

Krishna Gupta

✉ krishna2003research@gmail.com

☎ +91 7007872403

🌐 [KrishnaQuantum](#)

PROFILE

Physics undergraduate with experience in computational modeling, statistical analysis, and machine learning for astrophysical data. Skilled in large dataset handling and simulations, aiming to get as much exposure in research field as possible.

EDUCATION

- **St. Stephen's College** *University of Delhi, India*
Bachelor of Science (Honours) Physics; CGPA: 8.6
2022-2025
- **St. Thomas School** *Kanpur, India*
Indian School Certificate (ISC): **98.25%** (2021-2022)
Indian Certificate of Secondary Education(ICSE): **96.6%** (2021-2022)

RESEARCH EXPERIENCE

- **Project Student - Designing sampler enclosure for superconducting devices** *July 2025 - Present*
Quantum Measurement and Control Laboratory (QuMac) 🔗, Department of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai, India.
Guide: Prof. Rajamani Vijayaraghavan (*Pioneer of India's National Quantum Mission*)
 - Studied and analyzed the design of Atmospheric Dispersion Correctors (ADCs) for the ANDES spectrograph of the ELT, focusing on optimizing optical performance.
 - Reviewed optical design methods and glass selection strategies to minimize residual dispersion, transmission losses, and chromatic beam shift for high-resolution spectroscopy.
 - Examined impact of manufacturing tolerances and glass melt data variations on ADC efficiency and proposed ways to improve design reliability.
 - Collaborated in preparing and presenting findings in a team seminar, demonstrating problem-solving, research synthesis, and technical communication skills.
- **Summer Intern –Ab-initio Investigation of Structural and Electronic Properties of Materials** *June - July (2025)*
Quantum Material Design Laboratory(QMD) 🔗, Department of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai, India.
Guide: Dr. Bahadur Singh
 - Conducted first-principles DFT simulations using **VASP** to calculate band structures, DOS, and structural relaxation of candidate quantum materials.
 - Reproduced band structure and DOS of **Quantum spin Hall insulators (Pt₂HgSe₃ and Ta₂Te₂Se)** using VASP, validating results from *Phys. Rev. Lett. 120, 117701 (2018)*.
 - Gained hands-on experience in k-point path selection, pseudo potential choices (POTCAR), and convergence testing.

PROJECTS

- **ADCs design of the ANDES seeing limited arms:**
 - Studied optical design of ADCs for high-resolution spectrographs.
 - Analyzed glass combinations and dispersion residuals.
 - Examined effects of manufacturing tolerances and melt data.
- **Recalibration of CFLIB using Deep Learning based Spectral Interpolation**
 - Built a denoising autoencoder to recalibrate CFLIB spectra.
 - Used Random Forest interpolator trained on MILES as reference.
 - Improved spectral accuracy, especially in the blue region.
- **Mapping Water Bodies using NDWI**
 - Applied NDWI (Normalized Difference Water Index) to satellite imagery for water body detection.
 - Processed and analyzed spatial data using remote sensing and GIS tools.
 - Identified and visualized surface water distribution across the selected region.
- **Flood Inundation Mapping using DEM and Rainfall**
 - Utilized DEM data to model terrain and identify flood-prone zones.
 - Integrated rainfall data to simulate flood extent and inundation levels.
 - Generated flood risk maps using GIS for spatial analysis and visualization.

WORKSHOPS

- **CeNSE Summer School on Semiconductor Technology and Micro fabrication, IISc Bengaluru.**
 - Gained hands-on experience in Python, Astropy, and data visualization for astronomical analysis.
 - Learned to handle FITS files, perform galaxy classification, and access databases using Astroquery and SQL.
 - Applied Bayesian statistics and simulation techniques to real astrophysical problems and datasets.
- **Quantum Computing Workshop**
 - Learned fundamentals of quantum mechanics and qubit-based computation.
 - Explored quantum gates, circuits, and algorithms using simulators like Qiskit.
 - Understood real-world applications of quantum computing in cryptography and optimization.

TECHNICAL SKILLS & INTEREST

- **Quantum & Simulation:** Qiskit, QuTiP, VASP, Quantum ESPRESSO (basic), VESTA
- **Programming Languages:** Python (NumPy, Matplotlib, Pandas), LaTeX
- **Visualization:** Bloch sphere, Wigner function, Manim
- **Tools:** CST Microwave Studio, UNIX Shell

HONORS & AWARDS

- Recognized as **top 1% students** in the ISC (2022) board examinations.
- Recipient of the **INSPIRE scholarship**, DST Government of India (2022–2025).
- Recipient of the **Sumitomo scholarship** for academic excellence by **the Sumitomo Corporation, Japan** (2022–2025).

EXTRA-CURRICULAR ACTIVITIES

- Collaborated with teams of 20 members to construct the Moon Colony project at Nehru Planetarium during National Science Day.