

Measurement of the inclusive jet cross section with the ATLAS detector at the Large Hadron Collider

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Abstrak

Tests of the current understanding of physics at the highest energies achievable in man-made experiments are performed at CERN's Large Hadron Collider. In the theory of the strong force within the Standard Model of particle physics - Quantum ChromoDynamics or QCD - confined quarks and gluons from the proton-proton scattering manifest themselves as groups of collimated particles. These particles are clustered into physically measurable objects called hadronic jets. As jets are widely produced at hadron colliders, they are the key physics objects for an early "rediscovery of QCD". This thesis presents the first jet measurement from the ATLAS Collaboration at the LHC and confronts the experimental challenges of precision measurements. Inclusive jet cross section data are then used to improve the knowledge of the momentum distribution of quarks and gluons within the proton and of the magnitude of the strong force.