet TG 07/13/22 [link]



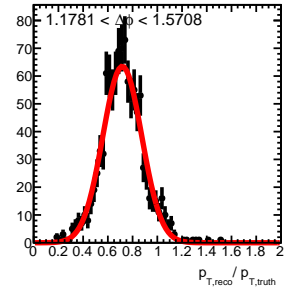
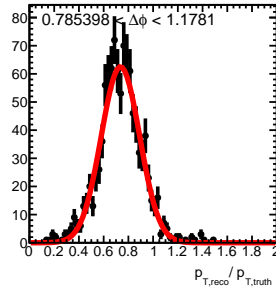
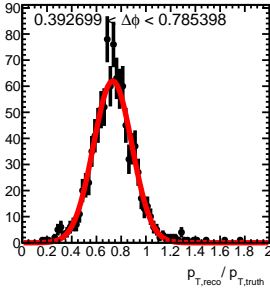
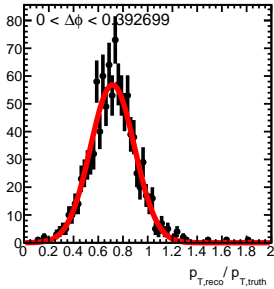
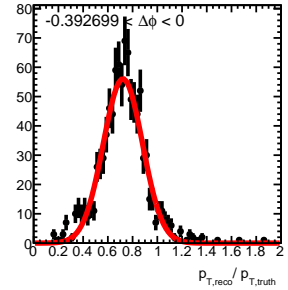
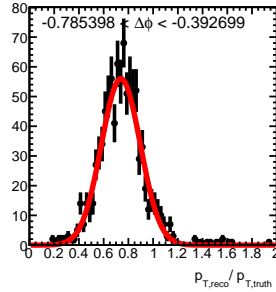
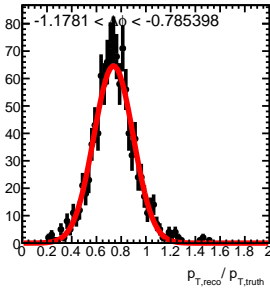
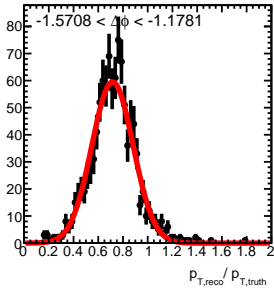
MOTIVATION/OUTLINE

- ▶ sEPD ψ_2 used in the flow modulated background subtraction shows no significant dependence of the jet yield on the eventplane
- ▶ Presentation contents:
 - JES with sEPD ψ_2 as a function of p_T^{truth}
 - JES with sEPD ψ_2 as a function of eventplane benchmarked against JES with calorimeter ψ_2
- ▶ Analysis details:
 - File: CreateFileList.pl -type 11 -embed DST_CALO_CLUSTER DST_GLOBAL DST_TRUTH_JET DST_TRUTH
 - Truth matched (Truth jet $p_T > 10$ GeV), $dR < 0.3$, $|\eta| < 0.7$

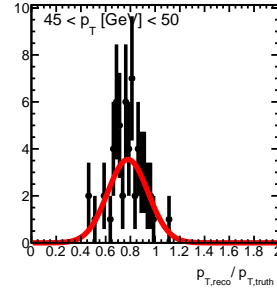
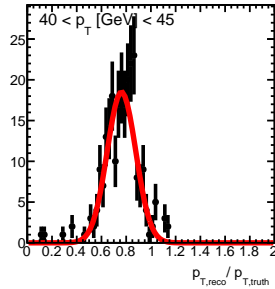
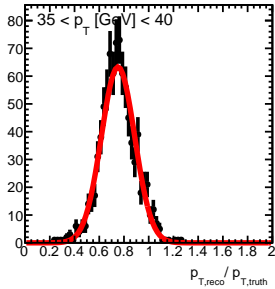
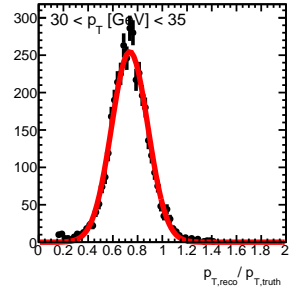
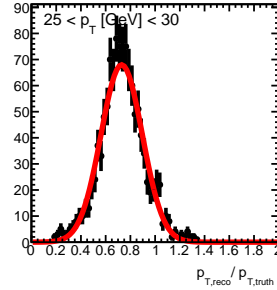
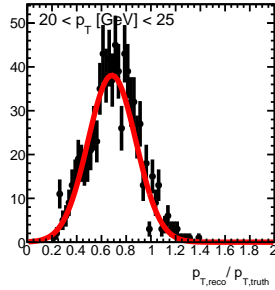
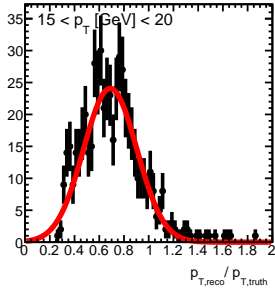
Jet yield as a function of the azimuthal distance from the event plane (01/07/2021). One of our first checks on the UE subtraction, which let us conclude the sEPD is required for this study.



