

**Opportunity Title:** Laboratories Studies of UV-Irradiated Titan Stratospheric Ices spanning 0.85 to 200  $\mu\text{m}$

**Opportunity Reference Code:** 0184-NPP-NOV23-GSFC-PlanetSci

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

**Reference Code** 0184-NPP-NOV23-GSFC-PlanetSci

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

**Description** The Astrochemistry Laboratory (691) in the Solar System Exploration Division (690) at NASA's Goddard Space Flight Center (GSFC) seeks a qualified postdoctoral applicant to work in the Spectroscopy for Planetary ICes Environments (SPICE) laboratory. This position is strictly laboratory based, and the aim of the NPP project will be to generate Titan stratospheric ice analogs by performing laboratory transmission spectroscopy spanning the far- to near-IR. The large spectral extent is essential to fully understand the Titan stratospheric ice structural properties.

Titan's stratospheric ice clouds play an important role in both atmospheric and surface processes. These ices, especially the nitriles, contribute significantly to Titan's atmospheric radiative balance. Given the important ramifications that Titan's stratospheric ices have on the thermal and dynamical properties of the atmosphere, along with potentially strong astrobiological implications, it is imperative that the optical and chemical properties of Titan's observed stratospheric ices become known. A dedicated laboratory effort is vital in order to determine the different effects of Titan's stratospheric ice formation processes, and to understand the fundamental changes - both slowly and rapidly developing - that are taking place between winter seasons on Titan.

Exploring alternate ice formation processes from that of vapor condensation, such as solid-state chemistry, will be a large emphasis of this NPP project. Solid-state chemistry offers an explanation for producing an ice in an atmosphere in the presence of its subsaturated vapor. In Titan's stratosphere, the Cassini Composite InfraRed Spectrometer (CIRS) has observed two types of stratospheric ice clouds presumed to form via heterogeneous chemistry or solid-state chemistry -- these ice clouds exhibit distinct stratospheric ice emission features but have no associated vapor emission features, which rules out their formation via vapor condensation processes. The likelihood of solid-state chemistry is much improved in the presence of co-condensation, so the NPP candidate will begin the experiments by studying co-condensed ices prior to evolving to the UV-irradiated heterogeneous chemistry studies. The ice characteristics of the former study must be understood prior to proceeding with the latter study.

**Location:**

Goddard Space Flight Center  
Greenbelt, Maryland

**Field of Science:** Planetary Science



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**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/oijr/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**

- **Degree:** Doctoral Degree.