

MATHUSLA detector prototyping

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The MATHUSLA collaboration has proposed to construct a large area detector on the surface above the CMS experiment. Such a detector would search for long-lived exotic particles produced in the pp collisions at the LHC. In order to maximize acceptance and sensitivity, MATHUSLA intends to instrument a large surface area with multiple layers of scintillator bars. The massive scale of the detector requires a high level of modularity and cost efficiency in the design. To achieve these goals, MATHUSLA will use extruded scintillator bars with WaveLength Shifting Fibre (WLSF) threaded through for light collection. This results in a basic detector unit of 2.5m long scintillator bars threaded with a WLSF that terminate at SiPMs on either end. These units are combined into increasingly larger mechanical assemblies to construct the modular MATHUSLA detector layers. At the University of Victoria we are making use of a desktop darkbox as well as MATHUSLA prototype detector made of 4 MATHUSLA-like layers of scintillator to characterize the performance of the various WLSF compounds, SiPMs, and scintillator dimensions. This talk will present an overview of our test setup, our experiences working with WLSFs and SiPMs in combination, and future plans.

Collaboration

MATHUSLA

Role of Submitter

I am the presenter

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