

LAKSH GUPTA

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Pursuing Master of Science in Astrophysics at [Argelander-Institut für Astronomie](#), University of Bonn. Currently working on understanding the effect of the environment on galaxy evolution. This work is being supervised by [Prof. Dr. Cristiano Porciani](#) and [Dr. Mohammadreza \(Reza\) Ayromlou](#).

EDUCATION

Master of Science in Astrophysics, [University of Bonn](#), Germany October 2025 - October 2027

- Expected GPA - 1.4 (highest: 1.0, lowest: 4.0), quantitative meaning: **very good**
- Awarded the **full scholarship** of [Bonn-Cologne Graduate School of Physics and Astronomy](#).

Bachelor of Science (Honors) in Physics, [Ahmedabad University](#), India August 2020 - December 2024

- GPA - 3.3 (highest: 4.0, lowest: 1.7), quantitative meaning: **very good**
- Minor in Mathematics.

RESEARCH INTERESTS

Galaxy formation and evolution | Galaxy clusters and groups | Large-scale structure | Numerical simulations

RESEARCH EXPERIENCE

Master's Thesis - Cold Gas Stripping in L-GALAXIES October 2026 - October 2027

Supervisors: [Prof. Dr. Cristiano Porciani](#) & [Dr. Mohammadreza Ayromlou](#) [Argelander-Institut für Astronomie](#)

- Aim is to develop a novel mechanism for implementing environmental stripping effects in the L-GALAXIES galaxy formation model.

Research Internship - Study on Environmental Dependence of Galaxy Evolution March 2026 - Present

Supervisors: [Prof. Dr. Cristiano Porciani](#) & [Dr. Mohammadreza Ayromlou](#) [Argelander-Institut für Astronomie](#)

- This project studied the interplay of AGN feedback and environmental processes in galaxy evolution, from small to large scales.
- Built a Python pipeline to classify and analyze galaxies based on not only their own properties, but also the characteristics of their local background environment. Ram pressure and specific star-formation rate estimates were then used to quantitatively estimate quenching.
- Worked with hydrodynamical simulations such as IllustrisTNG and gained experience in working with big simulation data.
- **In preparation for submitting to A&A by the end of 2026.**

Summer Research Fellow April 2025 - August 2025

Supervisor: [Prof. Blesson Mathew](#) [Science Academies' Summer Research Fellowship](#)

- Conducted a detailed theoretical and observational review on accretion mechanisms in Herbig Ae/Be stars, identifying a switch from magnetospheric to boundary layer accretion.
- Prepared a Python pipeline to produce the largest and most complete catalogue of identified Herbig Ae/Be stars from literature.
- After the fellowship ended (April-June), I continued working at the [IUCAA's ICARD](#) high-performance computing facility at [Christ University, Bengaluru](#) until August.
- I worked on modelling a Herbig Be star with boundary layer accretion mechanism in [RADMC3D](#) to understand forbidden [Ne II] and [Ne III] lines. This was done in collaboration with [Arun Roy](#) (Indian Institute of Astrophysics, Bengaluru) and [Shridharan Baskaran](#) (Tata Institute of Fundamental Research, Mumbai).

- In collaboration with Dr. Annalisa Calamida to refine the star count-crossing time analysis technique developed during my undergraduate thesis.
- A pipeline in Python was written for the analysis. This is unique as it provides star counts and evolutionary times using five parameters (age, mass, envelope thickness, membership probability, and distance modulus), making the predictions more robust.
- This work has been published in *The Astrophysical Journal* ([link](#)).

- Performed star count-crossing time analysis of different evolutionary phases using photometric data of NGC2808 from the HUGS survey.
- Overplotted various BaSTI models (White Dwarf Cooling Models, Isochrones and Evolutionary Tracks) on NUV-optical Color-Magnitude Diagrams to calculate crossing times across different evolutionary phases.
- Created a Python pipeline to systematically analyze stellar populations (White Dwarf Stars, Red Giant Branch Stars, Main Sequence Turnoff Stars) of NGC2808, potentially applicable to other globular clusters.
- Our results indicate that the White Dwarf Sequence in NGC2808 has no bimodality up to 24 magnitude in F275W.

PUBLICATIONS

Gupta, L., Choudhury, S., Calamida, A., Johnson, C. and Nardiello, D., 2025. An Excess of Luminous White Dwarfs in the Peculiar Galactic Globular Cluster NGC 2808. *The Astrophysical Journal*, 994, 97

Gupta, L., Ayromlou, M., Porciani, C., in preparation for submission to A&A.

