



Fermiophobic Higgs Boson in Associated Production with a Massive Vector Boson

Production in association with a vector boson V is a distinctive mode of production for a Higgs boson H without tree-level couplings to fermions, known as a fermiophobic Higgs boson. We focus on HV associated production with H decay into a pair of photons, and V into a pair of jets, with the goal of distinguishing a fermiophobic Higgs boson from the standard model Higgs boson. Performing a simulation of the signal and pertinent QCD backgrounds, and using the same event selection cuts employed by the LHC ATLAS collaboration, we argue that existing LHC data at 7 TeV with 4.9-fb^{-1} of integrated luminosity may contain evidence for a fermiophobic Higgs boson near 125 GeV at about 1.9 standard deviation signal significance 1.9σ . At 8 TeV the same analysis shows that associated production could yield 3σ significance with 10-fb^{-1} of data.

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