

Shruti Thakur

Assistant Professor (Ad-hoc), Physics

Department of Physics
St. Stephen's College, University of Delhi
Delhi, India

Research Interests

Cosmology, Dark Energy, Modified Gravity ($f(R)$ Gravity), Chaplygin Gas Cosmology, Cosmological Perturbation Theory.

Academic Qualifications

- 2013 **Ph.D. in Theoretical Astrophysics**, University of Delhi
Thesis: *Cosmological Models for Accelerated Expansion*
- 2007 **Qualified CSIR-UGC NET**
- 2007 **M.Sc. Physics**, Kirori Mal College, University of Delhi
- 2005 **B.Sc. (Hons.) Physics**, Dyal Singh College, University of Delhi

Professional Experience

- 2017–Present **Assistant Professor (Ad-hoc)**, St. Stephen's College, University of Delhi
- 2016–2017 **Visiting Researcher**, Centre for Theoretical Physics, Jamia Millia Islamia
- 2013–2015 **Postdoctoral Fellow**, IISER Mohali

Teaching Experience

- Core Courses Mathematical Physics, Electricity and Magnetism, Nuclear and Particle Physics, Astrophysics, Elements of Modern Physics
- Laboratory Courses Mathematical Physics Lab, Electricity and Magnetism Lab, Mechanics Lab, Modern Physics Lab, Waves and Optics Lab, EMT lab, Computational Labs
- Skill Enhancement Programming with Python, Basic IT Tools

Computational Physics Topics

Numerical solution of ODEs and PDEs, Numerical Integration, Systems of Linear Equations, Least Square Fitting, Fast Fourier Transform (FFT).

Online Teaching Contributions

- E-PG Pathshala **E-PG Pathshala Project**, Ministry of Human Resource Development (MHRD), Government of India.

Research Publications

- Prospects of probing quintessence with HI 21-cm intensity mapping survey, *Monthly Notices of the Royal Astronomical Society (MNRAS)*
- Can structure formation distinguish Λ CDM model from non minimal $f(R)$ gravity, *Physical Review D*
- Thawing vs Tracking behavior: Observational evidence, *Monthly Notices of the Royal Astronomical Society (MNRAS)*
- Non-minimally coupled $f(R)$ cosmology, *Physics Letters B*

Conference Proceedings

Variable Chaplygin Gas and $f(R)$ Gravity: Cosmological Constraints, Springer Nature Conference Proceedings (Accepted, 2025)

Conference Presentations

Affordable Astronomy for Regenerative Scientific Ecosystems, International Conference on Regenerative Economy (ICRE 2025), XIM University.

Ongoing Research

Perturbation analysis of Variable Chaplygin Gas models using $f\sigma_8$ growth data.

Invited Talks / Resource Person

- 2019 RAD@Home Astronomy Workshop
- 2021 e-Crash Course on Python and $\text{\LaTeX}$
- 2023 National Workshop for Laboratory Personnel
- 2023 Member, Local and Scientific Organizing Committee: The Pedagogical Workshop on Astronomy, Astrophysics, and Cosmology
- 2024 International Symposium on Space Science, Astrophysics and Cosmology (ISAC)
- 2025 Summer Research Internship Program

Faculty Development Programs

- 2021 Refresher Course in Astronomy and Astrophysics, IUCAA Pune
- 2021 Workshop on Quantitative Biology, MITx
- 2022 National FDP on Python, GAD-TLC
- 2025 GIAN Course on Astronomical Spectroscopy, IIT (ISM) Dhanbad

Institutional Responsibilities

- 2023-till date Block Tutor – Allnutt South: Mentored resident students, ensured discipline in the residence block, and coordinated with the Block Warden and Dean of Residence during emergencies.
- 2023-25 Staff Advisor – Junior Common Room (JCR): Facilitated accessibility improvements, including the construction of a ramp for PwD students and the initiation of washroom facilities.
- 2025 Staff Advisor – Mathematics Society (2025).
- 2026 till date Staff Advisor – Quiz Club (2026).
- 2025 Convener – Training Program in Financial Mathematics.
- 2024 Member – Anti-Hooliganism Committee during Holi Celebrations.

Other Responsibilities

1. Supervised undergraduate research projects across core and SEC courses.
2. Guided two students under the Summer Research Program (2025) on research projects in Cosmology.
3. Organized an academic visit to the Inter-University Accelerator Centre (IUAC), New Delhi (2024) for students of Nuclear and Particle Physics.
4. Developed laboratory worksheets, report formats, and instructional materials for newly introduced experiments in Mechanics and Electricity & Magnetism under NEP(2022-23).
5. Designed instructional posters to enhance student engagement in laboratory courses.

Workshops, Conferences and Schools

- 2010 13th Young Astronomers Meet, PRL Ahmedabad, 3–5 September (Oral Presentation)
- 2011 International Workshop on Dark Energy, Centre for Theoretical Physics, Jamia Millia Islamia, 21–23 December (Oral Presentation)
- 2012 Workshop on Cosmology, ICTP Trieste, Italy, 30 July–2 Aug (Poster Presentation)
- 2013 30th Meeting of the Astronomical Society of India, IISER Trivandrum, 20–22 Feb (Poster Presentation)
- 2013 Given a talk at Institute for Astronomy at ETH Zurich, Switzerland on 8th August
- 2013 27th Meeting of the Indian Association for General Relativity and Gravitation, H. N. Bahuguna Garhwal University, Uttarakhand, 7–9 March (Oral Presentation)