

Abhay Kumar Prusty

Fourth-year Undergrad , BS-MS

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Education

Integrated Bachelors & Masters in Physics (Minor in CS)

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH - KOLKATA

6th semester, Department of Physics

Semester Grade Point Average (SGPA): **8.21** (from a maximum of 10)

Cumulative Grade Point Average (CGPA): **7.55** (from a maximum of 10)

WB , India

OCT 2022-Present

Key-Courses: Advanced to QM , General physical Chemistry, Electrostatic and Magnetism, Earth System and Processes, Mathematical methods, Biological Science, Computer Science, Statmech, Thermal Physics

12thGrade - Secondary School

JUPITER HIGHER SECONDARY SCHOOL, Bhubaneswar, ODISHA

2020-21

90.5% in The Council Of Higher Secondary Education , ODISHA

10thGrade - High School

BHAGABATI NODAL HIGH SCHOOL , BELARPUR

2018-19

84.5% in Odisha Board Of Secondary Education , ODISHA

Research Project

Research Intern , TIFR

ADVISORS: Dr. Priyanka Chaturvedi

Colaba, Maharastra, India

June 2025 - July 2025

During my internship at TIFR , effectively reduced and analyzed observational data from the HFOSC spectrograph at the Hanle telescope for two M dwarf stars and made valuable contributions to the ongoing research program focused on understanding stellar flares in active stars (**J16111534**).

Project , INAF - National Institute for Astrophysics

ADVISORS: Shourya Khanna

Torino, Italy

Oct 2024 - Jul 2025
(Remotely)

Contributed to the development of a Python package documenting various **Spiral arm models** for Galactic structure analysis. This project integrates models for masers, radio data, electron density, and spiral arms, including those by Reid (2019), Taylor & Cordes (1992), Levine, Drimmel, Hou et al. (2009) and Poggio . The package is publicly available on my [Github repository](#).

Project , IISER KOLKATA

ADVISORS: Mr. Raghunath Ghara

Kolkata , India

Sept 2024 - Present

Currently engaged in a research project on the **21-cm signal from the Dark Ages and its importance to cosmology**, This work focuses on the theoretical and observational implications of the 21-cm line for understanding the early Universe's structure formation, the evolution of cosmic neutral hydrogen, and the interplay between baryonic matter and dark matter.

During my IIT Bhilai internship, I analyzed Gaia DR3 data for ~5.59 million stars to study the Milky Way's formation. Focusing on metal-poor stars, I examined orbits, kinematics, and metallicity, distinguishing disc and halo stars. Metal-rich stars showed high angular momentum, while metal-poor stars had random orbits, reflecting early galaxy conditions and evolution. Link to my [report](#)

Work Experience

- **Citizen Scientist (Zooniverse):** Analyzed light curves of variable stars (ASAS-SN) and explored supernovae detection (Galaxy Zoo).
- **Space Blogger (Infinity Cosmos):** Authored blogs on space science, covering topics like auroras, Aditya-L1, and Falcon 9 updates.
- **MTIAUA Workshop:** Completed a workshop on citizen science, lunar exploration, and galaxy formation with JWST.
- **Astroflux Member:** Participates in a student community discussing space-related topics in regular sessions.
- **Office bearers :** Was treasurer of IISER Kolkata Kabaddi Club (2023-24)

Publication

- SpiralMap: A Python library/package featuring major Milky Way spiral arm models (Prusty & Khanna, submitted for 2025 to JOSS). Preprint available at [arxiv](#).

Computational Skills

Languages : Python, Html, C(basic), LaTeX, Astrometrica, ADQL(Astronomical SQL), Astropy.

Devices : Windows, Linux

Professional Development

- **Chief Coordinator, Astronomy Department, ScienceOverse:** Led a team of 7-8 members to organize scientific webinars, discussions, and quizzes, including sessions like *Interstellar Habitability: Insights into Exoplanetary Life Potential* by Mr. Priyash Kumar Mistry and *Designing Rovers for Planetary Exploration* by Mr. Sarth Mohan.
- **Editor-in-Chief :** Published the inaugural edition of the magazine **The Scientifical**, showcasing scientific insights and discoveries.

Achievements and Certifications

- **Start-Up Meet 2023** (Dec 2023)
at Indian Institute of Technology, Kharagpur
- **Planetary Defender in DART** (July 2023)
- **National Means Cum Merit Scholarship (NMMS)** (Nov 2017)