Scalars 2023

Contribution ID : 53

Sub-GeV dark axion portal at FASER2

Saturday 16 Sep 2023 at 09:00 (00h15')

Content :

We investigate the dark axion portal, a connection between an axion-like particle (ALP), a photon, and a dark photon, in past and future intensity frontier detectors, such as FASER2, MATHUSLA, and SHiP. We expand on previous works by considering several mass regimes for the Dark Sector (DS) particles, resulting in an extended lifetime range for the unstable species. We also account for LLP production through vector meson decays, which have been previously overlooked but actually contribute dominantly to the LLP yield. Additionally, we investigate secondary LLP production, achieved through Primakoff-like upscattering of lighter DS particles into LLPs on tungsten layers of the FASERν2 neutrino emulsion detector. This process enables FASER2 to explore a substantial portion of the parameter space with $\gamma c\tau \sim 1$m, which is otherwise challenging to investigate due to the significant (~O(100 m)) distance between the primary LLP production point and the decay vessel.

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Session classification : Parallel Session 8

Track classification : --not yet classified--

Type : --not specified--