

POEMMA: Probe Of Extreme Multi-Messenger Astrophysics

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The Probe Of Extreme Multi-Messenger Astrophysics (POEMMA) has been recently selected by NASA for an in-depth probe mission concept study in preparation for the next decadal survey. POEMMA will combine the well-developed Orbiting Wide-field Light collectors (OWL) concept with the recently proposed CHerenkov from Astrophysical Neutrino Telescope (CHANT) concept to form a multi-messenger probe of the most extreme environments in the universe. POEMMA is designed to establish charged particle astronomy with ultrahigh energy cosmic rays (UHECRs) and to discover cosmogenic tau neutrinos (CTNs). The study of UHECRs and CTNs from space will yield orders-of-magnitude increase in statistics of observed UHECRs and the discovery of the cosmogenic flux of neutrinos for the full predicted range of UHECR models. These observations will solve the long-standing puzzle of the origin of the highest energy particle ever observed, providing a new window on the Universe and on its most energetic environments and events. The discovery of CTNs will help solve the puzzle of the origin of UHECRs and begin a new field of Astroparticle Physics with the study of neutrino properties at energies up to the 10 EeV scale.

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