Krishna Gupta

Project student|Tata Institute of Fundamental research(TIFR)

Education

2022-2025 **St. Stephen's College**- Delhi, India
Bachelor of Science (Honours) Physics; CGPA: 8.6

St. Thomas School - Kanpur, India
2021-2022 Indian School Certificate(ISC): 98.25%
2019-2020 Indian Certificate of Secondary Education(ICSE):96.6%

Technical Skills

Programming Languages
Python, Java, HTML5 & CSS
Python Libraries
Matplotlib, Scipy, Pandas, Numpy, Turtle
Quantum Computing Software
Qiskit, Qiskit-metal, Qiskit-Dynamics, Qutip
Software Tools and Development Environments
AWR Microwave environment , Keysight ADS, Anyss HFSS, Blender

Research Experience

Project Student- Quantum measurement and Control Laboratory (QuMac),
Department of Condensed Matter and Materials Science, TIFR, Mumbai, India.
Guide: Prof. Rajamani Vijayaraghavan (Pioneer of India's National Quantum Mission)

Sep 25 **Designed single- and four-transmon qubit chips in Keysight ADS**
Analyzed quantum parameters (qubit/resonator frequencies,Quality factor, anharmonicity, cross-Kerr coupling, Purcell time) and optimized device structure.

Aug 25 **Designed λ/4 and λ/2 transmission-line resonators (CPW & microstrip)**
Performed EM simulations with meshing, analyzed S-parameters for critically, under, over coupled , and optimized structures for maximum Q-factor.

Summer Intern - Quantum Material Design Laboratory (QMD),
Department of Condensed Matter and Materials Science, TIFR, Mumbai, India.
Guide: Dr. Bahadur Singh
Project Title: Ab-initio Investigation of Structural and Electronic Properties of Materials

Jun 25 **Analyzed bulk and monolayer MoS_2 using Density Functional Theory (DFT)**

- Designed **2D MoS_2** structure by cutting a single layer from the bulk unit cell.
- Demonstrated indirect-to-direct band gap transition upon exfoliation, highlighting its suitability for optoelectronic devices.

Jun 25 **DFT simulations with VASP on bulk Cu, NaCl, and Si**

- Analyzed band structures/DOS to classify them as metal, insulator, and semiconductor.
- Gained hands-on experience in k-point path selection, pseudo potential choices (POTCAR), and convergence testing.

Certification Link

IBM Quantum Learning (Online), 2025:
Received badges for multiple foundational, intermediate, and advanced courses:

- **Basics of Quantum Information** – Learned quantum states, measurements, and entanglement.
- **Fundamentals of Quantum Algorithms** – Studied algorithms like Grover's and Shor's, and their classical vs quantum advantages
- **Quantum Machine Learning** – Explored quantum kernels and variational models applied to classification tasks.
- **Variational Algorithm Design** – Designed and tested VQE/QAOA circuits on Qiskit simulators.
- **Quantum Diagonalization Algorithms** – Learned techniques for Hamiltonian diagonalization and eigenvalue problems.

Semiconductor Technology & Microfabrication Workshop –
IISc Bangalore (Online), 2024

- Learned fundamentals of semiconductor device fabrication (lithography, deposition, etching).
- Explored applications of cleanroom processes in device prototyping.
- Explored applications of cleanroom processes in device prototyping.

Honours & Awards

2022 Recognized as top **1% students** in the **ISC board examinations**.

2022-2025 Recipient of the INSPIRE scholarship, DST Government of India .

2022-2025 **3 Times-** Recipient of the **Sumitomo scholarship** for **academic excellence** by the **Sumitomo Corporation, Japan**