ANSAL KANU

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EDUCATION

Ramjas College (University of Delhi) *May 2027 (expected)*
B.Sc. (Hons.) Physics (Third Year)
GPA: **8.7**/10.0
Subjects: Physics, Mathematics and electives in other subjects

Maharishi Vidya Mandir, Silchar *May 2023*
AISSCE (CBSE)
Percentage: 93.8/100
Subjects: Physics, Chemistry, Maths, Computer Science

RESEARCH INTERESTS

Gravitational Waves: lensing and source detection
Fourier optics and computational imaging: phase retrieval, interferometry
Astronomical data analysis: exoplanet characterization, transient phenomena
Numerical and statistical methods in physics

SKILLS & HOBBIES

Programming Languages	Python, Bash, Unix Shell
Version Control	Git (Basics), GitHub
Scientific Libraries	`GLoW`, `qiskit`, `astropy`, `numpy`, `matplotlib`, `pandas`, `scipy`
Data Analysis	CSV/FITS handling, Monte Carlo simulations
Document Preparation	LaTeX, MS Word
Hobbies	Literature, Photography

RESEARCH EXPERIENCE

Wave-optics Lensing by Massive Black Hole Subhalos *Ongoing*

- Simulating gravitational lensing signatures of compact massive subhalos using parametric mass models
- Developing scripts using `GLoW` for calculating amplification and time delay and hence investigate detectability regimes for LISA
- Comparing point-mass and extended (NFW-type) lens models to study finite-size lensing effects
- Exploring parameter regimes relevant for detection in time-domain gravitational-wave follow-up surveys

Iterative Phase Retrieval Using the Hybrid Input–Output Algorithm
mentored by Prime Minister's Research Fellows at IIT Delhi

- Implemented a Hybrid Input Ouput (HIO) based phase retrieval algorithm for coherent imaging reconstruction
- Investigated constraint design to improve convergence and suppress twin-image artifacts
- Obtained the results of the paper titled "Twin-stagnation-free phase retrieval with vortex phase illumination" by **Kularia et.al.**.
- Released reproducible code, tutorials, and a project report as a citable record
  DOI: 10.5281/zenodo.16447566

Quantum Walks and Monte Carlo
Womanium Quantum Program 2025 + WISER QIntern

- Developed a quantum Galton board framework using Qiskit to simulate quantum walks
- Designed variational quantum algorithms to optimize gate parameters for target distributions
- Investigated noise mitigation strategies and distribution fidelity metrics

Exoplanet Demographics and Survey Bias Correction
NASA–Caltech Sagan Summer Workshop 2025

- Corrected detection biases in transit, RV, imaging, and astrometry surveys to compute occurrence rates
- Modeled stellar accelerations to derive companion mass distributions using Monte Carlo orbital simulations

ACHIEVEMENTS

Meritorious Award by University of Delhi for the **course topper** of a given year *2025*

Among the **top 0.2 percentile** scorers in Physics in **CUET UG** 2023 *2023*

Obtained **World rank 544** among **4000+ students from 50+ countries** in **Fizika** 2021, a Physics Competition for High Schoolers organised by **GRAMOLY** *2021*