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Measurement of the dependence of transverse energy production at large pseudorapidity on the hard scattering kinematics of proton–proton collisions at $\sqrt{s} = 2.76$ TeV with ATLAS

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A new control measurement of the relationship between hard scattering kinematics and the soft underlying event at negative pseudorapidity in 4.0/pb of pp collisions at 2.76 TeV is presented with the ATLAS detector at the LHC. These results are needed interpret the strong modifications in the rates of jet and dijet production in centrality-selected p+Pb collisions observed by ATLAS and CMS. The mean value of the transverse energy in the acceptance of the ATLAS forward calorimeter, where the centrality in p+Pb collisions is characterized, is reported in pp events with a dijet in the central region. This quantity is presented as a function of the average pseudorapidity and transverse momentum of the dijet, and also as a function of the scaled longitudinal momenta x_{proj} and x_{targ} , estimated event-by-event from the dijet kinematics, of the hard-scattered partons in the protons headed away from and towards, respectively, the region of transverse energy production. The transverse energy is observed to decrease strongly with increasing x_{targ} , which in the analogy with p+Pb collisions represents one of the nucleons in the Pb nucleus. On the other hand, the transverse energy depends only weakly on x_{proj} , which represents the proton in p+Pb collisions. These results provide counter-evidence to claims that the observed modifications in the jet production in p+Pb collisions arise from a correlation between hard scattering kinematics and soft particle production in the individual NN collisions.

On behalf of collaboration:

ATLAS

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