

Curriculum Vitae

Shalini Ganguly
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Languages: English (native fluency), Bengali (native fluency), Hindi (fluent)

Academic Background

2017-2022	PhD. Astronomy, University of Nevada Las Vegas, USA
2015-2017	M.Sc. Physics, Indian Institute of Technology Hyderabad, India
2012-2015	B.Sc. Physics, Calcutta University, India

Professional Appointments

2023-	Postdoctoral Scholar Astrophysics, University of Nevada Las Vegas
2022-2023	Postdoctoral Research Associate, University of North Texas
2017-2022	Graduate Teaching Assistant, University of Nevada Las Vegas
2017-2021	Summer Research Assistant, University of Nevada Las Vegas

Research Interests

- Formation and dynamics of accretion disks in binary star systems.
- State transitions in low mass X-ray binaries (LMXBs).
- Feedback and outflows from active galactic nuclei (AGN) using magnetohydrodynamic simulations; generating synthetic line profiles for comparison with observation.
- Cloud formation and dynamics in winds and outflows, and self-regulating feedbacks in accretion disks.
- Dynamics and plasma physics of intracluster medium/circumgalactic medium of galaxy clusters.
- Simulating sustained supercritical accretion in high-redshift galaxies.

Publication List

- **S. Ganguly**, T. Waters, D. Proga, *Resolving clumpy ultrafast outflows using adaptive mesh refinement*, in preparation.
- **S. Ganguly**, Yuan Li, Valeria Olivares, Yuanyuan Su, Francoise Combes, Sampadaa Prakash, Stephen Hamer, Pierre Guillard, and Trung Ha, *The Nature of the Motions of Multiphase Filaments in the Centers of Galaxy Clusters*, *Frontiers in Astronomy and Space Sciences*, vol. 10, id. 1138613 (2023).
- **S. Ganguly**, D. Proga, T. Waters, R. C. Dannen, S. Dyda, M. Giustini, T. Kallman, J. Raymond, J. Miller and P. Rodriguez-Hidalgo, *On Synthetic Absorption Line Profiles of Thermally Driven Winds from Active Galactic Nuclei*, *ApJ* 914 114 (2021).
- **S. Ganguly**, D. Proga, *On the wind-driven relaxation cycle in accretion disks*, *The Astrophysical Journal*, Volume 890, Issue 1, id.54, 8 pp. (2020).
- **S. Ganguly**, S. Desai, *Statistical significance of spectral lag transition in GRB 160625B*, *Astroparticle Physics*, Volume 94, p. 17-21. (2017).

Research Experience

Postdoctoral Research

2022-

Department of Physics and Astronomy, University of Nevada Las Vegas

- Developing adaptive mesh refinement criteria to simulate growing modes of thermal instability in ultrafast

outflows of AGN.

Department of Physics, University of North Texas

- Wrote a python script to assimilate data from HST MUSE and ALMA observations to analyse turbulence traced by gases in H- α filaments of galaxy clusters. Carried out a quantitative analysis of turbulent heating against radiative cooling using optical H- α data from MUSE, as a counterpart of the X-ray analyses prevalent in the literature.
- Worked towards developing a radiation hydrodynamics module to carry out mesoscale simulation of sustained super-critical accretion in 3D, in high-redshift galaxies.

Doctoral Research

(2017-2022)

Department of Physics and Astronomy, University of Nevada Las Vegas

- Doctoral thesis titled “The Effects of Winds on Accretion Disks and Spectra of X-ray Binaries and Active Galactic Nuclei”, under the supervision of Dr. Daniel Proga.
 - Studying thermal instability-generated clumps in AGN outflows via synthetic absorption line profiles. Wrote a pipeline in python to interface with photoionization calculation code XSTAR and magnetohydrodynamics code ATHENA++, to generate synthetic absorption line profiles for 1D radial outflows.
 - Modelling Compton-heated disk winds in black hole binary or AGN systems. Wrote a python code to simulate the self-regulating accretion-wind feedback system for several coupling parameters.

Graduate Research

(2015-2017)

Department of Physics. IIT, Hyderabad

- Master’s thesis titled “Triplet Fermion in the light of neutrino mass and dark matter”, under the supervision of Dr. Narendra Sahu.
- Analysed the statistical significance of the gamma ray burst (GRB) time lag data, claimed to justify the loop quantum gravity proposition of Lorentz invariance violation (LIV).

