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Measurement of the sensitivity of two-particle correlations in pp collisions to the presence of hard scatterings

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A key open question in the study of multi-particle production in high-energy pp collisions is the relationship between the “ridge” - observed azimuthal correlations between particles in the underlying event that extend over all rapidities and hard or semi-hard scattering processes. In particular, it is not known whether jets or their soft fragments are correlated with particles in the underlying event. This talk presents measurements of two-particle correlations in pp collisions at $\sqrt{s} = 13$ TeV with two different particle-pair selections. In the first case, charged particles associated with jets are excluded from the correlation analysis. This shows that excluding charged particles associated with jets does not affect the measured correlations. In the second case, correlations are measured between particles within jets and charged particles from the underlying event. Particles associated with jets do not exhibit any significant azimuthal correlations with the underlying event, ruling out hard processes contributing to the ridge.

Category

Experiment

Collaboration (if applicable)

ATLAS Collaboration

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