JYOTIRAJ NATH

+91 6001532852 ◇ Surat, India

jyotirajnath7@gmail.com Jyotiraj-Nath Jyotiraj-code Website

EDUCATION

Integrated MSc in Physics, NIT Surat, India [**CGPA: 8.70/10**] (2020-2025)
Classical Mechanics, Electrodynamics, Quantum Mechanics, Solid State Physics, Computational Physics, Atomic and Molecular Physics, Astrophysics, Plasma Physics, Digital Electronics, Semiconductor Physics, Nuclear Physics, Mathematical Physics

Higher Secondary, SVJC Guwahati [**Perc: 85.5% (92%** -Physics, Chemistry, Mathematics)] 2018 - 2020

TECHNICAL SKILLS

Technical languages	Python (Matplotlib, NumPy, SciPy), JavaScript, C++, MATLAB, Mathematica, Qiskit
Developer Tools	Linux (CLI), Git (Version Control), Visual Studio Code, LaTeX
Other Skills	HTML, CSS, Adobe Illustrator, Adobe Photoshop
Languages	English, Bengali, Hindi, Assamese
Areas of Interest	Quantum Information, Quantum Computation, Data driven Astrophysics

RESEARCH EXPERIENCE

Molecular structure analysis and Spectroscopy using Qunatum Computation Sept 2023- Ongoing
SVNIT, Surat

- Determining the energy value using molecular hamiltonian in qubits
- Simulating the Quantum Fourier transform for spectroscopic data
- Determing the molecular parameters and comparison of the results with classical values

Curved Prism based Imaging- spectrometer design in a CubeSat format for Astronomical Studies May 2023- July 2023
Physical Research Laboratory, India

- Visualized the spectrographic data with the designed curved prism
- Addressed Astronomical science cases with the imaging spectrometer in a 4U CubeSat
- Explored other items to make the science cases possible with the CUBESAT

Bidirectional Quantum Teleporation over a Amplitude Damping noisy channel for two qubit state January 2023- May, 2023
SVNIT, Surat

- Studied Quantum Teleportation phenomena
- Built a quantum circuit for Bi-Directional teleportation using Qiskit
- Obtained the error generated due to a noisy channel

Quantum Mechanical Study on Tritium-3 September 2022 - December 2022
SVNIT, Surat

- Formulated the radial and angular equation for Hydrogen-3 isotope (Tritium)
- Calculated the electromagnetic effects on Tritium and hyperfine structure of Tritium is calculated

Analyzing the spectrum of HD 94028 star and determining its receding speed using MATLAB Jun 2022 -July 2022
SVNIT, Surat

- Calculated the alpha hydrogen wavelength of the HD 94028 star
- Determined the redshift factor and the receeding speed

PERSONAL PROJECTS

- **Nuclear Decay using Monte Carlo Simulation** (Link to Github)
  Used Monte-Carlo method to simulate the nuclear decay process and then plot its graph using Matplotlib library of Python
- **Creating Lorenz attractor using Python** (Link to Github)
  Used Lorenz system equations to simulate the beautiful butterfly patterns of the Lorenz attractor
- **Monte Carlo method to estimate value of Pi** (Link to Github)
  Introduced the code to estimate the apporximate value of Pi using Monte-Carlo method

RELEVANT COURSES

- **QWORLD QClass 2023-2024** (Ongoing) 2 semester long undergraduate and graduate course on Quantum Information and Quantum Computation by University of Latvia
- **Quantum Computing for Natural Sciences (with IBM Quantum)** (Certificate) Learnt about mapping the quantum description of molecules to the qubits of a quantum computer and computing ground state and excited state energies of molecules with quantum algorithms. Simulated molecular dynamics on quantum computers
- **IBM Qiskit Summer School 2023** (Certificate) Completed IBM Qiskit Summer School with Excellence badge. Learnt the basic and Intermediate methods to solve different problems using quantum computing
- **IISER Kolkata QIQT, 2023** (Certificate) Attended 1 month long Quantum Information and Quantum Conference organized by IISER Kolkata, India
- **Scientific computing with Python** (Certificate) Used Python dictionaries, Regular expressions, and networking for web scrapping. Designed Relational database and visualized data using python libraries
- **Data Visualization with Matplotlib** (Certificate) Used concepts of Matplotlib into data visualization
- **Discrete Mathematics** (Certificate) Introduced to the abstract usage of numbers for system operations
- **AstroTech: The Science and Technology behind Astronomical Discovery** (Certificate) Explored about different observation and data manipulation methods used in sky viewing

EXTRA-CURRICULAR ACTIVITIES

- **Senior member at SCOSH**, the science club of NIT Surat
- **Senior Graphic Designer at RENESA**, contributed to various authorized magazines published by the publishing committee of NIT Surat
- **Visharad in Indian Classical instrument Tabla** Completed 5-year degree with a distinction and played on classical festivals
- **Visharad in Indian Classical Music** Completed 5-year degree with a distinction in Hindustani Classical Music