



ANUJ KUMAR

Assistant Professors (Physics)

CONTACT

📍 Department of Physics, Mahamaya Government College, Sherkot - 246747, Bijnor

☎ +91 941 186 9433

✉ Office Mail

📧 Gmail

🎓 Google Scholar

📺 YouTube

📘 Facebook

🐦 X.com

📷 Instagram

🌐 LinkedIn



PROFILE

I am an Assistant Professor of Physics at Mahamaya Government Degree College, Sherkot, Bijnor, with over 15 years of teaching and research experience. I hold a B.Sc. in Physics from C.C.S. University, Meerut, and an M.Sc. in Physics. I am currently pursuing a Ph.D. from Shri Venkateshwara University. My areas of expertise include Computational Condensed Matter Physics, with a particular focus on doping effects in materials, as well as advanced material characterization techniques. I have published numerous research papers and contributed to both national and international seminars. Additionally, I am proficient in programming languages like C and Fortran, and have hands-on experience with simulation tools such as WIEN2k and Quantum Espresso.

RESEARCH INTEREST

I am currently engaged in the field of Computational Condensed Matter Physics, specializing in doping compounds at extremely low concentrations, such as 0.5% by mass. My work involves conducting Density Functional Theory (DFT) calculations using the Full-Potential Linearized Augmented Plane Wave (FP-LAPW) method. I utilize various exchange-correlation potentials, including GGA, PBE, TB-mBJ, and GGA+U, to explore a broad spectrum of material properties. These calculations help reveal insights into electronic band structures, magnetic behavior, and optical responses that are crucial for developing advanced materials. My research also aims to enhance the efficiency of thermoelectric and photovoltaic materials, contributing to innovations in energy-related technologies.

I also have working in LiFePO cell grading for battery pack assembly and have contributed to the improvement of MOSFET-based Battery Management Systems (BMS). My work involves handling PWM signals, where I adjust various duty cycles and amplitudes for efficient switching. Additionally, I bring expertise in surface morphology techniques and a wide range of material characterization and deposition methods.

I have experience working with a variety of advanced deposition techniques, including Chemical Vapor Deposition (CVD), Rapid Thermal Processing (RTP), Chemical Solution Deposition (Sol-Gel), Atomic Layer Deposition (ALD), high-temperature furnaces for diffusion, E-beam deposition, thermal deposition, spin coating, lithography, nanopatterning, and molecular self-assembly. Additionally, I am skilled in surface morphology techniques such as SEM, AFM, and TEM, as well as using X-ray identifiers. My work involves electronic chemicals and materials, including high-purity acids, solvents, gases, etchants, pure elements, and characterizing electronic materials, such as measuring sheet resistance, I-V curves, optical properties, spectroscopy, and single crystal substrates. I was primarily conducting research at the National Physical Laboratory (NPL) on metal-semiconductor contacts, focusing on micro-level semiconductors and nano-level conductors for solar cell upper connections, specifically the finger contacts.

SKILLS

Electronics 5+ yrs

Linux 5+ yrs

C++ 5+ yrs

WIEN2k 3+ yrs

Microcontroller 5+ yrs

WORK AND RESEARCH EXPERIENCE

Higher Education Department, Government of Uttar Pradesh Jul 21 – Present

**Assistant Professor and Additional Nodal Officer
Higher Education, Dist.- Bijnor**

Computational Condensed Matter Physics, and Grading on different Changing of LiFePo4 Cells.

Higher Education Department, Government of Uttar Pradesh Jun 18 – Jul - 21

Assistant Professor - Dist.- Bijnor

Computational Condensed Matter Physics

Higher Education Department, Government of Uttar Pradesh Dec 15 – Jun 18

Assistant Professor - Dist. - Chitrakoot

Basics of Physics and Study of Geophysical Conditions in the Bundelkhand Region

Delhi University, New Delhi Jul 12 – Dec 15

Assistant Professor

Basics of Electronics, Solid-State Physics and Microcontroller Programming

National Physical Laboratory (NPL), New Delhi and Indian Institutes of Technology (IIT), New Delhi Apr 11 – Jul 12

Research Scholar

Selective emitter Silicon Solar cells to enhance efficiency

Aryabhata Research Institute of Observational Sciences (ARIES) (DST-GOI), Nainital Aug 10 – Apr 11

Research Scholar

Silicon Base Charge Coupled Devices (CCD) for capturing star images

Indian Institutes of Technology (IIT), Kanpur Aug 10 – Aug 10

Research Scholar

X-ray demonstration and applications in Condensed Matter Physics

Lara Electronics Ltd., Bulandshahr, Uttar Pradesh. Aug 09 – Jul 10

Junior Assistant, Research and Development Section

Participated in the improvement of non-microcontroller-based Switching Mode Power Supply (SMPS)

Department of Physics, C.C.S. University Meerut (Campus) Jan 09 – Jul 09

Post Graduation Student

Research Project: Radio Frequency Antenna



EDUCATION

2021 - Present

Ph.D. Physics.

