

Limits on an Exotic Higgs Decay From a Recast ATLAS Four-Lepton Analysis

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The ATLAS collaboration, using 139 fb^{-1} of 13 TeV collisions from the Large Hadron Collider, has placed limits on the decay of a Z boson to three dark photons. We reproduce the results of the ATLAS analysis, and then recast it as a limit on a exotic Higgs decay mode, in which the Higgs boson decays via a pair of intermediate (pseudo)scalars a to four dark photons V (or some other spin-one meson). Across the mass range for m_a and m_V , we find limits on the exotic Higgs branching fraction $\text{BR}(H \rightarrow aa \rightarrow VVVV)$ in the range of 4×10^{-5} to 1×10^{-4} .

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