

Abstract Submitted  
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**Study of High-Energy Particles Correlated with Lightning at Utah's Telescope Array Cosmic Ray Observatory** JOHN BELZ, Univ of Utah — It is known that x-ray and gamma radiation is emitted by lightning. This phenomenon has been observed by both ground-based and spaced-based detectors. Recently, cosmic ray physicists studying data collected by the 700 square-kilometer Telescope Array Surface Detector (TASD) have observed energetic elementary particles in coincidence with lightning strikes. A subset of these events contain reconstructable “showers” which point back to the particles' origin in the Earth's atmosphere. This implies that the energetic radiation may for the first time be traced to its source within the lightning strike. The Lightning Mapping Array (LMA) pioneered at Langmuir Laboratories is the ideal instrument to couple with the TASD in order to perform these studies. These LMA's consist of roughly ten VHF detectors spread over hundreds of square kilometers, and detect impulsive radiation from lightning. The sources of these impulses may be reconstructed and used to create a 3-dimensional GPS-timed reconstruction of a lightning strike. The merger of TA and LMA is also the ideal instrument to search for evidence of a more speculative - but more profound - connection between particle astrophysics and climate: The seeding of lightning strikes by cosmic ray air showers.

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