Department of Physics, School of Applied Sciences, Shri Venkateshwara University, Gajraula and Department of Physics, Lucknow University, Lucknow
First Principal Study of Electronic, Magnetic, Thermal and Optical behaviors of Dopant XYZ₂[X= Zn, Cd Y= Ge, Sn, and Z=As, P]

2007 - 2009

M. Sc. Physics.

Department of Physics, CCS University Meerut (Campus)
Specialization in Electronics

2004 - 2007

B.Sc.

D.N. P.G College Gulaothi, Uttar Pradesh (CCS University Meerut)
Physics, Chemistry, Mathematics



LIST OF PUBLICATION

1. Aman Kumar, Raj Kumar, Ram Kumar, **Anuj Kumar**, Vinod Kumar Nautiyal, and Nazia Iram, "First-principles investigations of physical properties of Nd doped FeSi compound," *Materials Physics and Mechanics*, Vol. 53(1), Jan-2025, pp. 01-16, DOI: https://dx.doi.org/10.18149/MPM.5242024_xx.
2. **Anuj Kumar**, Aman Kumar, Praveen Jain, Sandeep Kumar Pundir, and Nempal Singh, "TB-mBJ for doping concentration effects on magneto-optical properties in ZnMn_xSn(1-x)As₂ spintronics materials," *Optik*, Vol. 316, Nov-2024, pp. 172039, DOI: <https://doi.org/10.1016/j.ijleo.2024.172039>.
3. **Anuj Kumar**, Aman Kumar, Sandeep Kumar Pundir, and Nempal Singh, "First Principal Study for Concentration Profile of Mn Doped ZnSnAs₂," *TWIST*, Vol. 19(1), April-2024, pp. 377-381, DOI: <https://doi.org/10.5281/zenodo.10049652#103>.
4. Aman Kumar, Harshit Gupta, **Anuj Kumar**, Ajay Kumar, Subodh Kumar Sharma, Babu Lal, and Nazia Iram, "Ab-initio study of hybrid perovskites Cs₂AgGaCl₆ for solar cells applications," *Indian Journal of Physics*, Vol. 1, June-2024, pp. 100197, DOI: <https://doi.org/10.1007/s12648-024-03273-6>.
5. Aman Kumar, **Anuj Kumar**, Ajay Kumar, and Nazia Iram, "Ab-initio study of hybrid perovskites Cs₂AgGaCl₆ for solar cells applications," *Hybrid Advances*, Vol. 6, Aug-2024, pp. 100197, DOI: <https://doi.org/10.1016/j.hybadv.2024.100197>.
6. Aman Kumar, **Anuj Kumar**, and Nazia Iram, "First-principles calculations to investigate structural, electronic, mechanical and optical properties of SrAlO₃ compound," *Hybrid Advances*, Vol. 6, Aug-2024, pp. 100211, DOI: <https://doi.org/10.1016/j.hybadv.2024.100211>.
7. Vijay Kumar, Aman Kumar, Sanjay Kumar, Sumit Kachadiya, **Anuj Kumar**, and Rishi Pal Singh, "DFT Investigation of Electronic, Magnetic and Thermodynamic Properties of Rare Earth Transition Metal Ternary Gallides Er₄XGa₁₂ (X = PD, PT)," *SHODHASAMHITA, Journal of Fundamental & Comparative Research (UGC-Care)*, Vol. XI, Issue 1 (I), Jan-June 2024, pp. 001-017.
8. Aman Kumar and Harshit Gupta, Dev Kumar, Ritu Sharma, **Anuj Kumar**, Subodh Kumar Sharma, and Aman Pal Sing, "Study of structural, and electronic properties of CsMgCl₃ compound," *East European Journal of Physics*, Vol. 1, 2024, pp. 355-360, DOI: <https://doi.org/10.26565/2312-4334-2024-1-3>.
9. Veerta, **Anuj Kumar**, and Aman Kumar, "Structure, electronic, and thermodynamical properties of Aluminium-Lithium (Al_{0.75}Li_{0.25}) alloys by DFT calculations," *International Research Journal of Management Science & Technology* (UGC listed), Vol. 14, Issue 6, 2023, pp. 176-184, DOI: <https://doi.org/10.32804/IRJMST>.
10. Babu Lal, Aman Kumar, and **Anuj Kumar**, "Study of Structural, Electronics, and Magnetic Properties of Erznga," *International Journal of Research and Analytical Reviews*, Vol. 10, Issue 2, 2023, pp. 953-958, DOI: <https://www.ijrar.org/papers/IJRAR23B3868.pdf>.
11. Aman Kumar and **Anuj Kumar**, "Study of structural, electronic, and magnetic properties of NdFeSi compound," *Research Square version*, Vol. 1, April-2023, DOI: <https://doi.org/10.21203/rs.3.rs-2802719/v1>.
12. S. Balamurugan, Navneet Singh, Nirdesh Kumar Singh, Aman Kumar, **Anuj Kumar**, Amit Kumar, Kamal Kumar, Ravish Kumar Uppadhyay, Ashish Kumar, Vikas Kumar, Vijay Kumar, and Deepmala, "System and Method to Design Nano-Photonic Structures using Machine Learning," *The Patent Office Journal*, No. 07/2023, Feb-2023, pp. 11461.
13. S. Balamurugan, Aman Kumar, Mohd. Israil, Achal Kiran, Ritu Saran, Ravish Kumar Uppadhyay, Jayant Teotia, Vikas Kumar, Deepa Teotia, Ashish Kumar, Vikky Singh, Gajendra Kumar, and **Anuj Kumar**, "System and Method to Improve the Performance of Molecular Docking Using Machine Learning," *The Patent Office Journal*, No. 11/2023, Mar-2023, pp. 21159.

