Ritabik Banerjee

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Gender: Male **Date of birth:** 29/10/2001 **Nationality:** Indian

WORK EXPERIENCE

[01/08/2024 – Current] **MSc Thesis**

National Institute of Science Education and Research(NISER) [Supervisor - Dr. Tuhin Ghosh]

City: Bhubneshwar | **Country:** India

- Creating Dust Extinction (E(B-V)) templates from the Green et al. 2015 data as a function of line of sight distances. Using the E(B-V) distance dependent templates in the Bayesian Analysis.
- Aims to enhance dust emissivity characterization at far-infrared and submillimeter frequencies. Enhances methodologies for separating cosmic microwave background signals from foreground noise.

[20/03/2024 – Current] **Project Intern**

Stockholm University [P.I. - Dr. Goran Ostlin]

City: Stockholm | **Country:** Sweden

- In this project we try to understand the dynamics of globular clusters in a Blue Dwarf Galaxy. Utilized observational data from the VLT MUSE and the Hubble Space Telescope (HST) images.
- We are working to calculate the velocity and velocity dispersion of the globular clusters using ppXF software using the clean spectra extracted from QFitsView to create the velocity map, which contributes to broader understanding of galaxy evolution.

[25/05/2023 – 25/12/2023] **Project Intern**

Indian Institute of Astrophysics(IIA),Bangalore [P.I.- Dr. Mousumi Das]

City: Bangalore | **Country:** India

Link: https://drive.google.com/file/d/1nGu2Tje3ybdC0P7tGb3j_GUgVrEfvb6y/view?usp=drive_link

- Utilized S4G data from the VizieR catalogue to calculate bulge-to-disk mass ratios for early type spiral and SO galaxies.
- Plans to correlate these ratios with galaxy colors, star formation rates, and specific star formation rates for deeper insights into galaxy morphology and evolution.

[25/05/2023 – 30/07/2023] **Summer Intern**

Indian Institute of Astrophysics(IIA),Bangalore [P.I.- Dr. Mousumi Das]

City: Bangalore | **Country:** India

Link: https://drive.google.com/file/d/1JinYSFt-St1-BphvVGbnfuCN2PcForiZ/view?usp=drive_link

- Utilized GOTHIC survey images to explore double peaks in emission lines, attributing them to overlapping nuclei, outflows, or rotating ionized gas disks. Analyzed SDSS optical spectra and images to probe the origins of these double peaks.
- Employed MaNGA data from SDSS SkyServer to plot color-magnitude diagrams, BPT maps, and other plots, aiming to understand merger effects on galaxy evolution by studying double peaks in dual nuclei galaxies.

[15/03/2022 – 20/10/2022] **Project Intern**

National Institute of Science Education and Research(NISER) [P.I. - Prof. Bedangadas Mohanty]

City: Bhubneshwar | **Country:** India

- Explored RPC detectors for muon detection, gaining knowledge in detector physics, construction, and simulation techniques for gaseous detectors.
- I developed and analyzed RPC models using COMSOL Multiphysics, and utilized Garfield++ for detailed simulations, including energy calculations and structural analysis of detectors.

[17/05/2022 – 17/07/2022] **Summer Intern**

Indian Institute of Science Education and Research(IISER) [P.I. - Dr. Arindam Kundugrami]

City: Kolkata | **Country:** India

- Explored soft matter physics, including Langevin and Einsteinian methods, Brownian motion, and phase transitions.
- Utilized computational methods to calculate concentration thresholds and construct co-existence curves for polymer-solvent solutions, aiming to understand phase behavior in polymer physics and phase transitions.

[20/05/2021 – 25/07/2021]

Online Intern

Joint Institute of Nuclear Research(JINR) [P.I. - Dr. Chitta Ranjan Das]

City: Moscow | **Country:** Russia

Explored universe inflation, leptogenesis, and baryogenesis to understand particle-antiparticle asymmetry. Studied cosmological evolution, and the role of dark matter, aiming to deepen understanding of fundamental universe properties.

SEMESTER PROJECTS

[01/2024 – 04/2024]

Solving the Galactic dynamo Problems using Numerical Methods. [Course: Plasma Physics and Manetohydrodynamics, Supervisor: Dr. Luke Robert Chamandy]

- Utilized RK4 numerical method to solve galactic dynamo partial differential equations (PDEs), focusing on the Alpha-Omega model.
- Simulated variations of key parameters like pitch angle and radial distance over time, aiming to understand the dynamics of galactic magnetic fields.

