Sabbir Hasan Munna

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PERSONAL PROFILE

I am a Physics postgraduate researcher specialized in computational materials science and experimental condensed matter physics. My research includes synthesis and characterization of functional materials and first-principles Density Functional Theory (DFT) calculations to explore their structural, electronic, magnetic and spin-dependent properties. My expertise includes solid-state synthesis, advanced materials characterization, and scientific computing using Python for data analysis and materials modeling. My recent research on transition-metal-doped two-dimensional materials and altermagnetic systems has further stimulated my interest in electronic structure theory, quantum materials and computational methods for functional materials. I am looking for a PhD position that could combine first-principles simulations and experimental collaboration to further understand and design next-generation materials.

EDUCATION

Khulna University of Engineering & Technology Khulna, Bangladesh
MSc in Physics, GPA: 3.25/4.0 *November 2025*

- Thesis: "Enhancement of Magnetic Properties of Lanthanum-Doped Manganese-Zinc Ferrites for Efficient Chromium Removal from Wastewater."
- Relevant Coursework: X-ray Diffraction Crystallography, Solid State Physics, Thermodynamics of Solids, Experimental Techniques in Solid State Physics, Quantum Mechanics, Magnetism.
- Activities and societies: Consumer Youth Bangladesh - Secretary of Publication and Publicity
- Specialization - Solid State Physics
- Lab - Solid State Physics Laboratory

National University of Bangladesh Gazipur, Bangladesh
BSc in Physics, GPA: 3.14/4.0 *October 2023*

- Relevant Coursework: Mathematical Physics, Classical Mechanics, Electromagnetism, Quantum Mechanics, Statistical Mechanics, Solid State Physics, Classical Electrodynamics, Nuclear Physics, Atomic and Molecular Physics.
- Activities and societies: Science Club

PROFESSIONAL EXPERIENCE

OxBridge Coaching Khulna, Bangladesh
Physics Instructor *2022-2023*

- Conducted tutoring sessions for undergraduate physics, chemistry, and mathematics majors.
- Developed customized lesson plans to enhance student understanding and performance.

Science View Publications Khulna, Bangladesh
Writer *2022-Present*

- Authored books for undergraduate students in Physics.
- Topics covered include Classical Mechanics, Electromagnetism, Modern Physics, and Thermodynamics.

SKILLS

- **Experimental Techniques:** X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Vibrating Sample Magnetometry (VSM), Electrochemical Impedance Spectroscopy (EIS), Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA).
- **Computational Skills:** Density Functional Theory (DFT) using VASP, Material Studio (CASTEP), Quantum ESPRESSO, Wannier90, Micromagnetic Simulation (OOMMF, Ubermag), SQS (ATAT), VESTA, MATCH!, Matlab-Simulink, COMSOL Multiphysics, Origin Pro, ImageJ, and Rietveld Analysis using Fullprof,
- **Data Analysis:** Proficient in data analysis and visualization using Python libraries (NumPy, Pandas, Matplotlib, Seaborn, SciPy, Scikit-learn, JupyterLab).
- **Soft Skills:** Strong problem-solving abilities, Effective communication, Teamwork, and Adaptability.
- **Language:** Bengali (Native), English (IELTS 6.5), Hindi (Conversational)

RESEARCH EXPERIENCE

MSc Researcher, KUET (2024-Present)

- Synthesized and characterized Ni-Zn, Lanthanum-doped Manganese-Zinc, and Yttrium-doped Magnesium-Zinc ferrites using solid-state reaction methods.
- Conducted XRD, SEM, VSM, DTA, FTIR, and EIS to analyze structural, morphological, magnetic, thermal, and dielectric properties.
- Investigated the effects of doping on the structural, electronic, magnetic, and dielectric properties of the ferrites.
- Developed Python scripts for data analysis and visualization of experimental results.
- Utilized DFT, SQS calculations to model electronic structures and predict material properties.

MANUSCRIPTS

- "Improved Wideband Electromagnetic Performance in La^{3+} Substituted Mn-Zn Spinel Ferrites: Structure-Microstructure Regulation of Grain-Boundary Non-Debye Relaxation" (Under review in *Surfaces and Interfaces*)
- "Y^{3+} Substituted Mg-Zn Spinel Ferrites: Phase Stability, Grain Boundary Dominated Low Loss Response, and Stable MHz Permeability for Multilayer Chip Inductors" (Under review in *Ceramics International*)
- "Spin-Dependent Dual-Mode Gas Sensing in Bipolar Magnetic Semiconductor Mo-Doped Hexagonal Boron Nitride: A First-Principles Study of CO_2, CO, NO, and H_2S" (*Submitted in Applied Surface Science*)
- "Advanced Frontiers in Spatiotemporal Electron Microscopy: From Sub-Angstrom Ptychography to Quantum Coherence Mapping" (In preparation)
- "Strain-Tunable Anomalous Hall Conductivity in a Rutile Altermagnetic Insulator" (In preparation for PRM)

