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ATLAS measurements of soft-hard correlations and anisotropy decorrelations in pp collisions

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This talk presents two recent ATLAS measurements of multi-particle correlations in pp collisions. The first investigates the relationship between the pp "ridge"and hard scattering processes. In particular, it is not known whether jets or their soft fragments are correlated with particles in the underlying event. To study this "soft-hard"correlation, measurements of two-particle correlations in pp collisions with two different particle-pair selections are presented. First, charged particles associated with jets are excluded from the correlation analysis. The measurement shows that excluding such particles does not affect the pp-ridge. In the second case, correlations are measured between particles within jets and charged particles from the underlying event. Particles associated with jets are found to not exhibit any significant azimuthal correlations with the underlying event, ruling out that hard processes contribute to the ridge. A second measurement of longitudinal decorrelation in pp collisions at 5 TeV and 13 TeV is also presented. This is the first time such measurements have been performed in pp collisions. Because non-flow effects are more significant in pp collisions, non-flow template subtraction procedures are applied. The results are quoted over a range of multiplicities and compared to measurements in Xe+Xe collisions. This gives the first detailed information on the correlation between longitudinal and transverse energy deposition in pp collisions.

Category

Experiment

Collaboration

ATLAS

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