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## The POEMMA-Balloon with Radio Mission: a pathfinder for space-based multi-messenger astrophysics

The POEMMA-Balloon with Radio (PBR) mission is a pathfinder project for the Probe Of Extreme Multi-Messenger Astrophysics (POEMMA), a proposed dual-satellite observatory designed to explore the highest energy regimes in the Universe. Scheduled for launch in Spring 2027 from Wanaka, New Zealand, PBR will fly aboard a NASA Super-Pressure Balloon for a mission duration of up to 50 days over the Southern Ocean. PBR will employ a novel hybrid focal surface that consists of a Fluorescence Camera and a Cherenkov Camera, augmented by radio antennas, to address three main scientific objectives: to observe Ultra-High-Energy Cosmic Rays via the fluorescence technique from suborbital altitudes, to detect horizontal high-altitude air showers with energies above the cosmic ray knee (E > 3 PeV) using a pioneering combination of optical and radio measurements, and to follow up on multi-messenger alerts from astrophysical transients, such as gamma-ray bursts, in the search for Very-High-Energy Neutrinos.

This contribution presents an overview of the PBR payload and current developments, highlighting its expected performance and role in the future of high-energy cosmic observations.

## Secondary track

T11 - Detectors

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