

Searches for first and second generation leptoquarks using the ATLAS detector

Searches for the pair production of first and second generation scalar leptoquarks have been performed using 35 pb⁻¹ of proton-proton collision data recorded by the ATLAS detector at $\sqrt{s} = 7$ TeV, delivered by the LHC during 2010. We search for leptoquarks in events with two oppositely charged muons or electrons and at least two jets, and in events with one muon or electron, missing transverse momentum and at least two jets. The results on the dilepton and the single lepton channels are combined in each generation, and presented as limits on the leptoquark mass as a function of the branching fraction of a leptoquark to a charged lepton. The modeling of the Standard Model backgrounds is validated in dedicated control regions that enhance the major background contributions and that are orthogonal to the signal region. The signal region is defined using an a priori optimization procedure based on simulated signal and background yields. After full event selection, the observed number of events are consistent with the expected yields. Leptoquark production is excluded at the 95% CL for masses

$MLQ < 376$ (319) GeV and $MLQ < 422$ (362) GeV for first and second generation scalar leptoquarks, respectively, when assuming the branching fraction of a leptoquark to a charged lepton is equal to 1.0 (0.5).

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