SKILLS

Observational	BaSTI and MIST Models (White Dwarf Cooling Models, Isochrones, Evolutionary Tracks), Optical and Near-IR Hubble Data Analysis, Color-Magnitude Diagram Analysis, Reddening Estimation
Simulations	Analysis of IllustrisTNG, EAGLE & SIMBA L-GALAXIES
Tools	RADMC3D, VIZIER, xMATCH, TOPCAT, Tracker
Collaborative Tools	TeX, VSCode, git (branching, resolving conflicts)
Programming	Python (h5py, numpy, scipy, pandas, astropy, seaborn, shapely), MATLAB, Java, R, C parallel programming
Communication	Fluent in English (IELTS 7 band), Fluent in Hindi

AWARDS & ACHIEVEMENTS

- Awarded the Bonn-Cologne Graduate School of Physics and Astronomy Scholarship 2025.
- Awarded the Indian Science Academies’ Summer Research Fellowship 2025.
- Qualified IIT-Joint Admission test for Masters (IITJAM) 2025 (top 6% in the country).

CONFERENCES

- Talk at Joint L-Galaxies/GAEA workshop, INAF, Trieste, 30th November - 3rd December 2026 (Upcoming)
- Excess of Luminous WDs in the Globular Cluster NGC 2808 poster ([link](#)) at 24th European Workshop on White Dwarfs, Institute of Science & Technology, Austria, 3rd - 7th August 2026
- Study of White Dwarfs in NGC 2808 using Near-Ultraviolet and Optical data from the Hubble Space Telescope poster ([link](#)) at 43rd Meeting of the Astronomical Society of India, NIT Rourkela, 15th - 19th February 2025

MENTORSHIP EXPERIENCE

- Tutor for *Cosmology* at Argelander-Institut für Astronomie (October 2026 - March 2027)
- Mentored a summer intern in the Astronomy & Astrophysics Group at Ahmedabad University (May 2024 - June 2024)
- Tutor for *Atomic & Nuclear Physics* at Ahmedabad University (January 2024 - May 2024)
- Tutor for *Advanced Writing* at Ahmedabad University (August 2021 - December 2021)

ATTENDED SCHOOLS

- *From Particle Physics to Astrophysics - Cold Dark Matter and Beyond*, [56th Saas-Fee Advanced Course](#), Saas-Fee, Switzerland, 24th January - 29th January 2027 (Upcoming)
- National School on Space Radiation, [Manipal Center Natural Sciences, MAHE](#), Manipal, 16th - 20th September 2024
- School on Solar Physics [Physical Research Laboratory](#), Ahmedabad, 2nd - 6th September 2024

LEADERSHIP AND VOLUNTEERING ACTIVITIES

- Member of the [Diversity, Equity and Inclusion committee](#) at the Argelander-Institut für Astronomie, University of Bonn (April 2026 - Present)
- Part of the [Welcome Buddy Program](#) at the International Office of the University of Bonn (September 2025 - September 2026)
- Presented an experiment to school students on the [National Science Day](#) at Ahmedabad University (March 2024)
- Organized a [Math Fest](#) at Ahmedabad University (November 2023)
- Founded *Ramanujan Math Club* promoting student problem-solving and mathematics at Ahmedabad University (August 2023 - May 2024)
- Represented Physics at Ahmedabad University's [Career Development Centre](#) (May 2023 - May 2024)
- *Student Mitr* - Mentored 15 incoming students to acquaint them with Ahmedabad University's culture (August 2021 - April 2022)
- *Junior Manager* Outgoing Social Sector - Association Internationale des Étudiants en Sciences Économiques et Commerciales ([AIESEC](#)) in Ahmedabad (August 2021 - October 2021)
- Volunteered at [Prabhat Foundation](#) during the COVID-19 pandemic (May 2021 - July 2021)

RELEVANT COURSEWORK

Bachelor of Science: Quantum Mechanics | Atomic & Nuclear Physics | Condensed Matter Physics | Plasma Physics | Nonlinear Dynamics | Computational Mathematics | Linear Algebra | Differential Equations | Multivariate Calculus | Quantum Computing | Complex Analysis | Mathematical Statistics | Advanced Writing

Master of Science: Theoretical Astrophysics (General Relativity & Fluid Dynamics) | Cosmology | Physics of Dense Stellar Systems | X-ray Astronomy | Advanced Laboratory | Galaxy Clusters | Stellar Astrophysics | Interstellar Medium | Astrophysics of Galaxies