

Curriculum Vitae

Dr. Ashish Varma

Assistant Professor (Grade-II)

Departement of Physics

Kashi Naresh University, Bhadohi

(Previously Kashi Naresh Govt. P. G. College,

Gyanpur Bhadohi, UP-221304, India)

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DoB: 18.07.1995

Google Scholar: <https://scholar.google.co.in/citations?user=b560o1wAAAAJ&hl=en>

Researchgate ID: <https://www.researchgate.net/profile/Ashish-Varma-2>



RESEARCH INTEREST

Electron Bernstein wave, Lower Hybrid wave, Magnetosonic wave, Electron Acceleration, Kinetic Theory, Terahertz generation using laser-plasma interaction, Particle acceleration, Nanoclustered Plasma, Electron Heating, Laser Nanoparticles Interaction, Carbon Nanotube, Laser Harmonic Generation.

EDUCATION

2022 **Ph.D., University of Allahabad, India**

Thesis Title: Electron Bernstein waves in non-Maxwellian plasma embedded with cluster

2017 **Master of Science (Physics), University of Allahabad, India**

CGPA (% Marks): 7.79/10 (77.90%)

Division: First

Dissertation: Thermal Conductivity of Nickel EG based Nano Fluids

2015 **Bachelor of Science (B.Sc.), University of Allahabad, India**

Major Subjects: Physics, Chemistry and Mathematics

Division: First division (65.19%)

Dissertation: Quantum Hall Effect

05/08/2021- till date

Assistant Professor, Department of Physics, Kashi Naresh Govt. P. G. College, Gyanpur Bhadohi, India

23/01/19 to 22/01/2021

CSIR-UGC JRF at Department of Physics, University of Allahabad, India

23/01/21 to 04/08/2021

CSIR-UGC SRF at Department of Physics, University of Allahabad, India

PROFESSIONAL EXPERIENCE

AWARDS / ACHIEVEMENTS

- **Junior Research Fellowship** (NET+JRF) conducted by Council of Scientific and Industrial Research (CSIR), Ministry of Human Resource Development, India, (December 2016).
- Name appeared in the list of **Top 2% Scientists of the world** in a study published by the Professors of Stanford University, USA in 2024, 2025

ADMINISTRATIVE RESPONSIBILITIES

- **Member:** ICT cell, at Kashi Naresh Govt. P. G. College, Gyanpur Bhadohi, India, Aug 2021 - till date
- **Member:** IQAC, at Kashi Naresh Govt. P. G. College, Gyanpur Bhadohi, India, Sept 2021 - till date
- **Member organizer to exam NGPE**, at Kashi Naresh Govt. P. G. College, Gyanpur Bhadohi, India, Sept 2021 - till date
- **Member NAAC Committee**, at Kashi Naresh Govt. P. G. College, Gyanpur Bhadohi, India, July 2022 - till date
- **Member SAMARTH Committee**, at Kashi Naresh University, Bhadohi, India, July 2026 - till date

RESEARCH SKILLS

- Mathematical skills to solve analytical problems.
- Numerical techniques like finite difference method, finite element method and runge- kutta method to solve ordinary and partial differential equations using MATLAB, C++ and their effective use in analysis the mathematical complexities.
- Knowledge with Linux, Mac and Window.
- Writing code in MATLAB, C++, Python.

SELECTED RESEARCH WORK

- **Kinetic Theory:** Nonlocal Theory for excitation, electron Beam, Maxwellian distribution, Non-Maxwellian distribution, Growth rate, Cerenkov and slow cyclotron interactions.
- **Electron Bernstein wave:** Laser plasma interaction, Beat wave mechanism, Pondermotive force, Homogeneous and inhomogeneous magnetized plasma
- **Surface Plasma Wave:** Intense laser pulses or dual laser beat-waves interaction with metal surfaces to drive nonlinear currents and amplify local fields
- **Harmonic Generation:** Producing coherent light at new, hard-to-reach wavelengths,
- **THz Source**
- **Tunnel ionization:** Femtosecond laser, numerical study of spatial distribution of plasma density, study the effect of laser phase envelope on ionization process, the effect of inhomogeneity of plasma density on frequency, power and efficiency of emitted radiation. Study the effect of applied dc magnetic field in tuning the frequency and power of emitted radiation.
- **Optical Rectification in plasma:** Study the effect of laser profiles and beam width on field amplitude, efficiency and direction of the emission of terahertz radiations.

