



Name: Dr. Akash Anand Verma

Designation: Assistant Professor & Head, Department of Physics

Department: Physics.

Qualification: B.Sc. (Gold Medalist), M.Sc., Ph.D. NET JRF, GATE, JEST

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Date of Joining: 18/07/2022

Dr. Akash Anand Verma joined the Department of Physics at Udit Narayan P.G. College, Padrauna, Kushinagar, in **2022** as an **Assistant Professor**. Prior to joining the institution, he served as a **Lecturer in Physics**, where he gained valuable teaching and academic experience.

Dr. Verma has maintained an outstanding academic record throughout his career. He was awarded the **Gold Medal** for securing the highest academic distinction in his **Bachelor of Science (B.Sc.)** programme. He subsequently completed his **Master of Science (M.Sc.) in Physics** and qualified the prestigious **CSIR–UGC National Eligibility Test (NET) with Junior Research Fellowship (JRF)**, demonstrating his exceptional academic competence and research potential.

Research Interests

Dr. Verma's research focuses on the design, simulation, and optimization of advanced **photovoltaic** and **optoelectronic devices**, with special emphasis on **next-generation perovskite solar cells**. His research aims to improve the efficiency, stability, and commercial viability of renewable energy technologies through advanced computational modeling and innovative material engineering.

His major research areas include:

- Lead-based and lead-free perovskite solar cells
- 2D–3D hybrid and Dion–Jacobson perovskite architectures
- Bandgap engineering
- Interface and defect engineering
- Charge transport mechanisms
- Carrier recombination dynamics
- Computational device modeling and simulation
- Functional semiconductor materials
- Chalcogenide perovskites
- Photodetectors and photonic materials
- Renewable energy technologies
- Next-generation optoelectronic devices

Dr. Verma has extensive expertise in computational simulation of semiconductor devices and is actively engaged in developing high-performance photovoltaic systems by integrating theoretical physics with practical engineering solutions.

Research Contributions

Dr. Verma has made significant contributions to the field of **renewable energy materials** and **computational semiconductor physics**. His research findings have been published in several **high-impact international peer-reviewed journals indexed in SCI and Scopus**, reflecting the quality, originality, and global relevance of his work. His publications primarily focus on advanced photovoltaic materials, perovskite solar cells, semiconductor device physics, and optoelectronic applications.

His ongoing research seeks to develop innovative material and device engineering strategies for efficient, stable, and environmentally sustainable solar energy conversion systems.

Teaching Interests

- Semiconductor Physics
- Solid State Physics
- Electronics
- Quantum Mechanics
- Electromagnetic Theory
- Materials Science
- Renewable Energy Physics
- Optoelectronics

Academic Vision

Dr. Verma believes in integrating high-quality teaching with cutting-edge research. He is committed to inspiring students through scientific inquiry, innovation, and

problem-solving while fostering interdisciplinary research that addresses global challenges in sustainable energy and advanced electronic materials.

His long-term vision is to contribute to the development of efficient renewable energy technologies and next-generation optoelectronic systems through impactful research, collaborative projects, and academic excellence.

Curriculum- Vitae

Dr. AKASH ANAND VERMA

Assistant Professor & Head, Department of Physics

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VIDWAN ID:657517



Area of Interest:Solar cell,2D-3D Perovskite solar cell, Graded PSCs, Photonics.

Academic Qualification:

Examination Passed	Board/University	Year	% of Marks/CGPA	Rank/Remark
High School	J.N.V. Maharjganj	2009	84	---
Intermediate	J.N.V. Maharjganj	2011	70.40	----
B.Sc. (Physics) (Hons.)	SHUATS, Prayagraj	2014	9.81	Gold medalist
M.Sc. (Physics)	SHUATS, Prayagraj	2016	9.93	----
Ph.D.	M.M.M. University of Technology Gorakhpur	2026	Completed	Completed

- **Topic of Research:**Design and Optimization of Bandgap Graded Architectures for High Efficiency Perovskite Solar Cells

- **Current Status:** Working as an **Assistant Professor**(2022 Onwards) in the Department of Physics at **Udit Narayan Post Graduate College, Padrauna, Kushinagar (U.P.), India**, actively engaged in teaching and academic research.
- **Technical Skills:**SCAPS-1D, Origin, HTML, Problem solving, team building.

List of Research Publications:

(a) International Journals:

[1] A.A. Verma, Dwivedi, D.K., Lohia, P., Singh, P.K., Yadav, R.K., Kumar, M., Agarwal, S. and Kulshrestha, U., 2024. Achieving 31.16% Efficiency in Perovskite Solar Cells via Synergistic Dion-Jacobson 2D-3D Layer Design. *Journal of Alloys and Compounds*, p.177882.

ISSN:1873-4669, Impact Factor: 6.3, SCIE Journal

<https://doi.org/10.1016/j.jallcom.2024.177882>

[2] A.A. Verma, Dwivedi, D.K., Lohia, P., Pandey, R., Madan, J., Agarwal, S. and Kulshrestha, U., 2025. Innovative design strategies for solar cells: Theoretical examination of linearly graded perovskite solar cell with PTAA as HTL. *Journal of Physics and Chemistry of Solids*, 196, p.112401.

