

Abstract Submitted
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High-time-resolution Imaging of Lightning with the Long Wavelength Array JACOB M. HARTMAN, Jet Propulsion Laboratory, RICHARD SONNENFELD, BILL RISON, New Mexico Tech, LWA COLLABORATION — The first station of the Long Wavelength Array (LWA1), located in central New Mexico, is a 10–87 MHz radio telescope composed of 258 electronically steerable crossed-dipole antennas. The LWA1 includes a software correlator capable of imaging the full sky in real time with a five second cadence, or offline with cadences as short as a few milliseconds. Although designed to detect astronomical transients, we serendipitously discovered that this all-sky imager also images lightning. With a 5 ms frame rate, it can resolve the motion of leaders during intracloud flashes. In conjunction with the existing lightning observatories around the nearby Langmuir Laboratory, the LWA1 may also reveal previously undetectable properties of channel formation or current flow in intracloud lightning channels. Looking forward, this work represents a promising new observational technology when applied to lightning research. It suggests that future radio telescopes such as the Square Kilometer Array should be designed with this additional capability in mind.

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