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(G*) Observation of Single Top-Quark Production in pp Collisions at $\sqrt{s} = 5.02$ TeV with the ATLAS Detector

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The t -channel single-top quark production is observed for the first time at a centre-of-mass energy of 5.02 TeV using proton-proton collision data collected by the ATLAS detector at the Large Hadron Collider. The observation is made using an event selection optimized for the l +jets decay topology of the single-top process, which requires candidate events to have exactly one charged lepton (electron or muon), exactly two jets, only one of which must arise from a b -hadron decay, and a large transverse momentum imbalance; and after which using a multivariate discriminant to separate the t -channel signal events from background events that satisfy the l +jets topology. Using a profile likelihood fit, we measured the production cross-section of single-top quarks and antiquarks individually, the inclusive cross-section for the combined production, the ratio of single-top quark to antiquark production, and V_{tb} in the CKM matrix.

Keyword-1

Single top t -channel

Keyword-2

Cross-section measurement

Keyword-3

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