Link: https://drive.google.com/file/d/1cOMTha_7_o0e9DgCKww6U743G-9oZdeV/view?usp=drive_link

[01/2024 – 04/2024]

Fitting of Radiative transfer equation of Lunar surface from M3 Chandrayan data using Hapke model. [Course: Computational Phyiscs, Instructor: Dr. Subhasis Basak, Supervisor: Dr. Guneshwar Thangjam]

- Analyzed Lunar surface reflectance spectra from M3 Chandrayan Data Cube, extracting key parameters like Single Albedo Scattering and SHOE characteristics.
- Aimed to understand lunar surface properties and contribute to scientific knowledge of lunar geology and processes.

Link: https://drive.google.com/file/d/1spcgIzbths9UdaubUF0bjhSOZ-d9hdnL/view?usp=drive_link

[10/2023 – 12/2023]

Experiment Using 21-cm Radio Telescope [Course - Integrated Physics Advance Laboratory]

- We worked on assembling and data acquisition methods from 21-cm Radio Telescope.
- After data acquisition we tried to observe the HI emission line from data taken of various constellations.

Link: https://drive.google.com/file/d/1rBXT4ID0Zt0-pGuWyyIJ6xIIPm73eA7y/view?usp=drive_link

SEMINARS

IIA Seminar [Indian Institute of Astrophysics,Bangalore,India]

Topic : Identifying the double peaked emission lines and AGN pairs in a sample of merging galaxies from the GOTHIC survey.

IISER Seminar [Indian Institute of Science Education and Research(IISER), Kolkata, India]

Topic : Minimizing the free energy solution and producing the co-existence curve using Numerical Methods.

SUMMER SCHOOLS AND CONFERENCES

[01/06/2023 – 04/06/2023]

Online Summer School Programme [Indian Institute of Astrophysics(IIA), Bangalore, India]

Lectures on Advance topics of Astrophysics and Cosmology with their theoretical and Observational aspects.

[01/06/2022 – 05/07/2022] **Summer School [Indian Institute of Science Education and Research(IISER), Kolkata,India]**

This summer school solely focuses on the topics of Quantum Information and technology.

[13/07/2021 – 21/07/2021] **Online International Summer School [Osaka University,Osaka,Japan]**

Lectures on the basics to advance topics of Astronomy.

International Conference(2021)

Attended the conference in World Environmental Summit 2021

EDUCATION AND TRAINING

[2020 – 2025] **Integrated Masters of Science**

National Institute of Science Education and Research (NISER)

City: Bhubneshwar | **Country:** India | **Field(s) of study:** Physics | **Final grade:** 8.2 CGPA (till 8th semesters)

[2008 – 2020] **High School**

Kendriya Vidyalaya Barrackpore Army,Barrackpore

City: West Bengal | **Country:** India | | **Final grade:** - Secondary Examination(class 10th) : 90.6 %, Higher Secondary (class 12th) : 92.6 %

HONOURS AND AWARDS

[2020] **DISHA Scholarship Awarding institution:** Department of Atomic Energy,GOI

Qualified German A1 Exam Awarding institution: INTERNATIONAL GOETHE INSTITUTE

[2017] **Qualified Pre-Rastrapati Exam Awarding institution:** Bharat Scout and Guides

SOFTWARE AND COMPUTATIONAL SKILLS

Programming Languages

- Proficient in data analysis with Python using modules like numpy, scipy, astropy, and astroquery.
- Skilled in numerical algorithms including ODEs/PDEs solving, fitting methods, and Monte Carlo simulations in Python, with basic knowledge in C/C++ and website designing.

QFitsView, COMSOLE and Garfield++ Simulation

COMMUNICATION AND INTERPERSONAL SKILLS

Team work, Mediating and Intercultural Skills

- Experienced in diverse team settings from research groups to sports and organizing committees, fostering healthy and productive environments.
- Proficient in communicating with faculty and fellow researchers, bridging cultural and personal differences to facilitate effective research collaboration in a diverse environment.

Organizational/ Managerial Skills

- In this 2022,2023 years I have been a integral part of Bengali cultural Festival of NISER.
- In 2023, I am also a integral part of Cultural Fest Tvisha organized in our Institute.