

Esha Sajjanhar

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Education

Integrated PhD in Astrophysics

Aug 2025 onwards

National Centre for Radio Astrophysics, TIFR

Post-Graduate Diploma in Advanced Studies and Research (DipASR [🔗](#))

GPA 3.89/4.0

Ashoka University

Aug 2024 – May 2025

Graduated *Magna Cum Laude* with an advanced major in physics, a minor and thesis in astronomy. Awarded Dean's list for academic excellence in all semesters.

B.Sc. (Hons) Physics

GPA 3.82/4.0

Ashoka University

Aug 2021 – May 2024

Graduated *Magna Cum Laude* and awarded Dean's list for academic excellence in all semesters.

Research Experience

Studying QPOs in GX339-4 using AstroSat

Ashoka University

Post-Graduate Diploma Thesis (Advisor: Prof. Dipankar Bhattacharya)

Aug 2024 - May 2025

- Used X-ray data from AstroSat to study quasi-periodic oscillations (QPOs) in the low mass X-ray binary GX339-4.
- Studied the timing properties of QPOs to understand Comptonisation in the black hole corona.

Multi-Scale Radio Study of NGC 3516

National Centre for Radio Astrophysics

Visiting Students' Research Programme (Advisor: Dr. Preeti Kharb)

May – Jul 2024

- Studied the morphology of the radio jet of the AGN NGC3516 at multiple spatial scales using archival VLA and VLBA data.
- Examined variability of the core of a changing-look AGN to find radio signatures of a changing-look event.

Detecting HI (21 cm) Line Signal Using a Horn Antenna

Ashoka University

Research Assistantship (Advisor: Prof. Dipankar Bhattacharya)

Jun – Aug 2023

- Observed galactic HI line using a low-cost horn antenna and found the spectrum to be in agreement with LAB survey.
- Worked closely on designing an undergraduate lab experiment on using the horn antenna to observe galactic HI.

Evaluating Predictions of Inflationary Models

Old Dominion University

Research Internship (Advisor: Prof. Sául Ramos-Sánchez)

Jul – Sep 2022

- Studied the predictions of various inflationary models and evaluated their agreement with CMB data from Planck.

Projects

Studying the Kosterlitz-Thouless Phase Transition in the 2D XY model

Monsoon 2023

Course: Statistical Physics; Instructor: Prof. Bikram Phookun

Studied the Kosterlitz-Thouless phase transition and its effects on specific heat and vorticity by numerically modelling the 2D XY model.

Modelling Gravitational Effects of Stellar Oblateness

Summer 2022

Advisor: Prof. Bikram Phookun

Analysed the effects of stellar oblateness on stable planetary orbits by measuring their precession numerically.

Modelling Orbits Around Binary Star Systems

Spring 2022

Course: Mathematical Physics I; Instructor: Prof. Vikram Vyas

Evaluated the stability of various possible S-type and circumbinary orbits in a binary star system using an n-body simulation.

Successful Telescope Proposals

GMRT Proposal 48_079 (2025). *Searching for Evidence of Episodic Activity in the Changing Look AGN NGC3516*. PI: **Esha Sajjanhar**. Co-I: Salmoli Ghosh, Preeti Kharb.

NRAO VLBA Proposal VLBA/25A-171 (2024). *Searching for a Parsec-scale Jet in the Changing Look AGN NGC 3516*. PI: **Esha Sajjanhar**. Co-I: Salmoli Ghosh, Preeti Kharb.

Publications

Ghosh, S., Kharb, P., **Sajjanhar, E.**, Pasetto, A., and Sebastian, B., “Magnetic Field in the Lobes of the Seyfert Galaxy NGC 3516: Suggestions of a Helical Field”, The Astrophysical Journal, vol. 989, no. 1, Art. no. 40, 2025.

Bhattacharya, R.; Debnath, A.; **Sajjanhar, E.**; Sardeshpande, S.; Tenorio Hernández, P.; and Torres Heredia, J.R., “Challenging Predictions of Inflationary Models with CMB Data” (2022). 2022 REYES Proceedings.

Teaching Assistant Positions

AST1080: Observing the Cosmos  (Introductory Astronomy Lab)

Spring 2024

Course instructors: Prof. Dipankar Bhattacharya, Prof. Somak Raychaudhury

Ashoka University

Lodha Genius Programme  (Mathematics Module)

Summer 2023

Mentorship programme in science and mathematics for high school students.

Ashoka University

Conferences and Schools

Radio Astronomy Winter School

December 2023

Part of 25 student cohort selected across India

IUCAA-NCRA

11-day school consisting of lectures and experiments in the techniques of Radio Astronomy organized jointly by the Inter-University Centre for Astronomy and Astrophysics (IUCAA) and the National Centre for Radio Astrophysics (NCRA).

Ashoka Student Astronomy Conference

11 November 2023

Organizer & Presenter

Ashoka University

Organized the university's first student conference on amateur Astronomy with a focus on undergraduate research in Radio Astronomy and presented work on using a low-cost radio telescope to observe the 21cm line.

Curves and Surfaces: Geometry and Physical Application

May - Jun 2022

Participant

ICTS, TIFR

Introductory course on geometry and topology with an emphasis on their physical applications to polymers and membranes instructed by Prof. Joseph Samuel.

Nuclear and Particle Physics Mentorship

Aug - Oct 2021

Mentors: Prof Raúl Briceño, Prof Andrew Jackura

Old Dominion University

Introductory course in the paradigms of research in nuclear and particle physics.

Talks and Posters

Talk: Kosterlitz-Thouless Phase Transition in the 2D XY Model

Apr, 2024

2nd place, Meera Memorial Paper Reading Competition

St. Stephen's College, University of Delhi

Poster: Observing Galactic Hydrogen

Feb, 2023

Ashoka Science Research Festival

Ashoka University

Talk: Gravitational Effects of Stellar Oblateness

Meera Memorial Paper Reading Competition

Mar 2023
St. Stephen's College, University of Delhi

Talk: Introduction to Python for Physics

Ashoka Physics Society Annual Workshop

Spring 2024
Ashoka University

Talk: Multi-Messenger Astronomy

Young Scholars Programme for High School Students

Summer 2023
Ashoka University

Leadership Roles

Editor, Ashoka Physics Journal

Headed editorial and website teams for Ashoka Physics Society

Apr 2023 - May 2024

Ashoka University

[Ashoka Physics Journal 2024](#)

[Ashoka Physics Society Webpage](#)

Technical Proficiencies

Astronomical Software and Tools

Optical IRAF, Siril

X-Ray HEASOFT, XSpec, GHATS

Radio AIPS, CASA

Misc. ds9

Programming Languages

Python, Bash

Others

LaTeX

Other interests: Reading, Writing, [Astrophotography](#)