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Search for low mass dark matter at DUNE

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Various cosmological and astrophysical observations strongly support the existence of the Dark Matter (DM) with an abundance of $\approx 27\%$. Recent theoretical work has highlighted the motivations for sub-GeV dark matter candidates that interact with ordinary matter through new light mediator particles, called “vector portal” model. Recently, a great deal of interest has been paid to the possibility of studying these models at low energy, fixed-target experiments. Such sub-GeV (or light) dark matter particles are difficult to probe using traditional methods of dark matter detection, but can be copiously produced in Long Baseline Neutrino Facility (LBNF). The DM particles can then be detected through neutral-current like interactions either with electrons or nucleons in the detector. Since the signature of DM events looks just like those of the neutrinos, the neutrino beam provides the major source of background for the DM signal. Several ways have been proposed to suppress neutrino backgrounds by using the unique characteristics of the DM beam. In addition, since the electrons struck by DM will be much more forward direction, the angle of these electrons may be used to reduce backgrounds, taking advantage of fine angular resolution DUNE can provide. In this talk we will discuss the capabilities of searching Dark Matter produced in high intensity proton beams at LBNF using DUNE near detector

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