

Opportunity Title: Solar System Exploration: Modeling the Effect of Topography on Radiation Exposure at Airless Bodies

Opportunity Reference Code: 0205-NPP-NOV23-GSFC-PlanetSci

Organization

National Aeronautics and Space Administration (NASA)

Reference Code

0205-NPP-NOV23-GSFC-PlanetSci

Application Deadline

11/1/2023 6:00:59 PM Eastern Time Zone

Description

The radiation exposure experienced at the surface and sub-surface of airless bodies in the Solar System is dependent on several factors, including the energy and flux of incident energetic particles from the surrounding space environment, as well as the composition and density of the rocks and regolith forming the surface. However, an important factor that has heretofore been largely neglected is the elevation of the surrounding terrain. Primary radiation from galactic cosmic rays (GCRs) and solar energetic particles (SEPs) incident at the surface comes from all directions, such that the radiation exposure of a patch of surface is dependent on the amount of the sky visible above the elevation of the local horizon. For example, this means that radiation exposure will typically be greater at the rim of a crater compared to its floor. Characterizing the local variation in radiation exposure will have important implications for the interpretation of: space weathering processes, such as regolith damage from ionizing energy loss and dielectric breakdown; the evolution by radiolysis of sequestered volatiles and organics; as well as the planning and operations of future science and exploration activities.

Candidates are sought who are highly competent scientific programmers with experience in data analysis and modeling techniques (proficiency in MATLAB would be desirable). A science background in any of the following disciplines would be beneficial: space radiation, plasma physics, radiolysis, dielectric breakdown, space weathering processes. The project would focus on the Moon due to it being a location of great interest to NASA at present, and would utilize measurements of the Lunar Reconnaissance Orbiter (LRO). However, in the future, there would be substantial scope for targeting other bodies, including the moons of Mars and those of the outer planets.

Location:

Goddard Space Flight Center
Greenbelt, Maryland

Field of Science: Planetary Science

Advisors:

Timothy John Stubbs
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301-286-1524

Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: <https://www.nasa.gov/oair/export-control>.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Eligibility Requirements

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- **Degree:** Doctoral Degree.

NPP

NASA Postdoctoral Program

 ORAU Pathfinder



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