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(I) Prospects for Long Lived Particle searches with MATHUSLA

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Although Long Lived Particles (LLPs) are predicted in many models of physics beyond the Standard Model, general purpose accelerator-based experiments are limited in their ability to directly detect them, as they typically decay outside of the tracking acceptance of the detectors. While “missing energy” searches are possible, these are limited in scope by resolution effects and high background rates, particularly for the relatively light masses of LLPs favoured by many “dark sector” models. MATHUSLA is a dedicated LLP detector proposed for the HL-LHC, designed to directly detect the decays of LLPs across a broad range of masses and lifetimes. The detector is foreseen as a 100mx100mx25m instrumented decay volume constructed on the surface approximately 100m from the CMS interaction point. Decays of LLPs within this volume are reconstructed and vertexed by tracking their decay products. In this presentation I will present the physics case for such an experiment, and discuss the ongoing detector development activities within Canada and internationally.

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