

An anti-coincidence search for cosmic transients with the LWA radio telescopes

Kenneth S. Obenberger*¹, Savin S. Vaghese², and Gregory B. Taylor²

¹ Air Force Research Laboratory, Space Vehicles Directorate, KAFB,
NM, 87117

² University of New Mexico, Albuquerque, NM, USA

We report on a two year long effort to search for coincident transient events in the all-sky images from the LWA1 and LWA-SV radio telescopes located in central New Mexico. Each of the two telescopes is comprised of 256 dual-polarization dipole antennas and are capable of all-sky imaging and beam forming. Typical operation for each site includes the continuous creation of an all-sky images every 5 seconds covering 100 kHz bandwidth.

Previously, the imaging capability of LWA1 was used to search for transients on 5 to 60 second timescales. This search resulted in the discovery of meteor radio afterglows (MRAs), which occur at a rate of about 60 per year. Transients of extraterrestrial origin, if existent, would be hidden behind this terrestrial foreground and be impossible to identify with only one station. However, LWA1 and the newly constructed LWA-SV are close enough to observe the same sky, but far enough to identify foreground sources out to 1500 km, allowing triangulated identification of MRAs, which typically occur at an altitude between 90 and 120 km.

Using both stations we have identified many MRAs, a small number of scintillation events that coincidentally magnified an existing source at both stations, and one transient potentially of extraterrestrial origin. This 850 Jy event was recorded at 34 MHz, lasted for 20 seconds, and was only visible in Stokes I. We will present the evidence obtained from the two NM stations of the LWA and attempt to identify the nature of this candidate cosmic event.