

Evidence for a particle decaying to W^+W^- in the fully leptonic final state in a standard model Higgs boson search

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The evidence for a new particle decaying to W^+W^- in the fully leptonic final state in a standard model Higgs boson search is observed. The analysis is performed using 4.9 fb⁻¹ and 19.5 fb⁻¹ of data at the center-of-mass energy 7 TeV and 8 TeV, respectively, collected by CMS detector. The W^+W^- candidates are selected in the events with two energetic leptons of opposite charges and large missing transverse momentum. The analysis is performed in the four categories in number of jets and lepton flavors to enhance sensitivity. An excess of events consistent with Standard Model Higgs boson of mass around 125 GeV is observed. The inconsistency with the background-only hypothesis is 4.0 standard deviation. Additional Standard Model Higgs-like bosons are excluded in the range of 128-600 GeV. The spin-parity of the new boson is tested against the hypothesis of a narrow spin-2 resonance produced through gluon-gluon fusion mechanism and with minimal couplings to the W^+W^- pair.

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