Until very recently, lightning was thought to be an entirely conventional discharge, involving only low-energy (a few eV) electrons. This picture changed completely a few years ago with the discovery of intense x-ray emission from both natural cloud-to-ground lightning and rocket-triggered lightning. This energetic emission cannot be produced by a conventional discharge, and so the presence of x-rays strongly implies that relativistic runaway electrons, accelerated in air by strong electric fields, play a role in lightning processes. The Thunderstorm Energetic Radiation Array (TERA), located at the University of Florida/Florida Tech International Center for Lightning Research and Testing (ICLRT) at Camp Blanding, FL, is currently being constructed to make detailed measurements of x-ray emission from thunderstorms and lightning. Combined with the existing time-correlated (to sub-microsecond accuracy) multiple station electric field, magnetic field, optical and current measurements at the ICLR, TERA allows greatly improved measurements of correlated x-ray, RF and optical emission from both natural and triggered lightning. Indeed, with its 20 currently operating stations, TERA is already providing an unprecedented view of how x-rays are emitted by lightning. When completed this year, TERA will have a total of 32 stations and will be the largest array in the world for such measurements.

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