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Opportunity Title: Computational Modeling and Data Analysis for X-ray Astrophysics
Opportunity Reference Code: 0280-NPP-MAR26-GSFC-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0280-NPP-MAR26-GSFC-Astrophys

How to Apply All applications must be submitted in Zintellect

Please visit the NASA Postdoctoral Program website for application instructions and requirements: How to Apply | NASA Postdoctoral Program (orau.org)

A complete application to the NASA Postdoctoral Program includes:

1. Research proposal
2. Three letters of recommendation
3. Official doctoral transcript documents

Application Deadline 3/1/2026 6:00:59 PM Eastern Time Zone

Description **About the NASA Postdoctoral Program**

The NASA Postdoctoral Program (NPP) offers unique research opportunities to highly-talented scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed to advance NASA's missions in space science, Earth science, aeronautics, space operations, exploration systems, and astrobiology.

Description:

The conditions near accreting compact objects are very extreme, creating environments which are difficult to replicate in laboratories on Earth. This includes objects such as neutron stars or stellar-mass black holes in binary systems, or supermassive black holes in the active centers of most galaxies, from which large quantities of high-energy radiation are produced. Most of this radiation can be observed in the X-ray band. By modeling the interaction of these X-rays with the gas near the black hole, and how this radiation will be affected after the interaction, it is possible to infer the key physical properties of both compact objects and the surrounding material. Specifically, combining the models with X-ray observations, we can obtain information about the black hole, for example whether it is spinning or not and how fast as well as information regarding the gas nearby, such as its composition, temperature, and dynamics. The accuracy of these models requires collection and curation of atomic parameters, numerical methods for radiative transfer, and detailed calculations of ionization and energy balance. The implementation of these models to interpret observational data requires specialized statistical techniques such as spectral fitting and Bayesian inference. We are actively working on developing and implementing all these tools in a variety of astrophysical problems, which include: measuring black hole spins using reflection spectroscopy; studies of disk-jet-corona connection in accreting sources using spectral-timing

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techniques (X-ray lags, power-spectra analysis, etc.); photoionization modeling of astrophysical plasmas at high-densities; development of advanced spectral-fitting techniques using machine-learning algorithms; to name a few. Importantly, high-resolution spectroscopy, timing analysis, and polarization modeling are currently the foremost aspects in modeling efforts for the next decade.

Field of Science: Astrophysics

Advisors:

Javier Garcia Martinez
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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

Questions about this opportunity? Please email npp@orau.org

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.