

Aliaksandra (Sasha) Levina

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Research Interests	Gravitational wave astrophysics, black hole and neutron star merger rates and properties, binary and stellar evolution; I am interested in how gravitational waves can be used to study the properties of double compact objects and their progenitors in order to better understand stellar and binary evolution over cosmic history.	
Education	Johns Hopkins University , Baltimore, MD Ph.D. , Astronomy (expected 2028) Advisors: Floor Broekgaarden, Emanuele Berti	August 2023 - present
	Haverford College , Haverford, PA B.S. , Astronomy & Physics Concentration: Scientific Computing Senior thesis: “Applying Wind Roche-Lobe Overflow in Binary Evolution using MESA and POSYDON”	August 2019 - May 2023
Research	<i>Effect of the Metallicity-Dependent Star Formation Rate History on Binary Black Hole Merger Population</i> Johns Hopkins University, Baltimore, MD Advisors: Floor Broekgaarden, Emanuele Berti	August 2023 - present
	<ul style="list-style-type: none">• Use the rapid population synthesis code COMPAS to model assumptions for the star formation rate density and cosmic chemical enrichment and their impact on the merger rates and properties of binary black holes (BBH)• Test the effect of assumptions in the IllustrisTNG cosmological simulations on the BBH merger rates and primary mass distribution	
	<i>Modeling Wind Roche-Lobe Overflow in Binary Evolution</i> Northwestern University, Evanston, IL CIERA REU Advisors: Vicky Kalogera, Meng Sun, Zoheyr Doctor	June 2022 - May 2023
	<ul style="list-style-type: none">• Implemented a new physical mechanism for wind mass-transfer into the stellar evolution simulation code MESA (Modules for Experiments in Stellar Astrophysics) and the detailed binary population synthesis code POSYDON (POPulation SYnthesis with Detailed binary-evolution simuLatiONs)• Simulated and analyzed binary system evolution using MESA• Used the Quest High-Performance Computing Cluster to run population synthesis simulations using POSYDON• The work culminated in a senior thesis, and a paper submitted to AAS Journals November 2023	
	<i>Analyzing Crab Pulsar X-ray Emission</i> Haverford College, Haverford, PA Advisor: Andrea Lommen	June 2020 - May 2023
	<ul style="list-style-type: none">• Developed code in Python and used a high-performance Linux computing cluster to analyze data and construct plots using observational data• Developed a script that efficiently calculates pulse phases for pulsar timing data	

	<ul style="list-style-type: none"> • Contributed code to the NANOGrav pulsar timing analysis software PINT • Used NICERSoft, HEASoft, and PINT to download and process data • Used Bayesian statistics to fit models to observational data • Utilized large quantities of pulsar timing data from NICER (Neutron star Interior Composition ExploreR)
Publications	Sun, M., Levina, S. , Gossage, S., Kalogera, V., Leiner, E. M., Geller, A. M., Doctor, Z., “The Effects of Wind Roche-lobe Overflow on Binary Evolution.” submitted to AAS Journals.
Awards and Grants	<div>William H. Miller III Graduate Fellowship 2023 Johns Hopkins University</div> <div>NSF Research Experiences for Undergraduates 2022 Northwestern CIERA REU</div>
Poster Presentations	<p>“The effect from uncertainties within cosmological simulations on the binary black hole merger population”</p> <ul style="list-style-type: none"> • Nordic Winter School on Multimessenger Astrophysics, Skeikampen, January 2024 <p>“Applying wind Roche-lobe overflow in binary evolution using MESA and POSYDON”</p> <ul style="list-style-type: none"> • Senior thesis poster session, Haverford College, May 2023 • 241st Meeting of the American Astronomical Society, January 2023 • Summer research symposium, Haverford College, September 2022 • CIERA REU poster session, Northwestern University, August 2022 <p>“Pulse-to-pulse intensity modulation of the Crab Pulsar using NICER”</p> <ul style="list-style-type: none"> • NANOGrav 2022 Fall Meeting, University of Wisconsin-Milwaukee, October 2022 <p>“Pulse-to-pulse intensity modulation of three X-ray pulsars using NICER data”</p> <ul style="list-style-type: none"> • NANOGrav 2021 Fall Meeting, Vanderbilt University, October 2021 • Summer research symposium, Haverford College, September 2021 • 237th Meeting of the American Astronomical Society, January 2021 • NANOGrav 2020 Fall Meeting, October 2020 • Summer research symposium, Haverford College, September 2020
Outreach	“Physics and astronomy research talks” and “Careers in STEM” Q&A panel at City Neighbors High School, December 2023
Skills	<ul style="list-style-type: none"> • Programming Languages: Python, Fortran, MatLab, HTML, CSS • Operating systems: Windows OS, Linux • Software: LaTeX, GitHub, Mathematica • Other: High-Performance Computing Clusters
Professional Memberships	American Astronomical Society American Physical Society Society of Physics Students and Sigma Pi Sigma Physics Honor Society