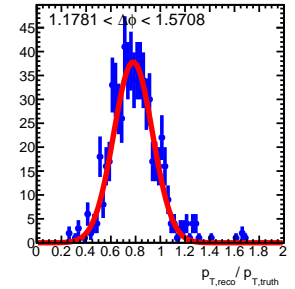
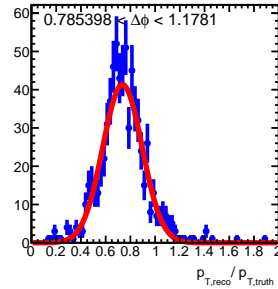
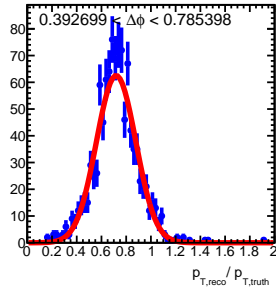
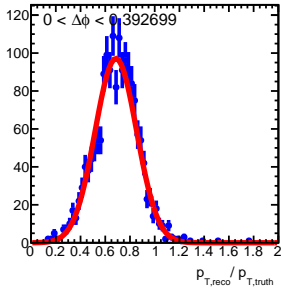
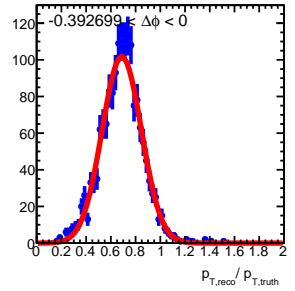
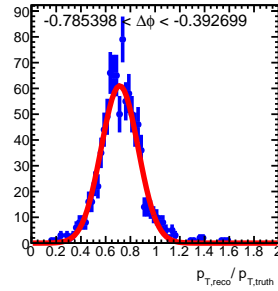
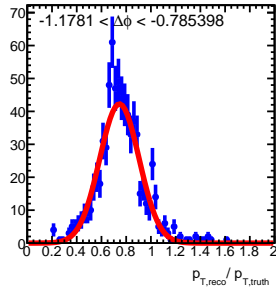
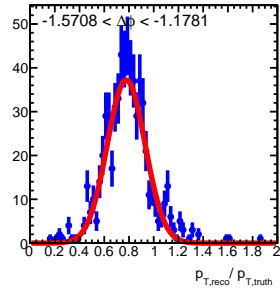
JES FITS USING sEPD ψ_2 ($\Delta\phi$ SLICES)



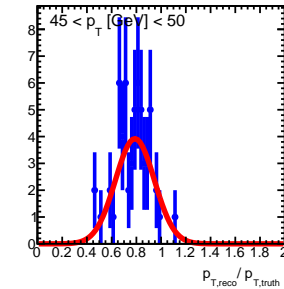
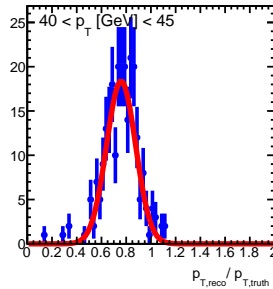
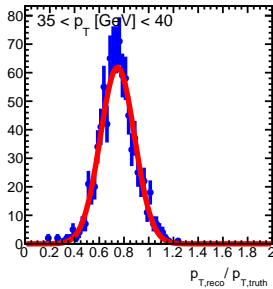
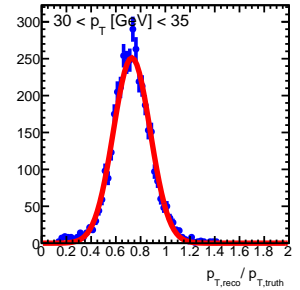
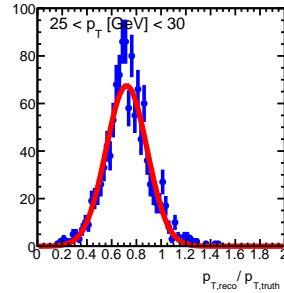
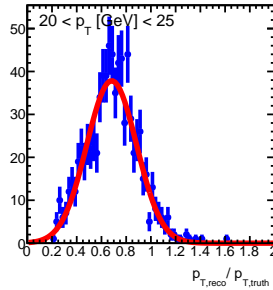
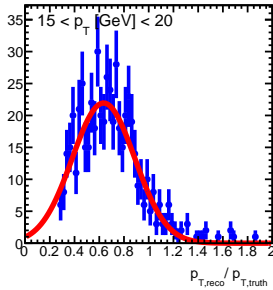
JES FITS USING sEPD ψ_2 (TRUTH p_T SLICES)



