

ABDUL SABOOR

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Graduate student specializing in semiconductor material modeling and electronic structure tuning using density functional theory (DFT). Experienced in Python programming, open-source package development, and advanced data analysis for materials research.

Education

2025 (Expected)	Ph.D. in Physics, University of Delaware, Newark, DE
2025	M.S. in Physics, University of Delaware, Newark, DE
2017	M.Phil. in Physics, Quaid-i-Azam University, Islamabad
2015	M.Sc. in Physics, Quaid-i-Azam University, Islamabad
2012	B.Sc. in Mathematics & Physics, University of Azad Jammu & Kashmir

Research Experience

- Examined metal oxidation in IrO_2 in collaboration with an experimental team.
- Investigated band-gap engineering by Bi incorporation in III-V alloys for mid-infrared applications.
- Collaborated in the study of rare-earth monpnictide nanoparticles embedded in bismide III-V alloys and uniaxial strain effects in transition metal-dichalcogenides.
- Quantifying epitaxial strain effects on III-V materials as leading researcher.

Technical Instruction & Training

- Trained and mentored undergraduate engineering students in laboratory settings, including instruction on the use of electrical instruments and data acquisition software such as **LabView** for the Fundamentals of Physics Laboratory II (PHYS 228) and Fundamentals of Physics with Biomedical Applications II (PHYS 204).
- Developed and delivered technical content for a variety of physics courses for remote instruction, effectively communicating complex topics to diverse audiences.
- Managed multiple lab sections and projects simultaneously, ensuring all objectives were met on schedule for courses including PHYS201, PHYS202 and PHYS207.

Technical Skills

- **Programming Languages:** Python (Expert), MATLAB, Mathematica
- **Scientific & Lab Software:** [VASP](#) (Expert), [Quantum ESPRESSO](#), [ASE](#), [nanohub](#), [Kwant](#), [ATAT](#), LabView (Familiar)
- **Developer Tools:** Git, VS Code, Jupyter, Conda, Linux, PowerShell
- **Core Competencies:** Data Analysis, Technical Documentation, Resourceful Problem-Solving, Project Management, Technical Training

Authored Open Source Software

- [ipyvasp](#): A Python package for processing and analyzing VASP simulations.
- [ipyslides](#) & [einteract](#): Python packages for creating interactive presentations and dashboards in Jupyter Notebooks, highlighting skills in user interface design for effective presentations.

Publications

- S. Nair, **A. Saboor**, et al., “Engineering metal oxidation using epitaxial strain,” *Nat. Nanotechnol.*, (2023)
- **A. Saboor**, S. Khalid, A. Janotti, “Band-gap reduction and band alignments of dilute bismide III-V alloys,” *arXiv:2411.19257 [cond-mat]* (2024)
- **A. Saboor**, “ipyvasp: A Python Package for Interactive Analysis and Visualization of VASP Data”. Zenodo, [DOI: 10.5281/zenodo.15482349](#) (2025)
- **A. Saboor**, “ipyslides: A Python Framework for Creating Interactive Presentations in Jupyter Notebooks”, [DOI: 10.5281/zenodo.15482496](#) (2025)
- I. Evangelista, I. Chatratin, R. Hu, D. Q. Ho, **A. Saboor**, M. Zubair, S. Khalid, I. Fampiou, and A. Janotti. “Effects of uniaxial stress and biaxial strain on the electronic properties of monolayer transition-metal dichalcogenides.” (submission ready)
- **A. Saboor**, R. Hu, and A. Janotti. “Electronic properties of InAlAs and InGaAs alloys containing a few percent of Bi.” (in progress)
- R. Hu, W. Acuna, **A. Saboor**, D. Q. Ho, J. Zide, G. W. Bryant, and A. Janotti. “Rare-earth mononictides nanoparticles embedded in bismide III-V alloys for THz devices.” (in progress)

Conference Presentations

- The 67th Electronic Materials Conference, Duke University NC, (2025)
Presented: “Electronic properties of InAlAs and InGaAs alloys containing a few percent of Bi”
- The Franklin Institute Awards Symposium, Temple University, (2025)
- PyCon US, Pittsburgh, (2025)
- American Physical Society (APS) March Meeting, Las Vegas, (2023)
Presented: “Electronic structure and band alignment of dilute III-V_{1-x}Bi_x alloys”

References

Prof. Anderson Janotti

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John Shaw

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