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Prospects for Long Lived Particle searches with the MATHSULA experiment

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Long Lived Particles (LLPs) are predicted in many models of possible physics beyond the Standard Model which seek to explain key questions in modern physics. The MATHUSLA experiment is a proposed LLP detection experiment for the CERN Large Hadron Collider (LHC). Consisting of a large decay volume instrumented with layers of scintillator tracking detectors positioned on the surface approximately 100m from one of the LHC interaction points, MATHUSLA seeks to reconstruct the decay vertices of neutral LLPs which penetrate the LHC overburden to decay within the MATHUSLA detector volume. Planning is currently underway for a 10m x 10m x ˜16m demonstrator module, which may ultimately become the first of 16 such modules comprising a 40m x 40m detector (referred to as "MATHUSLA-40"). The physics motivation and expected sensitivity for this detector will be presented, and ongoing MATHUSLA detector development work will be summarized.

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