PEER-REVIEWED SCI JOURNAL PUBLICATIONS

PUBLISHED

1. Ali, K., Kumar, S., Kumar, A. **Varma A.** Effect of ambient magnetic field on surface plasma wave-assisted second harmonics over metal surfaces embedded with carbon nanotubes. **Eur. Phys. J. Plus** 141, 902 (2026).
<https://doi.org/10.1140/epjp/s13360-026-08067-9>
2. Vishwakarma MK, Mishra SP, **Varma A.** Nonlinear resonant absorption of a laser beam in arrays of vertically aligned anharmonic carbon nanotubes over different dielectric surfaces. *Radiation Effects and Defects in Solids*. 2026 Apr 25:1-21.
3. Tiwari UK, Ansari A, Patel MS, Yadav A, Mishra SP, Kumar A, Kumar A, **Varma A.** Influence of external magnetic field on the excitation of lower hybrid wave by beating of two different profile laser beams in spherical nanoparticles: UK Tiwari et al. **Journal of the Korean Physical Society**. 2026 Jul;89(1):62-77.

4. UK Tiwari, A Ansari, MS Patel, SP Mishra, A Yadav, A Kumar, A Kumar, **A Varma**. Resonant absorption of surface plasma wave over different metal and dielectric surface embedded with vertically aligned arrays of cylindrical shaped nanoparticles. **The European Physical Journal Plus**. 2025 Dec 24;140(12):1249.
5. Kumar S, Ali K, Kumar A, Kumar A, Mishra SP, **Varma A**. Enhanced anomalous electron heating by nonlinear interaction of plasma wave–aided beat wave of two identical profile laser beams in plasma with density ripple. **Fusion Science and Technology**. 2025 Dec 13:1-2.
6. S. Kumar, K. Ali, A. Kumar, A. Kumar, B. K. Pandey, S. Kaur, S. P. Mishra, and **Ashish Varma**, 2026. Excitation of Ion Bernstein and Ion Cyclotron Waves by an Ion Beam in a Ripple Density Plasma. *Brazilian Journal of Physics*, 56(1), p.19. <https://doi.org/10.1007/s13538-025-01916-5>
7. M K Vishwakarma, SP Mishra, A Kumar, A Kumar, **Ashish Varma**. Excitation of a large amplitude electrostatic wave by counterpropagation of two laser beams in spherical nanoparticles. *Radiation Effects and Defects in Solids*. 2025 Nov 4:1-21.
8. Sujeet Kumar, Ali, Kaisar, Asheel Kumar, and **Ashish Varma**. " Plasma wave-assisted two-photon decay of skew cosh-Gaussian laser beam in a magnetized collisional nanoclustered plasma." *Radiation Effects and Defects in Solids* (2025): 1-22. <https://doi.org/10.1080/10420150.2025.2576874>
9. Ali, Kaisar, Sujeet Kumar, Arvind Kumar, Asheel Kumar, and **Ashish Varma**. "Surface plasma wave aided Laguerre–Gaussian laser beam second harmonic generation in arrays of vertically aligned carbon nanotube over metal surface." *Journal of Laser Applications* 37, no. 3 (2025). <https://doi.org/10.2351/7.0001819>
10. Vishwakarma, M. K., S. P. Mishra, Arvind Kumar, Asheel Kumar, and **Ashish Varma**. "Enhanced electron heating by electron plasma wave assisted beat wave of two different profile laser beams in magnetized collisional plasma with density rippled." *Journal of the Korean Physical Society* (2025): 1-16. <https://doi.org/10.1007/s40042-025-01446-y>
11. Ansari, A., M. S. Patel, S. P. Mishra, Arvind Kumar, Asheel Kumar, and **A. Varma**. "Excitation of large-amplitude electron plasma wave by counterpropagation of two laser beams in spherical nanoparticles." *Laser Physics* 35, no. 4 (2025): 045402. <https://doi.org/10.1088/1555-6611/adc559>
12. Ali, Kaisar, Sujeet Kumar, Asheel Kumar, and **Ashish Varma**. "Influence of field optimization property of Hermite cosh-Gaussian laser beam on nonlinear

