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Looking for Beyond Standard Model short-lived particles with secondary production

Many Beyond Standard Model (BSM) physics scenarios contain new long-lived particles (LLPs), leading to interesting experimental signatures such as e.g. highly-displaced decay signatures. Examples of such minimal models are so-called portals which include coupling of New Physics particle to SM particles through a renormalizable interaction. Going beyond such simple realisations of BSM physics, one can introduce non-minimal particle content where lighter particle can upscatter into heavier one in front of the detector, leading to interplay between short and long-lived regimes. We illustrate the prospects of such searches in FASER, MATHUSLA and SHiP for a representative models with inelastic dark matter, neutrino dipole portal and dark neutrino portal, among others. We also study signatures consisting of scattering off electrons or nuclei in tungsten detector followed by the decay outside both tungsten detector and the decaying vessel or inside tungsten detector, respectively.

Scheduling Preferences

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