

Untangling Soft and Hard Physics in pp Collisions

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The observation of QGP-like signatures in high-multiplicity pp collisions, believed to be driven by soft interactions, demands a good understanding of how to disentangle hard-scattering activity from the softer particle production, which composes the so-called underlying-event (UE). This talk presents two complementary measurements addressing this interplay. The first concerns the implementation of a novel event classifier, named flattenicity, in dijet acoplanarity studies in pp collisions, with the objective of reducing the selection bias introduced by the multiplicity estimator used in previous ALICE measurements. While the multiplicity-based estimator shows a broadening of the recoil-jet azimuthal distribution in high-multiplicity collisions relative to minimum-bias, results obtained with flattenicity are compatible between the two, indicating that the previously reported broadening arises from a selection bias rather than a medium effect. The second measurement characterizes the UE in pp collisions at $\sqrt{s}=13.6$ TeV, the highest collision energy reached at the LHC to date. Understanding the UE at this energy is essential both to isolate hard-scattering contributions in future analyses and to test the modeling of soft QCD dynamics in current MC event generators. An overall increase in activity relative to lower energies is observed, with comparisons to MC event generators showing good agreement.

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