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Final-State effects on higher-order fluctuations of the mean transverse momentum at the LHC

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The ALICE collaboration published the first measurement of the skewness and kurtosis of mean pT fluctuations, which can constrain the initial state of ultra-relativistic nuclear collisions. In this paper, we investigate the higher-order mean pT fluctuations using a multiphase transport model for three different collision systems: pp collision at 5.02 TeV, Pb+Pb collision at 5.02 TeV and Xe+Xe collision at 5.44 TeV. We find that the AMPT model provides a reasonable description of the standard skewness, intensive skewness and kurtosis as a function of system size for all three systems. Moreover, AMPT model reproduces the non-monotonic trends of intensive skewness as observed in the experimental data. In addition, we make predictions for the three observables in the forthcoming Pb+Pb collisions at 5.36 TeV. We further examine the impacts of final-state interactions and the local scaling of the initial conditions and find that skewness is particularly sensitive to these effects in semi-central and central collisions. In contrast, kurtosis shows little to no sensitivity.

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