JES FITS USING CALORIMETER ψ_2 ($\Delta\phi$ SLICES)

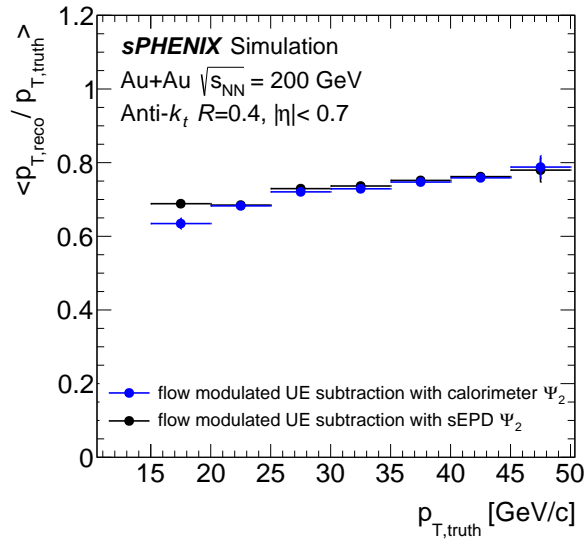


JES FITS USING CALORIMETER ψ_2 (TRUTH p_T SLICES)

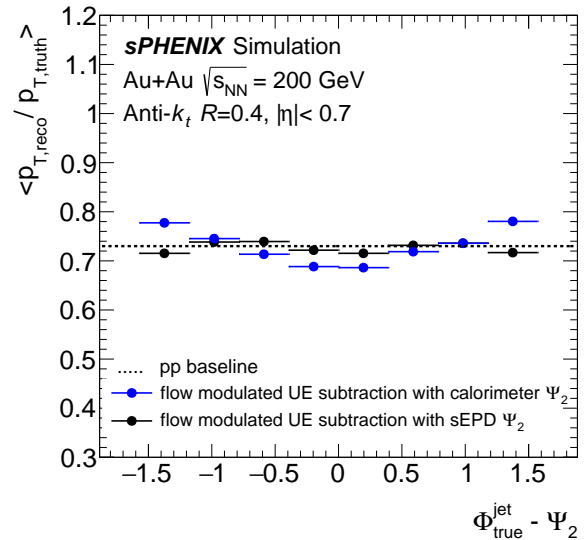


RESULTS (PLOTS IN QM POSTER)

JES vs Truth p_T



JES vs $\Delta\phi$



AUXILIARY MATERIAL

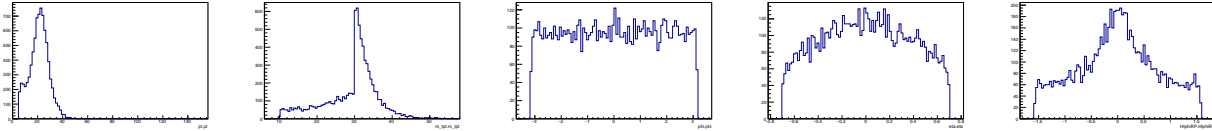


Figure. From left to right: reco jet p_T , truth jet p_T , reco jet ϕ , reco jet η (w/ 0.7 $|\eta|$ cut), $\Delta\phi = \phi_{true}^{jet} - \Psi_2$ using calorimeter Ψ_2

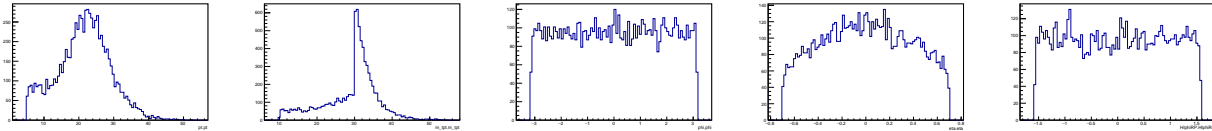


Figure. From left to right: reco jet p_T , truth jet p_T , reco jet ϕ , reco jet η (w/ 0.7 $|\eta|$ cut), $\Delta\phi = \phi_{true}^{jet} - \Psi_2$ using sEPD Ψ_2