IT SKILLS

Proficient in fundamental programming languages

C and Fortran

Experienced with plotting tools

GNU Plot, VISTA, and Xmgrace

Advanced Simulation Software

WIEN2k, Quantum Espresso, MATLAB

Expertise in Semiconductor Device Fabrication Tools

Silvaco

14. Aman Kumar, **Anuj Kumar**, Kamal Kumar, Rishipal Pal Singh, and Ritu Singh, "The Electronic and Thermodynamic Properties of Ternary Rare Earth Metal Alloys," *East European Journal of Physics*, Vol. 1, 2023, pp. 109, DOI: <https://doi.org/10.26565/2312-4334-2023-1-13>.
15. **Anuj Kumar** and Kamal Kumar, "Exploration of electronic and thermodynamics properties of GdNiSb compound First Principal Calculations," *International Research Journal of Management Science and Technology*, Vol. 13, Issue 8, pp. 119-128 (2022), DOI: <https://doi.org/10.32804/IRJMST>.
16. Aman Kumar, Rahul Gautam, Rishi Pal Singh, and **Anuj Kumar**, "DFT Investigations of Electronic, magnetic and Thermodynamic properties of ternary rare earth transition metal alloys," *International Journal of Advanced Science and Technology*, pp. 1150-1158, 2020. DOI: <http://sersc.org/journals/index.php/IJAST/article/view/19927>
17. Aman Kumar, Rahul Guatam, Satish Chand, **Anuj Kumar**, and R.P. Singh, "First Principle Electronic, Magnetic and Thermodynamic Characterization of Heavy Fermion Ternary Rare Earth Metal Alloys," *Materials Physics and Mechanics*, p. 112, 2019. DOI: https://www.ipme.ru/e-journals/MPM/no_14219/MPM142_10_kumar.pdf
18. **Anuj Kumar**, "History and Review of Multiwavelength Antennas Review and Concept," *Annals of MultiDisciplinary Research*, 22498893, 2018.
19. **Anuj Kumar**, "How Can Sturdy Improve in India with Political Idea and Framework," *SHODH PRERAK*, 2231413, 2018.
20. **Anuj Kumar**, "Preliminary Simulation Results of Selective Emitter Based Silicon Solar Cell," *Journal of Pure Applied Science Technology*, 22499970, pp. 46, 2014. DOI: <https://nlss.org.in/wp-content/uploads/2014/01/JPAST-JAN-14-PAPER-8-p-46-50.pdf>
21. **Anuj Kumar**, "SILICON SEMICONDUCTORUCT," *PARIPREKYA*, 22780602, pp. 51, 2014.
22. **Anuj Kumar**, "Summary on Market Value of Antenna," *ANULANA*, 09738762, 2014.

