

SOLICITATION TITLE: X-ray Spectroscopy of an Accreting Black Hole
SOLICITATION DEADLINE: February 11, 2022
SOLICITATION SPONSOR: Dr. Joey Neilsen
SOLICITATION FUNDING: External (NASA)
SOLICITATION SUMMARY:

Joey Neilsen's research group is seeking a Villanova undergraduate student for the summer research opportunity to work on X-ray spectra of the stellar mass black hole V4641 Sgr as observed by the *NuSTAR* mission. The appointment is for 10 weeks, starting on June 1, 2022. The selected student will learn to extract X-ray spectra from a series of *NuSTAR* observations taken in Fall 2021. The primary goal will be to model the spectra using standard high-energy astrophysics software and to determine the resulting physical parameters (such as the temperature and radius of an accretion disk around the black hole). The student will explore how these parameters change over time. The results of this study will help us understand the physical processes that occur around astrophysical black holes.

SOLICITATION REQUIREMENTS:

The research position is open to all Villanova undergraduates that are majoring in astronomy or a closely related field. Applicants need to provide:

- a current CV that highlights commitment to excellence in the applicant's current field of study;
- a 3-page proposal that discusses the scientific background and proposed work timeline;
- a 1-page narrative on expected outcomes and procedures; and
- a 1-page personal statement that conveys the suitability and interest of the applicant.

To apply for this position, interested students need to submit their applications by the deadline in the form of a single pdf document. Only electronic submissions are accepted; email your applications to jneilsen@villanova.edu. Any applications received after the deadline will be returned without review.

SOLICITATION DOCUMENTS:

In order to prepare a strong proposal, the following sources might be useful:

- NuSTAR proposal and example spectrum, contact jneilsen@villanova.edu for a copy
- NuSTAR [data analysis guide](#)
- [Review](#) of Black Hole behavior
- Example papers on *NuSTAR* observations of black holes:
<https://iopscience.iop.org.ezp1.villanova.edu/article/10.3847/1538-4357/ab7dco/pdf> ;
<https://iopscience-iop-org.ezp1.villanova.edu/article/10.3847/1538-4357/ac1bab/pdf>

SOLICITATION OUTCOME ANNOUNCEMENT:

The review of solicitation material will begin on Feb 11, 2022 and a short-list will be assembled by Feb 20, 2022. The highest-ranking candidate will be informed and offered a position. In the event that the highest-ranking candidate accepts the position, the solicitation will be closed. Otherwise the position will be offered to the next highest ranking applicant until the position is filled.