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Reconstructing the mixing angles of a pseudo-Goldstone sterile neutrino

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Low-scale models of neutrino mass generation often feature sterile neutrinos with masses in the GeV-TeV range, which can be produced at colliders through their mix- ing with the Standard Model neutrinos. We consider an alternative scenario in which the sterile neutrino is produced in the decay of a heavier particle, such that its production cross section does not depend on the active-sterile neutrino mixing angles. The mixing angles can be accessed through the decays of the sterile neutrino, provided that they lead to observable displaced vertices. We present an explicit realization of this scenario in which the sterile neutrino is the supersymmetric partner of a pseudo-Nambu-Goldstone boson, and is produced in the decays of higgsino-like neutralinos and charginos. The model predicts the active-sterile neutrino mixing angles in terms of a small number of parameters. We show that a sterile neutrino with a mass between a few 10GeV and 200 GeV can lead to observable displaced vertices at the LHC, and outline a strategy for reconstructing experimentally its mixing angles.

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