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Opportunity Title: Multi-Scale Physical Processes and Their Consequences in the Solar Wind and Planetary Magnetospheres and Their Moons
Opportunity Reference Code: 0289-NPP-JUL24-GSFC-Heliophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0289-NPP-JUL24-GSFC-Heliophys

How to Apply All applications must be submitted in Zintellect

Application Deadline 7/1/2024 6:00:59 PM Eastern Time Zone

Description **Description:**

Space plasmas are highly collisionless and involve several temporal and spatial length scales, which makes understanding the physical mechanisms responsible for energy transport and cross-scale couplings between these scales a challenge. These processes result in particle energization, heating and transport through plasma structures and boundaries. These processes can both result in beautiful aurora and destruction of our technological systems.

This research opportunity invites applicants who have background in spacecraft data analysis and/or theory/numerical simulations to study and collaborate in understanding these multi-scale processes and their consequences in the solar wind, Earth's magnetosphere or other planetary magnetospheres using the data from Heliophysics System Observatory spacecraft and ground-based systems, e.g., Magnetosphere Multiscale Mission (MMS) mission, various solar wind missions, and LEO satellites and various modeling tools. This opportunity offers/combines both the large-scale solar-terrestrial system studies (the Forest) and specific, detailed physical processes from MHD scales to kinetic scales (the Trees).

Some specific research topics that are encouraged, but are not limited to:

1) studying the structure and impacts of Coronating Interaction Regions (CIRs) and Coronal Mass Ejections (CMEs) on Earth's bow shock, magnetosheath and physical processes at the magnetopause.

2) study of magnetic reconnection and various plasma instabilities, such as Kelvin-Helmholtz Instability (KHI), drift mirror instability (DMI), fire-hose instability and associated secondary process on particle heating, acceleration and transport within solar wind-magnetosphere system (heliospheric current sheet, CIRs, CMEs, plasma sheet, magnetopause, magnetosheath)

3) Identification of plasma wave modes and study of turbulence and wave-particle interactions on plasma heating and acceleration.

4) Lunar wake interactions with the solar wind and Earth's magnetotail

Field of Science: Heliophysics 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;
- 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

Qualifications We expect the applicant to have a prior experience and detailed knowledge in the use and interpretation of major types of magnetospheric and/or solar wind data, and in utilization and development of data-analysis or modeling tools for space physics data.

Eligibility Requirements

- **Degree:** Doctoral Degree.