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Search for a pair production of dark photons via the Higgs portal at CMS

The Standard Model (SM) is known to be incomplete, it fails at explaining the nature of the cosmological observed dark matter. The introduction of a Dark Sector via an additional $U(1)_d$ gauge symmetry added to the SM Lagrangian provides a mechanism to introduce much needed new physics without perturbing the agreement between SM theoretical description and the Electroweak Precision Observables. The breaking of a new $U(1)_d$ symmetry gives rise to a massive dark photon, this dark photon can couple to SM particles via a small kinetic mixing parameter (ϵ). In this talk we review a search for a pair production of dark photons in a final state with 4 muons, with a dataset of 35.9fb^{-1} collected by CMS during 2016, methods to estimate SM background and observed experimental limits are presented, such limits in the 2D plane defined by ϵ and the mass of the dark photon cover an unexplored area. The plans to extend the search for an updated analysis with the whole Run-2 CMS dataset are discussed.

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