

Prospects for Cross-correlations of UHECR Events with Astrophysical Sources with Upcoming Space-based Experiments

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Ultra-high energy cosmic rays (UHECRs) are the messengers of the most extreme physics in the cosmos; however, efforts to identify their origins have thus far been thwarted by the fact that they don't point back to their sources. Using statistical studies cross-correlating UHECR arrival directions with astrophysical catalogs, the ground-based Pierre Auger Observatory has reported hints of a correlation (at energies ~ 40 EeV) with nearby starburst galaxies, as well as lower-significance correlations with other classes of astrophysical sources. Space-based UHECR experiments, such as POEMMA and ZAP, will monitor large interaction volumes on the Earth or the Moon, achieving unprecedented exposures at the highest energies and full sky coverage within a few years of mission operation time. We discuss the prospects for a significant detection of a correlation between UHECRs and astrophysical sources with POEMMA and ZAP.

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Collaboration

other (fill field below)

other Collaboration

POEMMA; ZAP

Subcategory

Future projects

Primary authors: VENTERS, Tonia (NASA Goddard Space Flight Center); Dr ROMERO-WOLF, Andres (Jet Propulsion Laboratory); FOR THE POEMMA AND ZAP COLLABORATIONS

Presenter: VENTERS, Tonia (NASA Goddard Space Flight Center)

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