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Probing sterile neutrino magnetic moments with non-pointing photon searches at the LHC

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In this talk, we explore long-lived particle (LLP) searches using non-pointing photons at the LHC as a probe for transition magnetic dipole moments of sterile neutrinos. We consider two heavy sterile neutrinos with masses ranging from a few GeV to several hundreds of GeV, which interact with the Standard Model (SM) through sterile-to-sterile and active-to-sterile dipole moments. In certain regions of the model parameter space, the sterile neutrinos have sizable decay lengths, leading to distinctive LLP signatures at colliders, such as displaced photons. Results of our numerical simulations reveal that non-pointing photon searches can be sensitive to sterile-to-sterile and active-to-sterile magnetic moments several orders of magnitude below existing limits.

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