

Abstract Submitted
for the 4CF10 Meeting of
The American Physical Society

Integrating multi-station radio and electric field measurements to understand lightning¹ RICHARD SONNENFELD, New Mexico Tech Physics Department and Langmuir Laboratory — By correlating the arrival-times of radio-frequency pulses emitted as a lightning leader breaks down air, an excellent three-dimensional, time dependent representation of a growing lightning channel can be realized. This technology has been refined and is referred to as a “lightning mapping array” (LMA). Significantly, the LMA images lightning channels inside of clouds which had hitherto been difficult to understand. Electric field measurements, on the other hand, clearly show when the breakdown of a lightning channel has lead to significant transport of charge from cloud to ground or one part of a cloud to another. The measurements are rich in detail, but were hard to intepret before the lightning mapping array illuminated the location of the channel so clearly. Over the past three years, we have developed a network of electric field measurement systems, the Langmuir Electric Field Array (LEFA), and this summer marks the first time that sufficient stations have been deployed to independently determine the location and quantity of charge transported by a lightning flash. Initial analyses from summer 2010 storms will be presented.

¹Work supported by the National Science Foundation under Grant #CMG-0724771.

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Date submitted: 13 Sep 2010

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