

**Opportunity Title:** Electron Impact Studies Relevant to Space Plasmas and Icy Planetary Surfaces

**Opportunity Reference Code:** 0017-NPP-NOV23-JPL-PlanetSci

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

**Reference Code** 0017-NPP-NOV23-JPL-PlanetSci

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

**Description** Electron collisions processes relevant to space plasmas (in upper planetary atmospheres and astrophysical environments) and planetary ices are studied. Plasma related experiments are performed using two main experimental techniques; electron energy loss spectroscopy and electron impact induced emission spectroscopy. In the former, a beam of monochromatic electrons is crossed with a beam of target molecules or atoms and scattered electrons are detected as a function of their momentum (energy and scattering angle). In the latter, experiments can be performed with either a crossed beam arrangement or by passing the electron beam through a 'swarm' of target gas. In either case, fluorescence photons are detected as the target species relax after electron impact excitation. By measuring excitation and emission cross sections we provide the fundamental input to models of space plasmas. Further description of electron energy loss and electron impact induced emission experiments can be found in two recent studies of atomic oxygen, references [1] and [2], respectively. The effects of electron impacts on analog planetary ices are also studied. Ices are created by vapor deposition of gas species on a cryogenic gold mirror. Evolution of the constituent species are monitored using Fourier Transform Infrared Spectrometry and Temperature Programmed Desorption Mass Spectrometry.

References: [1] P. V. Johnson et al., J. .Phys. B: At., Mol.Opt. Phys., 36, 4289-4299 (2003). [2] P. V. Johnson et al., J. .Phys. B: At., Mol.Opt. Phys., 36, 3203- 3218 (2003).

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:**Planetary Science

**Advisors:**

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**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/oiir/export-control>.

Eligibility is currently open to:

- U.S. Citizens;



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- 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**

- **Degree:** Doctoral Degree.