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# Observation of Top-Quark Production at 7TeV - CMS

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Observation of Top-Quark Production at 7TeV

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Abstract

The top quark is a fundamental building block of the standard model. Due to the large cross section, top quarks will be copiously produced in high energy proton-proton collisions at the Large Hadron Collider (LHC). The plans and analysis strategies of CMS to pursue the top quark physics program are discussed, with a focus on early cross-section measurements. We present the first results of a selection of top-quark pair production events in the dilepton channel, where both W-bosons from the top quarks decay leptonically into either an electron or a muon, plus a neutrino. We use LHC collision data at 7 TeV centre-of-mass energy collected with the CMS experiment during the first data-taking period at 7 TeV. Events with two isolated, prompt leptons with high energy, at least two jets with high transverse momentum, and significant missing transverse energy are selected. Several background contributions from other standard model processes, most importantly Drell-Yan and W+jets, are estimated in a data-driven way. Results obtained from data are compared with the simulation and a first estimate of the top-antitop cross section at  $\sqrt{s} = 7$  TeV is given, including systematic uncertainties. Similarly, first results are reported for the lepton+jets channel, where one W-boson from the top decays leptonically into a muon (or electron) and a neutrino, while the other one decays into a quark-antiquark pair.

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