



## 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  $4.9\text{fb}^{-1}$  of integrated luminosity may contain evidence for a fermiophobic Higgs boson near 125 GeV at about 1.9 standard deviation signal significance  $1.9\sigma$ . At 8 TeV the same analysis shows that associated production could yield  $3\sigma$  significance with  $10\text{fb}^{-1}$  of data.

**Primary author:** Dr BERGER, Edmond (Argonne National Laboratory (US))

**Presenter:** Dr BERGER, Edmond (Argonne National Laboratory (US))

**Track Classification:** Track 1 - The Standard Model and EW Symmetry Breaking - Higgs Searches