PROJECTS

Fast AI Assisted Material Screening: Specific Properties of Materials *2025*

- Generated crystal structures using Microsoft MatterGen with targeted properties.
- Performed Phonon calculation with MatCalc, DFT calculations using CASTEP and Quantum ESPRESSO to investigate electronic and magnetic properties.
- Analyzed and visualized results using Python libraries.

Micro Smart Grid for Smart City Modeling February, *2022*

- Analyzed the impact of renewable energy sources on grid stability and efficiency.

Home Gas Leakage Detection System February, *2022*

- Developed a prototype system using sensors and microcontrollers to detect gas leaks in residential settings.

CONFERENCES

International Conference on Physics, 2026 Dhaka, Bangladesh
Oral Presentation *April, 2026*

- Title: "Enhanced Adsorption and Activation of Greenhouse and Toxic Gases on Mo-doped hBN Monolayers: A First-Principles Investigation."

Poster Presentation

- Title: "Magneto-Dielectric and Relaxation Behavior of Yttrium-Substituted Mg–Zn and Mn–Zn Spinel Ferrites for High-Frequency Applications."

International Conference and Bioscience Carnival Rangamati, Chittagong, Bangladesh
Keynote *May, 2025*

- Title: "Enhanced Magnetic Properties and Adsorption of La-Doped Mn-Zn Ferrites for Industrial Wastewater Treatment."

International Conference and Bioscience Carnival Rangamati, Chittagong, Bangladesh
Poster Presentation *May, 2025*

- Title: "Optimization of Magnetic Properties of Yttrium-Doped Mg-Zn Ferrites for Heavy Metal Removal from Industrial Wastewater Treatment."

International Conference on Physics, 2024 Dhaka, Bangladesh
Poster Presentation *May, 2024*

- Title: "Impact of Sintering Temperature on Ni-Mn Nano Ferrites Prepared by Chemical Co-precipitation Method."

WEBINARS AND WORKSHOPS

Perovskite Optoelectronics-2026 by *Westlake × Science Symposium #1* *April 9, 2026*

- *Topic: Perovskite advancements, efficiency records, and stability challenges*

MRS Bulletin *by Materials Research Society* *Issue: February, 2026*

- *Topic: Grain Boundary Defect Phases: Thermodynamics, Atomic Structure, and Properties*

Quantum Connect Webinar Series by *American Physical Society (APS)* *2025*

- Topics: Examine the role of quantum technologies in national defense, including quantum radar, secure communications, and advanced sensing.
- Quantum Physics: The Future of High-Energy Particles

Two-dimensional Materials and Devices by *Westlake x Science Symposia* *2025*

- Topics: Advances in synthesis, characterization, physics, and applications of 2D materials; emergent quantum phenomena in moiré lattices; next-generation electronic and energy-efficient devices.

Innovative Energy Infrastructure by *BEPRC x KUET* 2025

- Topic: Renewable Energy and Sustainable Development in Bangladesh

Seminar on Physics Education in the Secondary and Higher Secondary Levels *November, 2024*

- Topic: Physics Education in the Secondary and Higher Secondary Levels

CERTIFICATIONS

Code in Place *2026*
Stanford University Stanford, CA 94305

Machine Learning with Python *2025*
Enhancing Digital Government & Economy Project Bangladesh

Apps and Website Development Training *2023*
Ministry of Public Administration of Bangladesh Khulna, Bangladesh

Deep Learning Specialization (Audited) *2023*
Coursera

MEMBERSHIPS

Student Member, *American Physical Society (APS),* *2025-Present*
Student Member, *Materials Research Society (MRS)*, *2025-Present*

REFERENCES

Dr. Md. Alomgir Hossain, Professor, Dept. of Physics, KUET, Bangladesh.
Email: liton@phy.kuet.ac.bd

Dr. Sujit Kumar Shil, Professor, Dept. of Physics, KUET, Bangladesh.
Email: sujit@phy.kuet.ac.bd

Dr. S. M. Sajjad Hossain, Deputy Director, Directorate of Secondary & Higher Education, Khulna.
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Md. Kamal Hossain, Assistant Professor, Dept. of Physics, KUET, Bangladesh.
Email: kamal@phy.kuet.ac.bd