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Cosmic Rays and Neutrinos with POEMMA and EUSO-SPB2 – Clinching Space to Open a New Gateway into Fundamental Physics

Thursday, 23 March 2023 14:10 (5 minutes)

Ultra-high energy cosmic rays (UHECRs) are the most energetic particles ever detected, reaching energies up to more than ten million times the beam energy of the Large Hadron Collider. Extremely energetic astrophysical sources also produce neutrinos up to very-high energies (VHE). Together, these two messengers offer an unparalleled opportunity to probe the most extreme physics in the Universe, including fundamental physics at energy scales that are far out of reach for terrestrial accelerators. The Probe of Extreme Multi-Messenger Astrophysics (POEMMA) is a proposed space-based experiment for observing fluorescence and optical Cherenkov signals from extensive air showers induced by $\gg 20$ EeV UHECRs and $\gg 20$ PeV neutrinos. In going to space, POEMMA will attain a substantial increase in statistics for the highest energy cosmic rays as well as quasi-uniform exposure over the entire celestial sky. POEMMA's design will also feature the capability to rapidly slew in response to transient astrophysical alerts. The upcoming Extreme Universe Space Observatory on a Super Pressure Balloon II (EUSO-SPB2) is a second-generation stratospheric balloon instrument that will serve as a pathfinder mission for space-based observatories such as POEMMA. EUSO-SPB2 is expected to launch from Wanaka, NZ this in Spring 2023. We will discuss the pioneering measurements of POEMMA and EUSO-SPB2 and the promise they offer for accessing fundamental physics.

Please select if remarks will be in person or on zoom

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Do you describe your self as early career?

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POEMMA and EUSO-SPB2

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