



## Dr. Zia Ur Rehman

Assistant Professor

Department of Applied Physics, University of Karachi

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### About

Dr. Zia ur Rehman holds a PhD in Nanotechnology with a specialization in two-dimensional (2D) materials. Dr. Zia leads the Nanoscale Synthesis & Research Laboratory, Department of Applied Physics, focusing on the synthesis and application of 2D materials in electronic and spintronic devices, energy solutions, and topological materials.

He has also served as a visiting scientist at the National Synchrotron Radiation Laboratory, University of Science and Technology of China, enhancing his expertise in advanced characterization techniques like ARPES. With over 25 international peer-reviewed publications, a cumulative impact factor of 196, an h-index of 15, and an i10-index of 18, his research has been widely recognized and cited more than 1,500 times.

Dr. Zia's work aims to explore novel properties of 2D materials and advance their integration into next-generation technologies. He has successfully supervised seven graduate research theses, fostering the development of young scientists in the field. His ongoing projects bridge fundamental nanoscience and practical device engineering, contributing to the cutting-edge research landscape at the University of Karachi.

#### Website:

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**Google Scholar:** [-grajZAAAAAJ&hl](https://scholar.google.com/citations?user=-grajZAAAAAJ&hl)

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**ResearchGate:** [Zia-Ur-Rehman-18](https://www.researchgate.net/profile/Zia-Ur-Rehman-18)

### Education

- PhD, Condensed Matter Physics (Nanotechnology).  
University of Science and Technology of China, Hefei, China.  
(2019)
- MPhil, Physics.  
Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan  
2016
- MSc, Applied Physics.  
University of Karachi, Pakistan  
(2003)

### Research Interests

- 2D Materials for energy storage, sensors, electronic and optoelectronic applications
- Phase and Band gap engineering in 2D materials
- Topological Materials
- ARPES
- Thin Films

### Awards & Honors

- Secured first class first position in MSc (Applied Physics), 2003
- Awarded Chinese government scholarship for PhD, 2016
- Awarded Alliance of International Science Organization (ANSO) fellowship for visiting scientist at National Synchrotron Radiation Laboratory, University of Science and Technology of China.

### Selected Publications

- Zia ur Rehman, Zahir Muhammad, et al. "Electronic structure investigation and anisotropic phonon anharmonicity in ternary

### Supervision

**PhD:**

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ZrGeTe<sub>4</sub> single crystals." Applied Physics Letters 125.14 (2024).

- Zahir Muhammad, Zia ur Rehman, et. al. "Signature of phonon anharmonicity in highly in-plane anisotropic ternary HfGeTe<sub>4</sub> single crystals", Appl. Phys. Lett. (2024), Doi: 10.1063/5.0191461
- Zia ur Rehman, Sheng Wang, Mukhtar Adam Lawan, Shah Zareen, Oyawale Adetunji Moses, Wen Zhu, Xiaojun Wu, Zhe Sun, and Li Song "Band structure tailoring in ZrSe<sub>2</sub> single crystals via trace Rhenium intercalation" Appl. Phys. Lett. 115, 213102 (2019); doi: 10.1063/1.5115280.
- Zia ur Rehman, Wen Zhu, Sheng Wang, YijieNiu, Zahir Muhammad, Oyawale Adetunji Moses, Chuanqiang Wu, Muhammad Habib, Shuangming Chen, Xiaojun Wu, Zhe Sun, Pulickel M. Ajayan, and Li Song. "Selective Selenium-Substituted Metallic MoTe<sub>2</sub> Towards Ternary Atomic Layers with Tunable Semiconducting Character." The Journal of Physical Chemistry C 123(2019): 24927-24933, DOI:10.1021/acs.jpcc.9b06881.
- Zhu Jiadi, Yuchao Yang, RundongJia, Zhongxin Liang, Wen Zhu, Zia ur Rehman, Lin Bao, Xiaoxian Zhang, YimaoCai, Li Song and Ru Huang. "Ion gated synaptic transistors based on 2D van der Waals crystals with tunable diffusive dynamics." Advanced Materials 30 (2018): 1800195.
- Qun He, HuiXie, Zia ur Rehman, Changda Wang, Ping Wan, Hongliang Jiang, Wangsheng Chu, and Li Song. "Highly defective Fe-based oxyhydroxides from electrochemical reconstruction for efficient oxygen evolution catalysis." ACS Energy Letters 3 (2018): 861-868.
- Muhammad, Zahir, Bo Zhang, HaifengLv, Huan Shan, Zia ur Rehman, Shuangming Chen, Zhe Sun, Xiaojun Wu, Aidi Zhao, and Li Song. "Transition from Semimetal to Semiconductor in ZrTe<sub>2</sub> Induced by Se Substitution." ACS nano 14, no. 1 (2019): 835-841.

Full List on [Google Scholar](#)

#### **MPhil:**

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#### **MSc:**

07 x MSc Scholars [Completed]

### **Administrative Roles**

- Leading scientist, Nanoscale Synthesis & Research Laboratory, Department of Applied Physics, University of Karachi, Pakistan.
- Member, board of studies, Aug 2025 – Present.
- Member, Board of faculty of Science, Aug 2025 – Present.

### **Professional Memberships**

- Lifetime member, Pakistan Physical Society.