Opportunity Title: Astrophysics: Theoretical Multi-messenger Astrophysics
Opportunity Reference Code: 0131-NPP-MAR22-GSFC-Astrophys

Organization	National Aeronautics and Space Administration (NASA)
Reference Code	0131-NPP-MAR22-GSFC-Astrophys
Application Deadline	3/1/2022 6:00:00 PM Eastern Time Zone
Description	In accordance with NASA's Strategic Objective of discovering how the universe works and exploring how it began and evolved, we study hadronic interactions in the most powerful astrophysical objects with the goal of identifying the sources of the highest energy cosmic rays and identifying prospects for multi-messenger observations performed by gamma-ray, neutrino, UHECR, and gravitational wave telescopes. The research involves studying particle acceleration and interactions in astrophysical objects such as active galactic nuclei, gamma-ray bursts, pulsars, and structure formation shocks. The fate of very-high energy gamma rays and ultra-high cosmic rays as they propagate through the infrared, optical, and ultraviolet background and the cosmic microwave background is also researched. In particular, we seek to determine how cascades of particles produced through these interactions impact astrophysical observations conducted at lower energies, especially gamma rays, and to determine the cosmogenic neutrino background. Also of interest are the intervening magnetic fields that deflect charged particles as they propagate over cosmological distances and their resulting impact on the fluctuation angular power of cosmological photon and neutrino backgrounds. Finally, in line with the aforementioned research, we seek astrophysical and observational probes of new physics, including photon-axion oscillations and Lorentz-invariance violation.

Location:
Goddard Space Flight Center
Greenbelt, Maryland

Field of Science: Astrophysics

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:

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- U.S. Citizens;
- U.S. Lawful Permanent Residents;
- Foreign nationals who are in the U.S. at the time of application and on a valid J1 visa; and,
- Foreign nationals, asylees or refugees in the U.S. at the time of application with a valid EAD card and pending I-485 or I-589 forms.

These temporary eligibility limitations have been put in place due to inaccessible U.S. consulates and travel restrictions resulting from the COVID-19 pandemic. Foreign nationals have made many substantive contributions to NASA, as well as to the greater scientific community throughout the life of the NPP. Therefore, we look forward to the time when the program will be open, once again, to all qualified scientists and engineers.

Eligibility Requirements

- **Degree:** Doctoral Degree.