National Center for Radio Astrophysics (NCRA), Pune, India

- Summer project titled “Semi-numerical model of reionization”, under the supervision of Dr. Tirthankar Roychowdhury. Wrote a FORTRAN99 code to locate centers of ionization bubbles during the epoch of reionization, by post-processing results from a 3D grid of data generated by IGM evolution code CITE.

Contributed Talks

- Dissertation talk at the 241st AAS Meeting (in-person), titled “The Effect of Winds on Accretion Disks and Spectra of XRBs and AGNs”, on January 10, 2023.
- Online Seminar at Indian Institute of Technology Hyderabad, titled “On Synthetic Absorption Line Profiles of Thermally Driven Winds from AGN”, on June 2, 2022.
- Online Seminar ‘Neem’ at Inter-University Center for Astronomy and Astrophysics (IUCAA), Pune, India, titled “On Synthetic Absorption Line Profiles of Thermally Driven Winds from AGN”, on September 30, 2021.

Poster Presentations

- Relativistic Astrophysics, Theory and Observational Perspectives virtual symposium on 16-19 March, 2021, organized by CTP PAS, Warsaw, Poland.
- Polarized Radiation near Supermassive Black Holes virtual conference on May 10-13, 2021, organized by Princeton Center for Theoretical Science, Princeton University, NJ, USA.

Conferences and Workshops

- Exploring the Hot and Energetic Universe: The Third Scientific Conference Dedicated to the ATHENA X-ray Observatory, held at the Cosmo Caixa’s Museum, Barcelona, from November 7-10, 2022 (hybrid meeting).
- Black Hole Accretion Disc Winds meeting, organized by Durham University, London, from September 6-9, 2021 (hybrid meeting).
- European Astronomical Society (EAS) Annual meeting, from June 28-July 2, 2021 (virtual conference).
- AtomDB Workshop and Advanced Spectroscopy School, from August 3-5, 2020, organized by Harvard-Smithsonian Center for Astrophysics (virtual meeting).

- Advancing Theoretical Astrophysics (ATA) workshop, from July 15-26 2019, at Anton Pannakoek Institute for Astronomy, University of Amsterdam, Netherlands.
- Winter School in Astronomy/Workshop on Stellar Clusters (Feb 2017), organized by Western University, Canada (IAU), YPCST and B.M.Birla Science Center, Hyderabad, India.
- Introductory course in Astronomy (2013-14) at the M.P.Birla Planetarium, Kolkata, India.
- UGC sponsored national seminar (2013) on Recent Advances in the Frontiers of Physics, organized by Department of Physics, Bidhannagar College, Saltlake, Kolkata, in collaboration with Indian Association for the Cultivation of Science, Jadavpur, Kolkata.

Mentorship Experiences

- Mentored a Texas Academy of Mathematics and Science (TAMS) fellow, at University of North Texas, on Fall 2022, leading to co-authorship in a published research article.
- Mentored a Physics undergraduate at University of North Texas for the Senior Research Thesis. The research project was selected for an oral poster presentation at the Conferences for Undergraduate Women in Physics (CUWiP), hosted by the American Physical Society (APS).
- Volunteered in Graduate Professional Student Association (GPSA)/Consolidated Students of UNLV (CSUN) Mentorship Co-op program for the term Spring 2022; assigned to mentor Mr. Rashad Hall, Department of Mathematics, UNLV, on general academic advises.

Other Scientific Appointments

- Panelist on the NASA Astrophysics Theory Program (ATP) review panel.

Other Academic Achievements

- Secured All India Rank of 102 in CSIR-UGC NET (National Eligibility Test), and qualified for the Joint Research Fellowship (JRF).
- Secured All India Rank of 286 in Joint Admission for M.Sc. exam, among ~ 9000 students appearing for the exam.

Computing Experiences

Languages	C/C++, Python, FORTRAN
Scientific Softwares	ATHENA++
Visualization softwares	Matplotlib, VisIt, yt
Python libraries	Astropy, scikit-learn, Numpy, Scipy
Developer tools	Github, Bitbucket
HPC clusters	NASA Pleiades, TACC Stampede2