ISSN: 1879-2553, Impact Factor: 4.9, SCIE Journal

<https://doi.org/10.1016/j.jpcs.2024.112401>

[3] A.A. Verma, D.K. Dwivedi, P. Lohia, S. Agarwal, U. Kulshrestha, M. Kumar, R. Pandey, Enhancing Efficiency of Lead-Free Cs₂TiI_xBr_{6-x} Perovskite Solar Cells Through Linear and Parabolic Grading Strategies: Toward 31.18% Efficiency, *Prog. Photovoltaics Res. Appl.* n/a (2025).

ISSN:1062-7995, Impact Factor: 7.6, SCIE Journal

<https://doi.org/10.1002/pip.3895>

[4] A.A. Verma, D.K. Dwivedi, P. Lohia, R. Pandey, J. Madan, U. Kulshrestha, M. Kumar, Advanced Optimization of Bandgap Grading Techniques in CsPbBr_{3-x}I_x Perovskite Solar Cells for Achieving Remarkable 30.96% Efficiency, *J. Inorg. Organomet. Polym. Mater.* (2025).

ISSN: 1574-1443, Impact Factor: 4.9, SCIE Journal

<http://dx.doi.org/10.1007/s10904-025-03744-1>

[5] A.A. Verma, Dwivedi, D.K. Revolutionizing environment friendly FASnI₃ perovskite solar cells with pioneering selenium doped metal chalcogenide charge transport layer unlocking 32% efficiency. *Sci Rep* 15, 27473 (2025).

ISSN: 2045-2322, Impact Factor: 3.9, SCIE Journal

<https://doi.org/10.1038/s41598-025-93786-9>

[6] A.A. Verma, Dwivedi, D.K. Performance Benchmarking of Lead-Free Double Perovskites: Design Optimization and Comparative Analysis of Inorganic Cs₂BX₆ (B = Sn, Pd; X = Br, I) Perovskites for Efficient PSCs. *J Inorg Organomet Polym* (2025).

ISSN: 1574-1443, Impact Factor: 4.9, SCIE Journal

<https://doi.org/10.1007/s10904-025-03983-2>

[7] **A.A. Verma**, D.K. Dwivedi, Advancing RbGeBr₃ perovskite solar cells with metal doped chalcogenide ETL: A leap towards higher efficiency, *Electrochimica Acta*, Volume 538, 2025, 146950, ISSN 0013-4686,

ISSN: 0013-4686, Impact Factor: 5.6, SCIE Journal

<https://doi.org/10.1016/j.electacta.2025.146950>.

[8] **A.A. Verma**, D.K. Dwivedi, Boosting lead-free solar efficiency: Gradient band alignment coupled with ETL engineering in chalcogenide perovskite solar cells, *Int. J. Mod. Phys. B* 39 (2025) 2550252.

ISSN: 0217-9792, Impact Factor: 2.8, SCIE Journal

<https://doi.org/10.1142/S0217979225502522>.

[9] **A.A. Verma**, Dwivedi, D.K. & Kumar, M. Revolutionizing Energy Band Alignment: Parabolic Grading for High-Performance BaZrS_{3-x}Se_x Chalcogenide Perovskite Solar Cells. *J. Electron. Mater.* **54**, 10085–10099 (2025).

ISSN: 0361-5235, Impact Factor: 2.5, SCIE Journal

<https://doi.org/10.1007/s11664-025-12369-6>.

[10] **Verma, A.A.**, Dwivedi, D.K. Dimensional synergy for next-generation photovoltaics: high-performance Dion-Jacobson 2D-3D perovskite solar cells. *J Mater Sci: Mater Electron* 37, 1042 (2026).

ISSN: 1573-482X, Impact Factor: 3.2, SCIE Journal

<https://doi.org/10.1007/s10854-026-17466-8>

[11] **Verma, A.A.**, Dwivedi, D.K. Tailoring compositional electron transport layers for enhanced carrier extraction in SrZrSe₃ lead-free PSCs. *Opt Quant Electron* 58, 299 (2026).

ISSN: 1572-817X, Impact Factor: 4.0, SCIE Journal

<https://doi.org/10.1007/s11082-026-08907-z>

(b) As Co-author:

1. Pulkit Katiyar, Yashwant Kumar Singh, D.K. Dwivedi, Pooja Lohia, Rahul Pandey, R.K. Yadav, **Akash Anand Verma**, Upendra Kulshrestha, Synergetic integration of Dion-Jacobson tin-based perovskite for enhanced charge transport and stability: Attaining 31.98 % efficiency, *Electrochimica Acta*, Volume 547, 2026, 147854,

ISSN: 0013-4686, Impact Factor 5.6, SCIE Journal

<https://doi.org/10.1016/j.electacta.2025.147854>

2. Pathak, G., Dwivedi, D.K., Lohia, Yashwant Kumar Singh, Rahul Pandey, Jaya Madan, **Akash Anand Verma** & Manish Kumar, Optimizing the Filtered Spectrum and Various Transport Layers of Synergistic Dion–Jacobson 2D–3D Perovskite Tandem Solar Cell: Achieving 32.11% Efficiency. *J Inorg Organomet Polym* 35, 9356–9370 (2025).
ISSN: 1574-1443, Impact Factor: 4.9, SCIE Journal

