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Exploring the lifetime and cosmic frontier with the MATHUSLA detector

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The MATHUSLA detector to be installed on the surface above and somewhat displaced from the CMS interaction point (IP) will cover an area of 100X100 sq. meter containing many layers of scintillators planes to establish the space and time coordinates of charged particle tracks. This is an unprecedented detector in terms of size and continuous sensitivity over an area of 104m. This talk describes the present MATHUSLA detector concept that is sensitive to both long-lived particles produced in the LHC collisions in CMS and cosmic ray extended air showers (EAS). The ability to improve significantly cosmic ray studies by adding a 10,000 sq. meter layer of RPCs that have both digital and analogue readout suitable for high-multiplicity EAS events will be discussed.

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