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Placing Bounds on New Physics with Displaced Photons

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If a neutral long-lived particle decays predominantly into photons and another stable particle, its presence can be reconstructed at the LHC in the form of displaced photons. These are recognized as such in terms of their delayed arrival time t_γ and a non-pointing parameter Δz_γ .

In this work we present a detailed recast of a search for displaced photons in ATLAS, and show how it can be used to constrain new physics. In particular, we use the search to put bounds on the Dimension-5 Seesaw Portal (which can explain neutrino masses) and on a dark photon model coupling via a scalar portal to the Standard Model (which can explain dark matter).

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