CONTRIBUTION IN INTERNATIONAL CONFERENCES /SEMINARS /WORKSHOPS

1. "One-Day Hands-On-Training on DFT Modelling of Materials and Its Applications," Department of Physics, School of Physics Sciences, Mahatma Gandhi Central University, Bihar, 15 March, 2024.
2. "Structure, Electronic, and Magnetic Properties of Cation Substitution Chalcopyrite ZnMnSnP," International Conference on Frontiers in Pure and Applied Science (FPAS-2024), Khandelwal College of Management Science and Technology, Bareilly, 5-6 April, 2024.
3. "Study of Structural, Electronic, Magnetic, and Thermodynamic Properties of NdFeSi Compound Using DFT," International Conference on Recent Advances in Functional Materials (RAFM-2024), Atma Ram Sanatan Dharma College, University of Delhi, 14-16 March, 2024.
4. "TB-mBJLDA Approach to Analyze Structure, Electronic, and Magnetic Properties of Cation Substitution Chalcopyrite CdMnSnAs," 3rd International Conference on Advancement in Core and Frontier of Physics (ACFP-2024), GLA University, Mathura, 2-4 February, 2024.
5. "TB-mBJLDA Approach to Analyze Structure, Electronic, and Magnetic Properties of Cation Substitution Chalcopyrite ZnMnGeAs," Meghnad Saha Memorial International Conference on Frontiers of Physics (MSMICFP-2023), University of Allahabad, 22-24 November, 2023.



NATIONAL LEVEL EXAM

**Cleared C.C.S. University
Campus Meerut, All India
Entrance Exam for M.Sc.
Physics - 2007**

**Cleared Joint Entrance
Screening Test (JEST) -
February 2009**

**Cleared Graduate Aptitude
Test in Engineering (GATE) -
February 2010**

**Cleared CSIR NET JRF
(December 2009) - March
2010**

**Cleared CSIR NET JRF (June
2010) - September 2010**



6. "First Principal Study for Concentration Profile of Mn Doped ZnSnAs," 2nd International Conference on Advanced Functional Materials and Devices (AFMD-2023), Atma Ram Sanatan Dharma College, University of Delhi, 13-15 March, 2022.
7. "Study Importance of Carbon Dating," National Seminar on Epic and Mythology with Special Reference to Asceticism, Shaheed Mangal Pandey Govt Girls PG College, Meerut, 29-30 March, 2022.
8. "Causes of Human Population Growth: A Quantitative Study," National Seminar on Population Growth: Challenges and Problems, Goswami Tulsidas Govt PG College, Karwi, Chitrakoot, 26-27 March, 2022.
9. "Study of Structural, Electronic, Magnetic, and Thermodynamic Properties of NdFeSi Compound Using DFT," International Conference on Recent Advances in Functional Materials (RAFM-2022), Atma Ram Sanatan Dharma College, University of Delhi, 14-16 March, 2022.
10. "Study of Structural, Electronic, Magnetic, and Thermodynamic Properties of NdFeSi Compound Using DFT," First International Conference on Technologies for Smart Green Connected Societies-2021, Yamagata University, Japan, 29-30 November, 2021.
11. "Gender Equality in Past and Present," Kashi Naresh Govt PG College, Gyanpur, Bhadohi, UP, 19 February, 2021.
12. "Employment Opportunities in Eco-Tourism in Chitrakoot," Mahamaya Rajkiya Mahavidyalaya, Sherkot, Bijnor, UP, 14 December, 2019.
13. "COP Meeting and Its Effect on Political Systems," Goswami Tulsidas Govt PG College, Karwi, Chitrakoot, UP, 25 February, 2021.
14. "Importance of Private Sector in Higher Education," Govt Raza PG College, Rampur, UP, 22 February, 2020.
15. "Indian Culture and Its Present Relevance," Goswami Tulsidas Govt PG College, Karwi, Chitrakoot, UP, 19 January, 2020.
16. "Technology Development and Women," Savitri Bai Phule Govt PG College, Chakiya, Chandili, UP, 17 November, 2019.
17. "First Principle Investigation of Electronic, Magnetic, and Thermodynamic Properties of TlGdX (X=S, Se, Te)," RIT Roorkee, India, 6 September, 2019.
18. "DFT Investigation of Electronic, Magnetic, and Thermodynamic Properties of Ternary Rare Earth Transition Metal Alloys," RIT Roorkee, India, 6 September, 2019.
19. "Digitization in Academic Activities," Ramabai Ambedkar Govt Degree College, Gajraula, Amroha, UP, 12 February, 2019.
20. "Role of ICT in Higher Education," Govt Raza PG College, Rampur, UP, 19 January, 2019.
21. "Impact of Demonetization on Rural Life in India," DRA Govt PG College, Bisauli, Badaun, UP, 5 January, 2019.
22. "Water Pollution and Its Challenges," Goswami Tulsidas Govt PG College, Karwi, Chitrakoot, UP, 21 February, 2018.
23. "COP-21 and System of Biodiversity," Govt Degree College, Manikpur, UP, 18 February, 2018.
24. "Social System for Woman Equality," Dr. BRA Govt Girls PG College, Fatehpur, UP, 10 February, 2018.
25. "Quantum Physics and Integral Humanism," JNC University, Ballia, UP, 9 December, 2017.
26. "Role of Print and Electronic Media in the Protection and Promotion of Human Rights," Mahatma Gandhi Chitrakoot Gramoday Vishwavidyalaya, Chitrakoot, Satna, MP, 26 September, 2017.

