

Revealing the source of the radial flow patterns in proton–proton collisions using hard probes

Abstract

In this work (based on a recent published paper), we propose a tool to reveal the origin of the collective-like phenomena observed in proton–proton collisions. We exploit the fundamental difference between the underlying mechanisms, color reconnection and hydrodynamics, which produce radial flow patterns in Pythia 8 and Epos 3, respectively. Specifically, we proceed by examining the strength of the coupling between the soft and hard components which, by construction, is larger in Pythia 8 than in Epos 3. We study the transverse momentum ($\{p\}_{\{T\}}$) distribution of charged pions, kaons and (anti)protons in the pseudorapidity ($|\eta| < 1$). From our studies, quantitative and qualitative differences between Pythia 8 and Epos 3 are found as the multiplicity is increased. In addition, we show that for low-multiplicity events the presence of jets can produce radial flow-like behavior. Motivated by our findings, we propose to perform a similar analysis using experimental data from LHC.

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