Contribution ID: **73** Type: **not specified**

Long-lived ALPs in Top Production

Wednesday 13 December 2023 09:30 (15 minutes)

We investigate the discovery potential for long-lived particles produced in association with a top-antitop quark pair at the (High-Luminosity) LHC. Compared to inclusive searches for a displaced vertex, top-associated signals offer new trigger options and an extra handle to suppress background. We propose a search strategy for a displaced di-muon vertex decaying in the tracking chambers, calorimeter or the muon chambers, in addition to a reconstructed top-antitop pair. Such a signature is predicted in many models with new light scalars or pseudo-scalars, which generically couple more strongly to top quarks than to light quarks. For axion-like particles with masses above the di-muon threshold and below the $b\bar{b}$ threshold, we find that the (High-Luminosity) LHC can probe effective top-quark couplings as small as $c_{tt}/f_a = 0.03(0.01)$ TeV^{-1} and proper decay lengths as long as 10 (400) m, with data corresponding to an integrated luminosity of 150 fb^{-1} (3 ab^{-1}).
In this talk I will present a summary of the phenomenology study of long-lived axion-like particles in $t\bar{t}$ events at the (High-Luminosity) LHC, and the on-going analysis to search for this signature in CMS.

Primary authors: BLEKMAN, Freya (DESY/University of Hamburg); NIEDZIELA, Jeremi (DESY); ALIMENA, Juliette (CMS (CMS Fachgruppe Searches)); RYGAARD, Lovisa (CMS (CMS Fachgruppe Searches))

Presenter: RYGAARD, Lovisa (CMS (CMS Fachgruppe Searches))

Session Classification: Searches Parallel

Track Classification: Parallels: Searches