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Initial Results From Project RESUN, A Radio Search For UHE Neutrinos Using The EVLA THEODORE JAEGER, ROBERT MUTEL, KEN-NETH GAYLEY, University of Iowa — The origin, composition, and acceleration mechanism of the highest energy cosmic rays all remain mysteries in astrophysics. However, with measurements indicating an attenuation of the cosmic ray flux for energies greater than $10^{19.6}$ eV, Ultra High Energy (UHE, E > 10^{18} eV) neutrinos may be the only observable indicators of the extreme universe. While the past 20 years have seen numerous experiments aimed at observing these cosmic messengers, no attempts have yielded a detection. In this light, we present the initial results of the Radio EVLA Search for UHE Neutrinos project. RESUN utilizes highly sensitive antennas to monitor the lunar limb for short-duration radio Cerenkov bursts associated with UHE neutrino interactions. With the first 50 hour implementation of the setup described in this paper, we have already improved the lunar-based UHE particle flux upper limit by a factor of 2 for energies greater than 10^{21} eV. A 200 hour observation (beginning September 2009) will achieve as much as a factor of 100 improvement over previous lunar searches, potentially making the first UHE neutrino detection and unraveling the unknown mysteries of intense astrophysical processes. Also discussed is the difference between lunar observations and ongoing Antarctic ice experiments, and how the results from lunar target experiments compare and compliment their terrestrial counterparts.

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