

The NuMoon Experiment: Lunar Detection of Cosmic Rays and Neutrinos with LOFAR

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The low flux of ultra-high-energy cosmic rays (UHECRs) makes it challenging to understand their origin and nature. A very large effective aperture is provided by the lunar Askaryan technique. Particle cascades in a dielectric medium produce radio emission through the Askaryan effect. Ground based radio telescopes are used to search for nanosecond radio pulses that are produced when cosmic rays or neutrinos interact with the Moon's surface. The LOw Frequency ARray (LOFAR) is currently the largest radio array operating at frequencies between 110 – 190-MHz; the optimum frequency range for lunar signal search and 30 – 80-MHz for radio detection of air showers. One minute of observation has been carried out with six LOFAR stations beam-formed towards the Moon. In this contribution, we present some preliminary results of the analysis of the data and a complete description of the analysis steps.

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