Search for a Z' resonance in dilepton decays with the ATLAS

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Abstract

The ATLAS physics potential for the search of a Z' dilepton resonance has been studied under the assumption that heavy Z' bosons have the same couplings as the Standard Model Z boson. The exclusion limit on the Z' mass reached by the Tevatron is $m < 1$ TeV. The ATLAS experiment allows for significantly improved mass reach already for the initial LHC data taking at 7 TeV center-of-mass energy. An integrated luminosity of around 50 pb^{-1} is enough to reach the Tevatron exclusion limits. A Z' dilepton resonance with a mass of about 1 TeV can be observed with a total luminosity of 100 pb^{-1} and a luminosity of about 1 fb^{-1} is required to expand the discovery range up to 1.5 TeV. The results from the first proton-proton collisions in ATLAS in 2010 are discussed.