Curriculum Vitae

Dr. Sandeep Kumar Verma

Assistant Professor
Department of Physics
Rajju Bhaiya Institute, V.B.S.P.U, Jaunpur, India
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RESEARCH INTEREST

Theoretical Condensed Matter Physics, 2D and 3D Topological Insulators, Spintronics, Optoelectronics, Van-der Waals Heterostructures, 2D materials, Transport properties in strongly correlated electron system.

EDUCATION

2026 **Ph.D., Indian Institute of Information Technology, Allahabad, Prayagraj, India**
Thesis Title: Computational and Experimental Analysis of Topological Insulators heterostructure based Photodetectors for Optoelectronic Applications

2017 **Master of Science (Physics), University of Allahabad, Prayagraj India**
***CGPA (% Marks)*:** **(79.11%)**
***Division*:** First
Dissertation: Electronic properties of perovskite solar cell
***Committee*:** Dr. Lokendra Kumar

2015 **Bachelor of Science (B.Sc.), University of Allahabad, Prayagraj, India**
***Major Subjects*:** Physics, Chemistry and Mathematics
***Division*:** First division **(69.12%)**

PROFESSIONAL EXPERIENCE

03/01/2020- till date Assistant Professor, Department of Physics,
Rajju Bhaiya Institute, V.B.S.P.U, Jaunpur, U.P, India

AWARDS / ACHIEVEMENTS

- **Junior Research Fellowship** (NET+JRF) conducted by Council of Scientific and Industrial Research (CSIR), Ministry of Human Resource Development, India, (June 2017).
- **Joint Entrance Screening Test (JEST)** conducted by Science and Engineering Research Board (SERB), India. (April 2018)
- **Graduate Aptitude Test in Engineering (GATE)** conducted by Department of Higher Education, Ministry of Education (MoE), Government of India (April 2018)

RESEARCH SKILLS

- Solve many body problems by using "Quantum Espresso Simulation Package" based on Density Functional Theory (DFT).
- Using "Yambo code" for optical properties calculation

PEER-REVIEWED SCI JOURNAL PUBLICATIONS

PUBLISHED

1. **S K Verma**, K. Kandpal, P. Kumar, A. Kumar and C. Wiemer, "Performance of Topological Insulator (Sb_2Te_3)-Based Vertical Stacking Photodetector on n-Si Substrate," in IEEE Transactions on Electron Devices, 69, (8), 4342-4348, 2022, doi: 10.1109/TED.2022.3181534.

2. **S K Verma**, S. Sharma, G. K. Maurya, V. Gautam, Singh, R. Singh, A. Singh, K. Khandpal, P. Kumar, A. Kumar, C. Wiemer, Bi_2Te_2Se and Sb_2Te_3 Heterostructure Based Photodetector with High Responsivity and Broadband Photoresponse: Experimental and Theoretical Analysis, Physical Chemistry Chemical Physics 25 (36), 25008-25017, 2023, doi: https://doi.org/10.1039/D3CP03610C.

3. G. K. Maurya, R. Singh, V. Gautam, F. Ahmad, **S K Verma**, K. Kandpal, R. Kumar, M. Kumar, A. Tiwari, P. Kumar, "Topological Insulator TlBiSe2/GaN vertical heterojunction n diode for high responsive broadband UV to near-infrared photodetector", Journal of Electronic Materials 53 (3), 1561-1576, 2024, doi: 10.1007/s11664-023-10889-7.

4. V Gautam, **SK Verma**, R Singh, Z ashraf, K Kandpal, P Kumar, "Quasi-2D material based heterostructure devices and its applications", Journal of Physics D: Applied Physics 57 (44), 443002, 2024, doi: 10.1088/1361-6463/ad6a20

5. V Gautam, S Gautam, S Sharma, **SK Verma**, G Maurya, SS Kushvaha, P Kumar, "Bulk induced photo-current in topological insulating materials (Bi_2Se_3/Si) heterojunction for highly responsive photodetectors", Journal of Physics D: Applied Physics 58 (6), 065302, 2024, doi: 10.1088/1361-6463/ad94fe.

6. **SK Verma**, GK Maurya, S Kumar, V Gautam, R Singh, R Kumar, K Kandpal, P Kumar, A Tiwari "Emerging vertically stacked n-Bi_2Te_2Se/p-Bi_2Te_3 topological insulator heterojunction for high-performance self-powered photosensor" Journal of Materials Science: Materials in Electronics 35 1627, 2024, doi:10.1007/s10854-024-13381-y.

7. V Gautam, **SK Verma**, P Kumar "Enhancement of Photocurrent in TI/TI (Bi_2Se_3/Bi_2Te_2Se) Heterojunction Devices: An Electronic and Optoelectronic Based Study", ACS Applied Electronic Materials 7 (1), 480-488, 2024, doi: 10.1021/acsaelm.4c01906.

8. **SK Verma**, P Kumar, "Electronic and Optical Properties of 2D Ferromagnetic $CrSiTe_3$ IEEE Workshop on Recent Advances in Photonics (WRAP), 1-3, 2023, doi: 10.1109/WRAP59682.2023.10712913

9. GK Maurya, **SK Verma**, R Singh, S Kumar, V Kumar, R Kumar, P Kumar, "Enhanced wide band spectral photodetection (UV-NIR) and high detectivity investigated in topological p-TlBiSe2/n-ITO heterojunction" Materials Science in Semiconductor Processing 193, 109513, https://doi.org/10.1016/j.mssp.2025.109513.

10. **SK Verma**, P Kumar, Strain and electric field induced electronic and optical properties of ZrTe2/CrGeTe3 van-der Waals heterostructures, Physica B: Condensed Matter, 418719, https://doi.org/10.1016/j.physb.2026.418719

CONFERENCES/ SCHOOL/ WORKSHOP

1. **Sandeep Kumar Verma**, attended workshop on *"Advanced Materials and*

Instrumentation Based Engineering" AMIBE-2021, Organized by Department of Applied Science, Indian Institute of Information Technology Allahabad, from 16 to 20 April, 2021.

2. **Sandeep Kumar Verma**, attended workshop on *"Two-Dimensional Materials: Atom to Devices"* **(STC),** Organized by ECE Department, IIIT Allahabad during 21-25 October 2021.
3. **Sandeep Kumar Verma**, attended workshop on *"Ab-initio Many Body Methods and Simulations with the Yambo Code"***,** Organized by International Centre for Theoretical Physics (ICTP), Italy, 04-08 April 2022.
4. **Sandeep Kumar Verma**, attended workshop on *"Molecular Modeling and Computational Chemistry"***,** Organized by Department of Chemistry, Rajju Bhaiya Institute, V.B.S.P.U, Jaunpur U.P, India, 07 to 08 February 2023.

Plenary/Invited Lecture:

- **Invited lecture,** *"Quantum Mechanics: The Physics of Microscopic Word"* in Chhatrasal Govt PG College, Panna, M.P, 10 January 2021.

Academic References:

Prof. R.R. Yadav
(Ex V C of VBSPU)
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University of Allahabad
Prayagraj, India
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Prof. Pramod Kumar
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