Call for Abstracts for the April Meeting 2023

print

Would the speaker like to volunteer as a session chair?	No

Abstract ID: 1351776

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Abstract Body: Many searches for beyond the standard model (SM) physics predict the existence of "long-lived particles" (LLPs). These LLPs are neutral, weakly-coupled, and have a long lifetime. Moreover, LLPs often have large displacement signatures allowing them to go undetected in conventional searches for prompt particles and thus remain largely unexplored at the LHC. We present an extension of a previous search at the LHC that used the CMS muon detectors (MD) as a sampling calorimeter capable of detecting displaced showers produced by LLP decays. The MD are composed of detector planes interleaved with the steel layers of the magnet flux return yoke. Decays of LLPs in the MD induce hadronic and electromagnetic showers, giving rise to a high hit multiplicity in localized detector regions that can be efficiently

identified with a novel reconstruction technique. Additionally, the steel layers allow for exceptional background shielding from the SM which dominates existing LLP searches. This search is largely model-independent, can detect LLP masses as low as a few GeV, and is sensitive to many final states including hadrons, taus, electrons, and photons. Starting in Run3, a new high level trigger was developed for LLP searches allowing for a higher event rate and access to a larger kinematic regime. Using a partial dataset from Run3 and the new trigger, we present a sensitive measurement of the LLPs proper lifetime from 0.1m to 1000m.

Category Type: Experimental

Newsworthy Research? No

Order	Name	Role	Email	Affiliation	Presentation	Action
001	Paul W. Simmerling	Speaker	psimmerl@caltech.edu	Caltech		Submitter
002	Christina Wang	Co-Author	cwang5@caltech.edu	Caltech		
003	Si Xie	Co-Author	sixie@caltech.edu	Caltech		
004	Cristián Peña	Co-Author	cmorgoth@fnal.gov	FNAL		
005	Maria Spiropulu	Co-Author	smaria@caltech.edu	Caltech		

Will this session be presented at the in-person meeting or the virtual meeting? In-person (April 15 - 18, 2023)

Submission Type Poster Abstract

Sorting Category: F Particles and Fields (DPF)

Sub-Category: F15 Beyond Standard Model Physics (NonSUSY)

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Abstract Title: Search for Neutral Long-lived Particles Decaying in the CMS Muon Detectors with Run3

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