

A TGF with Azimuthal Substructure at the Pierre Auger Observatory

Tuesday, 16 July 2024 12:00 (30 minutes)

The Pierre Auger Observatory, designed to study ultra-high-energy cosmic rays, turned out to be a tremendous instrument for detecting and characterizing Terrestrial Gamma-ray Flashes (TGFs). In contrast to most TGF detections, which are almost exclusively from single locations, the vast array at the Auger Observatory yields upwards of 40 well spaced samples of the entire TGF footprint. As a consequence, we can show for the first time a TGF that is clearly asymmetric with regard to the vertical axis. Additionally, we can now show that the event had an azimuthal substructure with a primary and second peak in fluence in the SE and SW regions, respectively. While tilted TGFs have been predicted in the literature, azimuthal substructure has not. We examine some possible implications for spatial structure at the TGF source, and whether or not other events at the Auger Observatory show evidence of this similar substructure.

Primary authors: ORTBERG, John (University of California, Santa Cruz); PIERRE AUGER COLLABORATION; COLALILLO, Roberta (Istituto Nazionale di Fisica Nucleare)

Co-authors: SMITH, David (University of California, Santa Cruz); DWYER, Joseph (University of New Hampshire)

Presenter: ORTBERG, John (University of California, Santa Cruz)

Session Classification: Atmospheric Electricity