

## Semi-dark Higgs decays: sweeping the Higgs neutrino floor

*Tuesday 28 June 2022 15:00 (30 minutes)*

We study exotic Higgs decays  $h \rightarrow ZX$ , with  $X$  an invisible BSM particle, resulting in a semi-dark final state. Such exotic Higgs decays may occur in theories of axion-like-particles (ALPs), dark photons or pseudoscalar mediators between the SM and dark matter. The SM process  $h \rightarrow Z\nu\bar{\nu}$  represents an irreducible “Higgs neutrino floor” background to these new physics searches, providing also a target experimental sensitivity for them. We analyze  $h \rightarrow ZX$ ,  $X \rightarrow E_T^{\text{miss}}$  searches at the LHC and a future ILC, showing that these exotic Higgs decays can yield sensitivity to unexplored regions of parameter space for ALPs and dark matter models.

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