



Article No. 4

Search for Long-Lived Particles Decaying in the CMS End Cap Muon Detectors in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV.

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Abstract

A search for long-lived particles (LLPs) produced in decays of standard model (SM) Higgs bosons is presented. The data sample consists of 137 fb^{-1} of proton-proton collisions at $\sqrt{s} = 13 \text{ TeV}$, recorded at the LHC in 2016–2018. A novel technique is employed to reconstruct decays of LLPs in the end cap muon detectors. The search is sensitive to a broad range of LLP decay modes and to masses as low as a few GeV. No excess of events above the SM background is observed. The most stringent limits to date on the branching fraction of the Higgs boson to LLPs subsequently decaying to quarks and $\tau^+\tau^-$ are found for proper decay lengths greater than 6, 20, and 40 m, for LLP masses of 7, 15, and 40 GeV, respectively.