<https://doi.org/10.1007/s10904-025-03863-9>

3. Pulkit Katiyar, D.K. Dwivedi, Pooja Lohia, Rahul Pandey, Jaya Madan, **Akash Anand Verma**, Mohamed H.H. Mahmoud, M. Khalid Hossain, Synergistic combination of DJ 2D-3D Layers: Achieving 30.75 % perovskite solar cell efficiency, *Journal of Physics and Chemistry of Solids*, Volume 207, 2025, 112877,
ISSN: 0022-3697, Impact Factor 4.9, SCIE Journal

<https://doi.org/10.1016/j.jpcs.2025.112877>

4. Abhishek Raj, Niharika Das, **Akash Anand Verma**, Vivek Mani Tripathi, Rohit Kumar Singh Gautam, Manvandra Kumar Singh, Manish Kumar, Optimization of CsGeI₃ lead-free perovskite solar cells through transport-layer-dependent charge extraction and recombination dynamics, *Electrochimica Acta*, Volume 562, 2026, 148699.

ISSN 0013-4686, Impact Factor 5.6, SCIE Journal

<https://doi.org/10.1016/j.electacta.2026.148699>.

CONFERENCE/ SHORT TERM COURSES

(a) International/National Conference attend:

1. POWERING PROGRESS: THE INTERNATIONAL CONFERENCE ON ENERGY, FUNCTIONAL MATERIALS AND PHOTONICS (PPICEFP-2024) Organized by Department of Physics and Material Science Madan Mohan Malviya University of Technology Gorakhpur in association with INSTITUTE OF ADVANCED MATERIALS, SWEDEN AND KIPM-CET, GIDA, GORAKHPUR (1 & 2 MARCH, 2024).
2. Smartworld 2025 Third International Conference on Intelligent Systems in Mechanical, Civil, Electronics, Computer, Science & Management” jointly organized by the R&D cell & IIC, Bangalore Technological Institute, Bangalore, Karnataka, India & RSP Conference hub, Coimbatore, Tamil Nadu, India on 1 & 2 December 2025.

(b) Workshop/Short Term Course/FDP

- [1] One week faculty development program EMERGING TRENDS IN SOFT & FUNCTIONAL MATERIALS (ETSFM) (11-15 Dec.2023) Organized by Department

of Physics and Material Science Madan Mohan Malviya University of Technology Gorakhpur.

- [2] One week faculty development program EMERGING ADVANCES IN FUNCTIONAL & SMART MATERIALS (RAFSM) (03-07 Feb.2025) Organized by Department of Physics and Material Science Madan Mohan Malviya University of Technology Gorakhpur.

(c)FIP/ Refresher course

1. Faculty induction program organized by UGC-HRDC, Aligarh Muslim University, Aligarh from 15 November to 19 December 2023.
2. Refresher course organized by UGC-MMMTC, BPMSV, from 15 April to 28 April 2025.

Achievements:

S. No.	Year	Examination / Achievement	Organization /Exam Conducting Body	Result / Rank
1)	2004-11	School Education (Class VI–XII)	Jawahar Navodaya Vidyalaya (JNV)	Successfully Completed
2)	2014	B.Sc.	SHUATS, Prayagraj	Gold Medalist
3)	2017	CSIR–UGC NET-JRF (June)	CSIR–UGC	Qualified JRF (AIR-218)
4)	2017	GATE	IITs / IISc	Qualified (95.75 Percentile)
5)	2017	CSIR–UGC(NET-JRF) (December)	CSIR–UGC	Qualified JRF (AIR-152)
6)	2018	GATE	IITs / IISc	Qualified (AIR-575)
7)	2018	Joint Entrance Screening Test (JEST)	JEST	Qualified (AIR-143)
8)	2021	Lecturer Examination	UPSESSB	Selected (Rank-73)
9)	2022	Polytechnic Lecturer Examination	UPPSC	Selected (Rank-20)
10)	2022	Assistant Professor Examination	UPHESC	Selected (Rank-12)
11)	2023	Assistant Professor Examination	MPPSC	Selected

Research Awards:

1. PREMIER RESEARCH AWARD at Madan Mohan Malaviya University of Technology, Gorakhpur (April-2025)
2. COMMENDABLE RESEARCH AWARD at Madan Mohan Malaviya University of Technology, Gorakhpur (August-2025)
3. PREMIER RESEARCH AWARD at Madan Mohan Malaviya University of Technology, Gorakhpur (August-2025)

Technical Expertise:

- SCAPS-1D Software, Origin Software.

Areas of Interest:

- Solar cell, 2D-3D Perovskite solar cell, Graded PSCs, Photonics

Declaration:

I hereby declare that all the information furnished above is true to the best of my knowledge and belief.

Place: Gorakhpur (U.P.)

AKASH ANAND VERMA