Ritabik Banerjee

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WORK EXPERIENCE

Project Intern

Stockholm University [P.I. - Dr. Goran Ostlin] [20 Mar 2024 – Current]

City: Stockholm | **Country:** Sweden

- In this project we try to understand the dynamics of globular clusters in a Blue Dwarf Galaxy.
- We are trying to calculate the velocity and velocity dispersion of the globular clusters using ppXF software using the clean spectra extracted from QFitsView.

Project Intern

Indian Institute of Astrophysics(IIA),Bangalore [P.I.- Dr. Mousumi Das] [25 May 2023 – 25 Dec 2023]

City: Bangalore | **Country:** India

- 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.

Summer Intern

Indian Institute of Astrophysics(IIA),Bangalore [P.I.- Dr. Mousumi Das] [25 May 2023 – 30 Jul 2023]

City: Bangalore | **Country:** India

- Studied GOTHIC survey Galaxy Images to understand double peaks in emission lines, exploring origins like overlapping nuclei, outflows, or rotating ionized gas disks.
- Analyzed SDSS optical spectra and images, plotted color-magnitude diagrams, BPT maps, and MaNGA data to investigate the causes of double peaks in dual nuclei galaxies, providing insights into merger effects on galaxy evolution.

Project Intern

National Institute of Science Education and Research(NISER) [P.I. - Prof. Bedangadas Mohanty] [15 Mar 2022 – 20 Oct 2022]

City: Bhubneshwar | **Country:** India

- Explored RPC detectors for muon detection, learning detector physics, construction, and simulation techniques, especially in gaseous detectors.
- Developed and analyzed RPC models using COMSOL Multiphysics, and utilized software like Garfield++ for detailed detector simulations, including energy calculations and fundamental structure analysis.

Summer Intern

Indian Institute of Science Education and Research(IISER) [P.I. - Dr. Arindam Kundugrami] [17 May 2022 – 17 Jul 2022]

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.

Online Intern

Joint Institute of Nuclear Research(JINR) [P.I. - Dr. Chitta Ranjan Das] [20 May 2021 – 25 Jul 2021]

City: Moscow | **Country:** Russia

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

SEMESTER PROJECTS

[Jan 2024 – Apr 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.

[Jan 2024 – Apr 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 using Hapke Model.
- Aimed to understand lunar surface properties and contribute to scientific knowledge of lunar geology and processes.

[Oct 2023 – Dec 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.

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

[1 Jun 2023 – 4 Jun 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.

[1 Jun 2022 – 5 Jul 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 Jul 2021 – 21 Jul 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

Integrated Masters of Science

National Institute of Science Education and Research (NISER) [2020 – 2025]

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

High School

Kendriya Vidyalaya Barrackpore Army,Barrackpore [2008 – 2020]

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

HONOURS AND AWARDS

[2020] Department of Atomic Energy,GOI

DISHA Scholarship

INTERNATIONAL GOETHE INSTITUTE

Qualified German A1 Exam

[2017] Bharat Scout and Guides

Qualified Pre-Rastrapati Exam

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

Basic Knowledge of COMSOLE MULTIPHYSICS and Garfield ++ simulation of the gaseous detectors.

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.