Contribution ID: 139

Type: Poster

## **POEMMA-Balloon with radio: A balloon born Multi-Messenger Multi-Detector Observatory**

Thursday, 30 May 2024 08:34 (1 minute)

The Probe Of Extreme Multi-Messenger Astrophysics (POEMMA) is a proposed dual-satellite mission to observe Ultra-High-Energy Cosmic Rays (UHECRs) increase the statistics at the highest energies and Very-High-Energy Neutrinos (VHENs) following multi-messenger alerts of astrophysical transient events, such as gammaray bursts and gravitational wave events, throughout the universe.

POEMMA-Balloon with radio (PBR) is a small-scale version of the POEMMA design, adapted to be flown as a payload on one of NASA's suborbital Super Pressure Balloons (SPBs) circling over the Southern Ocean for up to 100 days after a launch from Wanaka, New Zealand.

The main science objectives of PBR are: (1) to observe UHECRs via the fluorescence technique from suborbital space; (2) to observe horizontal high-altitude air showers (HAHAs) with energies above the cosmic ray knee (E>0.5 PeV) using the optical and radio detection for the first time; and (3) to follow astrophysical event alerts in the search of VHENs.

The PBR instrument consists of a 1.1m aperture Schmidt telescope

similar to the POEMMA design with two cameras in its focal surface: a Fluorescence Camera (FC) and a Cherenkov Camera (CC). In addition, PBR has a Radio Instrument (RI) optimized for the detection of EASs (covering the 50-550 Mhz range).

The FC observes UHECR-induced EASs in the ultraviolet (UV) using

an array of 9216 pixels Multi-Anode Photo-Multiplier Tubes (MAPMTs) imaged every 1 µs. The CC uses a 2048-pixel Silicon Photo-Multiplier (SiPM) imager to observe cosmic-ray-induced HAHAs and search for neutrino-induced upward-going EASs. The CC covers a spectral range of 320-900nm with an integration time of 10 ns.

This overview will provide a summary of the mission with its science goals, the instruments, and the current status of PBR.

## **Role of Submitter**

I am the presenter

## Collaboration

PBR

**Primary authors:** Dr OSTERIA, Giuseppe (INFN - Napoli); ESER, Johannes (University of Chicago); OLINTO, Angela (The University of Chicago); BATTISTI, Matteo (APC - CNRS/IN2P3)

Presenter: BATTISTI, Matteo (APC - CNRS/IN2P3)

Session Classification: Detector Techniques for Cosmology and Astroparticle Physics - Poster session

Track Classification: T1 - Detector Techniques for Cosmology and Astroparticle Physics