

Probing new physics through exotic Higgs boson decays to a pair of light bosons

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Exotic decays of the Standard Model (SM) Higgs boson provide a unique window for the discovery of new physics, as the Higgs may couple to hidden-sector states that do not interact under the SM gauge transformations. Models predicting exotic Higgs decays to additional light bosons appear in many extensions to the SM and can explain several unknowns in physics, such as the nature of dark matter and the existence of supersymmetry. These type of searches also provide many exciting experimental aspects, including soft (low energy) leptons and jets, final states with triggering challenges, and jet merging at low energy scales. This talk will focus on the $h \rightarrow aa \rightarrow 2b2\mu$ search to illustrate some solutions to these challenges and present an outlook for future ATLAS searches in this extended light boson sector.

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