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Soft QCD, Minimum bias and UE measurements at ATLAS

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Particle distributions sensitive to the underlying event in proton-proton collisions have been measured with the ATLAS detector at the LHC at 7 TeV centre-of-mass energy. Various and complementary measurements are presented, e.g. charged particle multiplicity, charged and inclusive sum transverse momentum densities and mean charged-particle transverse momentum in the regions of each event, azimuthally transverse to the hardest jet or Z boson directions. When compared to the predictions of different Monte Carlo models, the data show sensitivity to modelling of the underlying event. An explicit study of double-parton scattering using W+dijet events is presented, along with a measure of the effective cross section. In addition the high-energy pp collisions at the LHC provide unique opportunity to study particle flow and event shapes of the hadronic final state particles. Evolution of the event shape variables, such as the transverse thrust, thrust minor and transverse sphericity have been studied for minimum bias events as a function of momentum scale.

Bose-Einstein correlations provide a unique opportunity for detailed understanding of the space-time geometry of the hadronization region, for determining the size and shape of the source from which particles are emitted and for interpreting of quark confinement effects. Bose-Einstein correlation lead to an enhancement of the production of identical bosons close in phase space. The ATLAS collaboration has performed a measurement of Bose-Einstein correlations of the pairs of charged particles with transverse momentum greater than 100 MeV in p-p collisions at 900 GeV and 7 TeV. Bose-Einstein correlation parameters are investigated up to very high charged-particle multiplicities. The dependence of the BEC parameters on the average transverse momentum per pair and per particle is also investigated.

Summary

Primary author(s) :   ATLAS, Collaboration (CERN)

Presenter(s) :   Dr. ZENIN, Oleg (IHEP Serpukhov)

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