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Reinterpretation of CMS search for LLPs using endcap muon detectors

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We present the recast and sensitivity projection in a large number of benchmark models, significantly extending the physics scope of the recent search for LLPs using the CMS endcap muons detector (https://arxiv.org/abs/2107.04838). The search uses the endcap muon detectors as sampling calorimeter to identify displaced showers produced by decays of long-lived particles (LLPs). The exceptional shielding provided by the steel return-yoke interleaved between the CMS muon detector stations drastically reduces the SM background that limits other existing searches. We present a new dedicated Delphes module for fast detector response simulation of the muon detector showers. The Delphes module can be used to recast this analysis to any BSM model that predicts the existence of LLPs. I will show the recast and projected sensitivity of this search, using the Delphes module, in a few benchmark models. We show that this new search approach is sensitive to LLPs as light as a few GeV, and can be complementary to proposed and existing dedicated LLP experiments.

Author: WANG, Christina Wenlu (California Institute of Technology (US))

Presenter: WANG, Christina Wenlu (California Institute of Technology (US))

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