

Search for Low Mass Dark Photons in the CMS Hadronic Calorimeter (HCAL) in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV

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We present a search for a low mass dark photon below 1 MeV which is radiated from a muon in proton-proton collisions at a center-of-mass energy of 13 TeV. A low mass dark photon has no available decay channel to standard model particles, and is hence stable. We assume that a dark photon directly interacts with detector materials through bremsstrahlung, and its small kinetic mixing, in which the dark photon converts to and from the normal photon, means depositing energy outside the CMS Electromagnetic Calorimeter. The search is model-independent, and applies to all dark photons with mass lower than 1 MeV. I will present preliminary feasibility studies using Monte Carlo simulation, which have shown that a dark photon shower in HCAL is distinguishable from the standard model backgrounds.

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