

Opportunity Title: Astrophysics: High Energy Galaxy Surveys

Opportunity Reference Code: 0094-NPP-NOV23-GSFC-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0094-NPP-NOV23-GSFC-Astrophys

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

Description With the advent of the Chandra and XMM-Newton X-ray observatories as well as ground-based gravitational wave detectors, there has been a great increase in the available knowledge concerning compact object (neutron star and black hole) populations in binary systems in normal and star-forming galaxies. Similarly, X-ray calorimeters have shown the promise of high-precision studies of the hot phase of the interstellar medium of galaxies and hard X-ray detectors have placed the best constraint to date on particle acceleration in star-forming environments. The compact object studies include those in our own Milky Way where compact object properties may be studied in depth currently using electromagnetic techniques, and in the future, with space-based gravitational wave observatories such as LISA. The high-energy emission from galaxies (both compact objects and the hot interstellar medium [ISM]) can and will be studied from the local universe to high redshift where compact object populations emit X-ray radiation that may significantly impact the primordial Intergalactic Medium. This research opportunity concerns statistical studies of binary populations both within our own Milky Way as well as galaxies detected in surveys in environments ranging from the field to the most dense galaxy cluster environments. This research opportunity covers work connecting high energy emission (both X-rays and gravitational waves) to measured galaxy properties in the radio, UV, optical and NIR (including star formation histories and metallicities). Example projects that fit well with the above include studies of both compact object mass/luminosity functions as well as galaxy luminosity functions, measurements of ISM properties in star-forming galaxies, constraint of high-energy emission in galaxy groups and clusters, hard X-ray and gamma ray spectral studies of particle acceleration in star forming environments, and studies of super-Eddington accretion. Research projects relevant to missions/instruments such as XARM, Athena, LISA, future wide-field X-ray survey missions, and future hard X-ray ($E > 10$ keV) missions, are particularly encouraged.

Location:

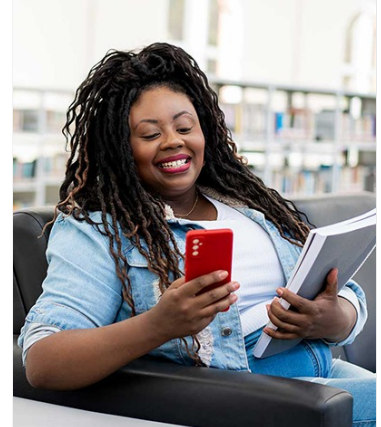
Goddard Space Flight Center
Greenbelt, Maryland

Field of Science: Astrophysics

Advisors:

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Applications with citizens from Designated Countries will not be



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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

**Eligibility
Requirements**

- **Degree:** Doctoral Degree.