

# 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

<b>2026 (Expected)</b>	Ph.D. in Physics, University of Delaware, Newark, DE
<b>2025</b>	M.S. in Physics, University of Delaware, Newark, DE
<b>2017</b>	M.Phil. in Physics, Quaid-i-Azam University, Islamabad
<b>2015</b>	M.Sc. in Physics, Quaid-i-Azam University, Islamabad
<b>2012</b>	B.Sc. in Mathematics & Physics, University of Azad Jammu & Kashmir

## Research Experience

- Examined metal oxidation in  $\text{IrO}_2$  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
- **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 67<sup>th</sup> 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<sub>1-x</sub>Bi<sub>x</sub> alloys”

## References

### Prof. Anderson Janotti

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### John Shaw

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