

**Opportunity Title:** Behavior of Electrons in Solar System Water Ices

**Opportunity Reference Code:** 0057-NPP-NOV23-JPL-PlanetSci

**Organization** National Aeronautics and Space Administration (NASA)

**Reference Code** 0057-NPP-NOV23-JPL-PlanetSci

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

**Description** Intense magnetospheric electron and ion bombardment of Jovian and Saturnian icy satellites such as Europa and Iapetus results in highly contrasting surface geology on these bodies. For example, Europa's trailing hemisphere receives far more electron and ion irradiation than the leading hemisphere and these icy surfaces are heavily radiation processed. Recent studies have shown that upon ultraviolet radiation [1,2] electrons are generated within these ices containing organic impurities. The fate of electrons that are released into the ices is under investigation, which forms the theme of this research opportunity.

The NPP colleague will focus on understanding both short-term (nanosecond time scale) and long-term (seconds to days) properties of electrons released through ionization process into the water ices at conditions relevant to outer solar system icy moons. These studies will enable a better understanding of surface processes of icy moons such as Europa and Enceladus, both of which are targets of next flagship missions.

[1] Gudipati, M.S.; Matrix-Isolation in Cryogenic Water Ices: Facile Generation, Storage and Optical Spectroscopy of Aromatic Radical Cations. *JPhysChem A*. 108(2004)4412.

[2] Gudipati, M.S., Allamandola, L.J.; Unusual stability of polycyclic aromatic hydrocarbon radical cations in amorphous water ices up to 120 K: Astronomical implications. *ApJ*. 638(2006)286.

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:** Planetary Science

**Advisors:**

Murthy S Gudipati  
Murthy.Gudipati@jpl.nasa.gov  
818-354-2637

**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



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at: <https://www.nasa.gov/oiir/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

***This opportunity may require the following: 1- Mandatory drug testing; 2-Random drug testing; 3- Testing prior to initiation of fellowship appointment.***

**Eligibility Requirements**

- **Degree:** Doctoral Degree.