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COSMOGENIC NEUTRON DETECTOR (COSMONED): ROVER-BORNE NEUTRON  
SPECTROMETER FOR MAPPING LUNAR WATER ICE

**Abstract**

The paper presents the design concept, status, and the expected performance of the Cosmogenic Neutron Detector (CosmoNeD) prototype. CosmoNeD is a small neutron spectrometer module under development for lunar surface exploration and resource prospecting on small to medium sized rovers. Its objective is to measure the abundance of hydrogen bearing compounds and particularly to map water ice in lunar regolith and rocks for planetary geology studies as well as In Situ Resource Utilization (ISRU) missions. Based on the recent scintillator CLYC and solid-state photodetector technologies, CosmoNeD will have a compact form as opposed to the bulky He-3 gas counter detectors that has widely been used in neutron detection applications. CosmoNeD will also have the capability of measuring both low energy neutrons and gamma rays, and in this regard, it will serve as a dual detector. Integration and testing of the engineering model, and preliminary results from benchmarking simulations using the GEANT4 Monte Carlo toolkit are described.