

# Vikrant Gupta

Second Year Physics Undergraduate Interested In Cosmology & Astrophysics

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## Professional Summary

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Physics undergraduate with a strong academic foundation and focused interest in cosmology and galaxy evolution. Experienced in computational modeling, stellar population synthesis, and critical analysis of astrophysical literature. Proficient in Python and LaTeX, with hands-on experience using the Prospector framework for controlled SED modeling and interpretation.

## Education

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### Integrated BS–MS in Physics

Indian Institute of Science Education and Research (IISER), Pune

2024 – Present

**CGPA: 9.2 / 10**

#### *Relevant Coursework*

**Completed:** Calculus I, Calculus II, Linear Algebra, Introductory Mechanics, Introductory Electricity and Magnetism, Introductory Quantum Physics, Mathematical Methods for Physics, Introduction to Probability, Introduction to Proofs, Introduction to Computing, Physics Laboratory I.

**Ongoing:** Group Theory, Real Analysis I, Discrete Structures, Classical Mechanics, Thermal & Statistical Physics, Thermodynamics, Data Analysis, Physics Laboratory II.

## Projects & Academic Work

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### Stellar Population Age Effects on Galaxy Spectral Energy Distributions

- Conducted a controlled study on how stellar population age influences integrated galaxy spectral energy distributions.
- Generated synthetic spectra using the Prospector stellar population synthesis framework with simplified model configurations.
- Isolated age-dependent spectral variations to study their impact on inferred galaxy properties.
- Developed experience in SED modeling, parameter control, and astrophysical interpretation.

### Academic Paper Reviews in Galaxy Evolution & Cosmology

- **Review of “The Impact of Parametric Star Formation History Models on Galaxy Physical Parameter Estimates”** — Analyzed assumptions of parametric SFH models and their effects on derived galaxy properties.
- **Review of “How to Measure Galaxy Star Formation Histories II: Nonparametric Models”** — Examined model flexibility, degeneracies, and interpretational challenges in non-parametric SFH approaches.
- **Review of “Stellar Population Inference with Prospector”** — Studied Bayesian inference, model modularity, and applications of the Prospector framework in galaxy SED fitting.
- **Review of “Extraordinarily Bright Lensed Galaxy at Redshift 5.04”** — Critically assessed observational methods, lensing interpretation, and implications for early galaxy formation.

## Honors & Awards

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- INSPIRE Scholarship for Higher Education (SHE), Department of Science & Technology (DST), Government of India

## **Skills**

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- Python (scientific computing, basic data analysis, visualization)
- LaTeX (academic writing, reports, and documentation)
- Stellar population synthesis using Prospector (working proficiency)
- Galaxy spectral energy distribution modeling
- Critical analysis of astrophysical literature

## **Certifications**

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- *Confronting the Big Questions: Highlights of Modern Astronomy* — University of Rochester
- *From the Big Bang to Dark Energy* — University of Tokyo