



Muhammad Mubashir Israr

Nationality: Pakistani **Date of birth:** 01/05/2000

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Home: Islamabad (Pakistan)

ABOUT ME

- As a keen observer, I am eager to model real-world phenomena, particularly those unfolding in the vast expanse of space. My goal is to comprehend the underlying logic and intricate physical processes that govern the activities taking place within this dynamic environment.
- I am already well on the path toward achieving my objective, having undertaken research during my Master's degree on the dynamics of giant planets. My work delved into the intricate physical processes that underpin various phenomena, with a particular focus on long-lived vortices, such as the Great Red Spot, unraveling the complex interactions that sustain these remarkable features over extended periods.
- I was astounded during my research by the stark contrast between the activities occurring on other planets and those on Earth. This realization sparked a deepening fascination within me, and my interest continues to grow as I explore the unique events unfolding in space and across other planetary bodies.

EDUCATION AND TRAINING

Master of Science in Applied Physics

Air University [13/09/2022 – 25/09/2024]

City: Islamabad | **Country:** Pakistan | **Final grade:** (CGPA) 3.09/4.0 | **Number of credits:** 31

Core Courses: Experimental Techniques, Electrodynamics, Advanced Quantum Mechanics, Methods of Mathematical Physics

Bachelor of Science in Physics

Air University [03/09/2018 – 22/06/2022]

City: Islamabad | **Country:** Pakistan | **Final grade:** (CGPA) 2.50/4.0 | **Number of credits:** 133

Core Courses: Plasma Physics, Waves and Oscillations, Physical Electronics, Methods of Mathematical and Computational Physics

F.Sc (Pre-Engineering)

Punjab College For Boys Gujar Khan [01/07/2016 – 12/09/2018]

City: Rawalpindi | **Country:** Pakistan | **Final grade:** 78 %

Core Courses: Physics, Mathematics, Chemistry

Physics Grade: 79 %

Matriculation (Science)

Fauji Foundation Model Secondary School, Gujar Khan [01/03/2014 – 20/07/2016]

City: Rawalpindi | **Country:** Pakistan | **Final grade:** 90 %

Core Courses: Physics, Mathematics, Chemistry, Biology

Physics Grade: 89 %

WORK EXPERIENCE

Lab Assistant

Army Public School And College, Defense Complex E-10 [06/10/2022 – Current]

City: Islamabad | Country: Pakistan

1. Proficient in the practical demonstration of theoretical concepts, ensuring hands-on application of scientific principles in real-world scenarios.
2. Expertise in the meticulous management and documentation of records pertaining to chemicals and laboratory apparatus, ensuring compliance and accuracy in all experimental processes.

PROJECTS

[01/08/2023 – 03/09/2024]

MS Thesis: Theoretical Modelling on Vortex Dynamics in Jupiter and Saturn Atmospheres

About the project:

My research was centered on the vortices present on giant planets, with a particular focus on understanding their formation, longevity, and the factors that maintain their distinct shapes. By incorporating a comprehensive analysis of various physical processes, I sought to unravel the complex mechanisms driving these phenomena. My findings revealed the underlying reasons for the enduring nature of these vortices, shedding light on the way energy is stored within them and elucidating the stability of high-energy systems in such environments over prolonged periods.

Research skills developed:

1. Proficient in modeling complex events and problems to predict outcomes and gain deeper insights.
2. Skilled in gathering and synthesizing data from up-to-date and reliable sources for comprehensive analysis.
3. Expertise in incorporating all relevant physical effects to ensure accuracy and depth in problem-solving.
4. Adept at creating graphical representations to visualize data and facilitate detailed analysis.
5. Capable of identifying and understanding the underlying logic behind results, drawing meaningful conclusions from data.

Key findings:

1. Identified and analyzed the energy exchange processes occurring within complex systems, highlighting key mechanisms that drive the transfer of energy.
2. Determined the stable frequency ranges within which certain phenomena remain consistent, contributing to the long-term stability of the system.
3. Uncovered the intricacies of the dispersion process, exploring how energy or particles spread and disperse within the system, affecting overall behavior.

Paper Publication:

I have submitted my research paper titled "**Theoretical Perspectives on the Dynamics of the Great Red Spot and Self-Organized Vortices in Jupiter's Atmosphere**" to the **Journal of Geophysical Research**, and it is currently under review.

BS Thesis: Comparison of Potential Variations associated with Quantum Dynamics of Electron in Quantum Plasma using Quantum Hydro-Dynamics Model

About the project:

Our research focused on the quantum potentials in the conduction band under varying electron densities, considering key perturbations such as Bohm's potential, exchange-correlation potential, and Fermi pressure. These quantum effects were integrated into the Quantum Hydrodynamics (QHD) model using approximations of the exchange-correlation functional. The QHD model was employed to calculate the electron number density, yielding approximate values aligned with the Schrödinger wave equation. By analyzing the calculated electron number density, we derived the relationship between electron density and the potential generated by quantum effects,

incorporating the quasi-neutrality condition of plasma. Our study further examined the electron behavior across low-density and high-density limits, including both spin-polarized and spin-unpolarized cases.

Research skills developed:

1. Mathematical modelling of Quantum Plasma Flow in Conduction band of a Conductor.
2. Solving and Graphing Mathematical set of equations using Mathematical techniques, Wolfram Mathematica and MATLAB.
3. Interpretation of Graph and Deduction of Physical Results using Graphs.
4. Improved the ability to communicate complex scientific concepts clearly, both in written and oral formats, by preparing detailed technical reports and discussing the implications of findings on electron fluid behavior and material properties.

RESEARCH INTERESTS

Theoretical Researcher in Astrophysics

- Solar System
- The Dynamics of Planetary Atmospheres
- Dynamics of Long-Lived Atmospheric Phenomena
- Integrating Satellite Data to Validate Theoretical Predictions
- Comparative Analysis of Planetary Activity

PERSONAL SKILLS

Digital Competence

- OriginLab
- Microsoft Office
- Wolfram Mathematica
- MATLAB

Organization/Managerial Skills

- Mentoring
- Leadership
- Problem solving
- Decision-making
- Time Management
- Interpersonal Skills
- Theoretical prediction
- Communication and motivation
- Forward planning and strategic thinking

HONOURS AND AWARDS

Prime Minister's Youth Programme

Recipient of a Laptop Award

Awarded for outstanding academic performance in matric.

Punjab College For Boys, Gujar Khan

Merit-based scholarship

Honored with a merit-based scholarship, granting a full fee waiver for two consecutive years during my F.Sc. studies.

LANGUAGE SKILLS

Mother tongue(s): Urdu

Other language(s): English (Avanced Level)

RECOMMENDATIONS

Name: Dr. Rizwan Akram | (Associate Professor)

Air University, Islamabad, Pakistan

Email: rizwan.akram@au.edu.pk

Name: Dr. Umer Rehman | (Assistant Professor)

Air University Islamabad, Pakistan

Email: umer@mail.ustc.edu.cn

Name: Dr. Shakeel Mahmood | (Associate Professor)

Air University Islamabad, Pakistan

Email: shakeel_mahmood@hotmail.com