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## Towards Space Probes of Astrophysical and Cosmogenic Neutrinos

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The Probe Of Extreme Multi-Messenger Astrophysics (POEMMA) mission is being designed to establish charged particle astronomy with ultra-high energy cosmic rays (UHECRs) and to observe astrophysical and cosmogenic neutrinos using both fluorescence and Cherenkov emission from extensive air-showers (EAS). The POEMMA design combines the concept developed for the Orbiting Wide-field Light-collectors (OWL) mission, the experience of the Extreme Universe Space Observatory (EUSO) on the Japanese Experiment Module (JEM-EUSO) fluorescence detection camera as recently flown on EUSO-SPB1 by a NASA Super Pressure Balloon (SPB) from Wanaka, New Zealand, with the recently proposed Cherenkov from Astrophysical Neutrinos Telescope (CHANT) concept to form a multi-messenger probe of the most extreme environments in the Universe.

The fluorescence and Cherenkov study of EASs from space will yield orders-of-magnitude increase in statistics of observed UHECRs at the highest energies and the observation of astrophysical and cosmogenic flux of neutrinos for a range of UHECR models. These observations should solve the long-standing puzzle of the origin of the highest energy particles ever observed, providing a new window onto the most energetic environments and events in the Universe, and on studies of particle interactions well beyond accelerator energies.

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