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Unraveling the final state interaction and correlation inside high multiplicity jet at LHC

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The recent CMS measurements of high multiplicity jets have revealed intriguing structures in two-particle correlations within jets with over 80 charged tracks, which may suggest the existence of final state interactions other than those considered in current parton shower programs. We investigate whether two final-state interaction mechanisms that may become important when the phase-space density of partons in a jet becomes large: 1) partonic rescattering 2) two-to-one merging of patron pairs of small invariant mass. We implement such processes approximately after Pythia8 shower and carefully model the spacetime structure and track the color information in these final state interactions. We analyze the impact of these two effects on particle correlation inside jet as measured by CMS. This study may shed light on understanding QCD hard processes in the high-multiplicity limit.

Category

Theory

Collaboration

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