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A Study to Enhance the Sensitivity for the Discovery of the Higgs Boson Coupling to Dimuons in Association with a Vector Boson[1]
BRENDAN REGNERY, DARIN ACOSTA, JUSTIN HUGON, Univ of Florida - Gainesville — We present our optimized selection criteria for the predicted Higgs coupling to dimuons with associated production of a vector boson. On July 4th 2012, the discovery of the Higgs boson was announced by the ATLAS and CMS collaborations in data from the Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN). Researchers must search for the rare decay modes of the Higgs, as predicted in the Standard Model of Particle Physics, to confirm its predicted couplings to mass. We are contributing to that process by developing a dedicated search strategy for the Higgs decay to dimuons, with associated production of a W or Z vector boson detected in the dijet final state. In order to optimize the search for this channel, we improved upon the published CMS search for the Higgs decay to dimuons by adding additional discrimination criteria: invariant mass of the dijet decay of the W or Z vector boson, dimuon transverse momentum, the angle between the dimuon and dijet systems in the transverse plane, and missing transverse momentum. We optimized these criteria on 7, 8, and 13 TeV CMS simulated data to improve the sensitivity for discovery of this decay channel and will report on the result.

[1]Compact Muon Solenoid (CMS) and University of Florida University Scholar's Program

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