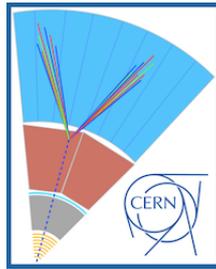


Searching for long-lived particles at the LHC and beyond: Eighth workshop of the LHC LLP Community



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Long-lived Sterile Neutrinos at the LHC in Effective Field Theory ($12'+3'$)

Thursday 19 November 2020 16:05 (15 minutes)

We study the prospects of a displaced-vertex search of sterile neutrinos at the Large Hadron Collider (LHC) in the framework of the neutrino-extended Standard Model Effective Field Theory. The production and decay of sterile neutrinos can proceed via the standard active-sterile neutrino mixing in the weak current, as well as through higher-dimensional operators arising from decoupled new physics. If sterile neutrinos are long-lived, their decay can lead to displaced vertices which can be reconstructed. We investigate the search sensitivities for the ATLAS/CMS detector, the future far-detector experiments: AL3X, ANUBIS, CODEX-b, FASER, MATHUSLA, and MoEDAL-MAPP, and at the proposed fixed-target experiment SHiP. We study scenarios where sterile neutrinos are predominantly produced via rare charm and bottom mesons decays through minimal mixing and/or dimension-six operators in the ν SMEFT Lagrangian. We perform simulations to determine the potential reach of high-luminosity LHC experiments in probing the EFT operators, finding that these experiments are very competitive with other searches.

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