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Single top quark production cross section using the ATLAS detector at the LHC

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Measurements of single top-quark production cross section in proton proton collisions at 7 and 8 TeV are presented. In the leading order process, a W boson is exchanged in the t-channel. For this process, for the first time a fiducial cross section measured within the detector acceptance is presented and the modelling uncertainty when extrapolating to the total inclusive cross section is assessed with a large number of different Monte Carlo generators. The result is in good agreement with the most up-to-date theory predictions. Furthermore, the single top-quark and anti-top total production cross sections, their ratio, as well as a measurement of the inclusive production cross section is presented. Differential cross sections are measured as a function of the transverse momentum and the absolute value of the rapidity of top and anti-top quarks. In addition, a measurement of the production cross section of a single top quark in association with a W boson is presented. The s-channel production is explored and limits on exotic production in single top quark processes are discussed. This includes the search for flavor changing neutral currents and the search for additional W bosons (W').

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