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The NuMoon Experiment: Preliminary results and upper limits on UHE particles

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Ultra-high energy (UHE) particles interacting with the Moon produce particle showers in the regolith. Due to charge asymmetry in the shower front, a short broadband coherent burst of radio emission is produced - via a phenomenon referred to as the Askaryan effect. With ground based radio telescopes, such pulses can be searched for. The LOw Frequency ARray (LOFAR) - a radio observatory located in the Netherlands - is currently the largest radio array operating at frequencies between $110 - 190$˜MHz; an optimum frequency range for Lunar signal search. A pulse search on the near-surface of the Moon is carried out. This requires a proper understanding of the background noise and other factors (like the ionosphere) that could have an adverse effect on the signal. In this contribution, we discuss results from first Lunar observations with LOFAR and the development of a trigger algorithm for future observations. Results from a detailed Monte-Carlo (MC) simulation of the effective lunar aperture for UHE particles and the expected sensitivity to the UHE particle flux are shown.

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