FELLOWSHIPS AND AWARDS

Got Gold Medal as Academics
topper - 2007

Shyama Prasad Mukherjee
(SPM) Fellowship - 2011

Fellowship from Department
of Atomic Energy (DAE),
Government of India - August
2010 at IIT Kanpur

Fellowship from Department
of Science and Technology
(DST), Government of India -
August 2010 to April 2011 at
ARIES Nainital

Fellowship from Council of
Scientific and Industrial
Research (CSIR), Government
of India - June 2011 to July
2012 at NPL New Delhi

Best Teacher Award at District
Level - 2021



27. National Seminar on Role of Ion Beam in Materials Science and Acquaintance Programmer on Ion Beam Facilities at IUAC New Delhi, 20 September, 2013, Department of Physics, Ch. Charan Singh University, Meerut, India.

ARTICLES IN EDITED BOOKS/CONFERENCE PROCEEDINGS/BOOK CHAPTER PUBLISHED

1. Aman Kumar, and **Anuj Kumar**, "Study Of Structural, Electronics, Magnetic, Optical Properties Of BaAlO Compound using GGA Approaches," International Congress on Advanced Energy Studies by Dr. Saltuk Bugra, New York, 1-3 June, 2024, Chapter-NA (135-135), ISBN: 978-625-367-727-5.
2. Aman Kumar, Kuldeep Singh, and **Anuj Kumar**, "Artificial Intelligence (AI) as a Tool of Physics," Emerging Technologies Unveiled: Application of Blockchain, AI, and IoT Across Science Technology by Dr. Soniya Gupta, Dr. Nikhil Gupta, Prof. Shiv Raj Singh, Dr. Subodh Kumar Sharma, and Mr. Ayush Singhal, Manglam Publications, 15 February, 2024, Chapter-8 (98-103), ISBN: 978-81-19681-89-1.
3. Aman Kumar, Sandhiya Saini, and **Anuj Kumar**, "Basic Information of Sensors," Futuristic Trends in Science and Technology by Dr. Deeksha Yajurvedi and Dr. Subodh Kumar Sharma, Manglam Publications, 12 September, 2023, Chapter-3 (36-53), ISBN: 978-8196443221.
4. Aman Kumar and **Anuj Kumar**, "Materials," Recent Advancements in Science and Technology by Dr. Subodh Kumar Sharma and Dr. Deeksha Yajurvedi, Manglam Publications, 20 May, 2023, Chapter-31, ISBN: 978-9391193799.
5. **Anuj Kumar**, "The Employment Opportunity in Eco-Tourism in Chitrakoot," Youth in India: Education and Employment by Dr. Jeet Singh and Dr. Vishal Dubey, ISBN: 978-8193974131.
6. **Anuj Kumar**, "Social System Collapses after Privatization of Education," Privatization of Education: Possibilities and Problems by Dr. Rajesh Kumar Pal and Mr. Amit Kumar Singh, Books Arcade, 10 June, 2017, Chapter-58 (221-224), ISBN: 978-9386932242.
7. **Anuj Kumar**, "Possibility of Private Sector Stability of Eco-Tourism in Chitrakoot," Possibility and Problems of Tourism in the Region of Chitrakoot by Dr. Rajesh Kumar Pal and Mr. Amit Kumar Singh, Books Arcade, 10 May, 2017, Chapter-50 (190-193), ISBN: 978-9386932242.