Divyansh Tripathi

Nationality: Indian **Date of birth:** 31/12/2003 **Gender:** Male **Phone number:** (+91) 8382002155

Email address: divyansh20@iiserb.ac.in

Website: https://higgs317.github.io/

Work: Indian Institute of Science Education and Research Bhopal Bhauri Bypass Road,Bhauri, 462066 Bhopal (India)

ABOUT ME

BS-MS student majoring in Physics with a minor in Data Science.
Research Interests:

1. Compact Object Evolution and Merger
2. Gamma Ray Bursts, Astrophysical Jets
3. Accretion Disk in astrophysical systems
4. Using Deep Learning to Study Astrophysical Phenomenons
5. Computational Astrophysics

EDUCATION AND TRAINING

BS-MS Dual Degree

Indian Institute of Science Education and Research Bhopal [20/12/2020 – Current]

City: Bhopal | **Country:** India | **Website:** https://www.iiserb.ac.in | **Field(s) of study:** Natural sciences, mathematics and statistics: ● Physics | **Final grade:** 8.49 | **Level in EQF:** EQF level 7 | **Thesis:** EXPLORING POST MERGER FATE OF BNS MERGER REMNANT USING KILONOVA

Link: https://drive.google.com/file/d/1OT71Yo5i0MdSr8t-mIH3EJEoBQaQhZxQ/view?usp=sharing

Relevant Subjects: Introduction to Astronomy and Astrophysics, Cosmology, General Relativity, Numerical Methods in Programming, Quantum Mechanics, Electrodynamics, Classical Mechanics, Machine Learning, Computer Vision and Data Science

PROJECTS

[01/06/2024 – Current]

Exploring Post Merger Fate of BNS Merger Remnant using Kilonova (Master's Thesis)

This thesis studies the relationship between different BNS merger remnants with mass ejected and explores their kilonova signature. We also studied the uncertainty in ejecta mass and velocity fitting formulas from the equal mass BNS merger

[01/07/2024 – 31/08/2024]

Higher Order Numerical Schemes for Hydrodynamics using PLUTO

In this project, I aim to study higher-order numerical schemes (WENO3, WENOZ) for hydrodynamics using PLUTO MHD code. I also performed simulations of 1D and 2D hydrodynamics problems using PLUTO code and studied Shock Tube, Isentropic Vortex, and Rayleigh-Taylor Instability and why higher order schemes are essential.

[01/08/2023 – 01/12/2023]

Applying Deep Learning Techniques to Astronomy

This was a course project as part of the Computer Vision course. In this project, I have used Convolutional Neural Networks(CNN) to make a robust star-galaxy classification model. We have also shown that the model performs better than the models described in the literature.

[20/12/2022 – Current]

Long Term Evolution of Neutron Stars X-ray Binaries using MESA

In this project, I aim to study how the binary and the neutron parameter values are evolving in the X-ray Binary system in which a Neutron star is accreting material from a companion star. I have calculated the critical accretion rate on the accretor in the LXMBs using MESA stellar evolution code and studying the various accretion states of pulsars and the effect of accretion rate on pulsar evolution

[05/10/2024 – 10/04/2025]

Magnetized Shock Discontinuity

In this project, I contributed to improving an existing Monte Carlo simulation code to incorporate variable particle velocity to study particle acceleration and to see how magnetic fields affect the particle spectrum.

PUBLICATIONS

[2024]

A Novel Sector-Based Algorithm for an Optimized Star-Galaxy Classification

The paper introduces a novel sector-based methodology for star-galaxy classification, leveraging the latest Sloan Digital Sky Survey data (SDSS-DR18). By strategically segmenting the sky into sectors aligned with SDSS observational patterns and employing a dedicated convolutional neural network (CNN), we achieve state-of-the-art performance for star galaxy classification.

LIKHIT, A.A.S.R., Tripathi, D. and Agarwal, A.,In The Second Tiny Papers Track at ICLR 2024.

CONFERENCES AND SEMINARS

[03/03/2025 – 04/03/2025] Bhopal, India

Physics Symposium 2025- IISER Bhopal

Poster Presentation on my MS- Thesis Work

Link: https://drive.google.com/file/d/1ggG7M3eGBCSrnJwZAPs9rQVo3jAUmX8v/view?usp=sharing

SKILLS

Technical Skills

- **Astronomical Codes**:- PLUTO, MESA
- **Programming Languages**:- Python , FORTRAN-90 , C , Bash
- **Libraries Used**:- Astropy, Scipy , Pandas, Scikit-Learn , TensorFlow
- **Software**:- Linux, LATEX, SAO DS9 ,Git

HONOURS AND AWARDS

[01/01/2021] Department of Science and Technology (DST)

DST Inspire Higher Education Fellowship

Awarded to top 1% of the students in India who pursue higher education in natural sciences.

SUMMER SCHOOLS

[01/07/2024 – 12/07/2024]

Summer School on Gravitational Wave Astronomy

Organized by the International Centre of Theoretical Sciences(ICTS), Bangalore

[01/07/2022 – 10/07/2022]

Astrophysics Summer School

Organized by Indian Institute of Astrophysics.

RECOMMENDATIONS

Name: Dr. Ritam Mallick | Thesis Supervisor
Master Theis Supervisior
Email: mallick@iiserb.ac.in | **Phone number:** (+91) 7552691205

Name: Dr. Sudip Bhattacharyya | Collaborator
Project Collaborator

Email: sudip@tifr.res.in | **Phone number:** (+91) 02222782925

Name: Dr. Akshay Agarwal | Collaborator
Course Instructor and Project Collaborator
Email: akagarwal@iiserb.ac.in | **Phone number:** (+91) 7552692691