- absorption in arrays of vertically aligned cylindrical carbon nanotubes." *Radiation Effects and Defects in Solids* (2025): 1-15. <https://doi.org/10.1080/10420150.2025.2484740>
13. Vishwakarma, M. K., S. P. Mishra, Arvind Kumar, Asheel Kumar, and **Ashish Varma**. "Electron Bernstein wave aided Hermite cosh-Gaussian laser beam absorption in plasma with static magnetic field." *Journal of Optics* (2024): 1-13. <https://doi.org/10.1007/s12596-024-02343-6>
 14. Mishra, S. P., **A. Varma**, and A. K. Kushwaha. "Structural, electronic and optical properties of CdTiX₂ (X= N and P): A first principles density functional theory investigation." *Computational Condensed Matter* 41 (2024): e00974. <https://doi.org/10.1016/j.cocom.2024.e00974>
 15. M. K. Vishwakarma, S. P. Mishra, A. Kumar, A. Kumar and **A. Varma**, Excitation of electrostatic lower hybrid wave by nonlinear interaction of hermite cosh-gaussian and cosh-gaussian laser beams in collisional plasma embedded with static magnetic field. *Opt Quant Electron* 56(10):1644 (2024). <https://doi.org/10.1007/s11082-024-07584-0>
 16. K. Ali, S. Kumar, A. Kumar, A. Kumar, S. P. Mishra, and **A. Varma**, Nonlinear absorption of Hermite cosh-Gaussian laser beam in an assembly of cylindrical carbon nanotubes embedded with static magnetic field. *Opt Quant Electron* 56, 9 (2024). <https://doi.org/10.1007/s11082-024-07344-0>
 17. S. Kumar, K. Ali, A. Kumar, A. Kumar, S. P. Mishra, and **A. Varma**, Langmuir Wave-Assisted Two-Photon Decay of an Amplitude-Modulated Gaussian Laser Beam in Rippled Density Plasma. *Arab J Sci Eng* (2024). <https://doi.org/10.1007/s13369-024-09234-9>
 18. S. P. Mishra, A. Kumar, A. Kumar and **A. Varma**, Electrostatic wave assisted super-gaussian laser beam absorption in collisional plasma embedded with static magnetic field. *J Opt* (2024). <https://doi.org/10.1007/s12596-024-01903-0>
 19. **A. Varma**, S. P. Mishra, A. Kumar, and A. Kumar, Third harmonic generation of cosh-Gaussian laser beam in arrays of vertically aligned carbon nanotube. *Opt Quant Electron* 56, 905 (2024). <https://doi.org/10.1007/s11082-024-06839-0>
 20. **A. Varma**, S. P. Mishra, A. Kumar, Laguerre-Gaussian Laser Beam Second Harmonic Generation in Arrays of Vertically Aligned Carbon Nanotube. *Plasmonics* (2024). <https://doi.org/10.1007/s11468-024-02284-7>

21. A. K. Kushwaha, S. P. Mishra and **A. Varma**, Lattice dynamical and elastic properties of fluoride structure PbF₂, CdF₂ and their mixed superionic conductors PbxCd_{1-x}F₂. Computational Condensed Matter 39(B5):e00899 (2024). [https://doi.org/ 10.1016/j.cocom.2024.e00899](https://doi.org/10.1016/j.cocom.2024.e00899)
22. **A. Varma**, S. P. Mishra, A. Kumar, S. Kumar and A. Kumar, Electron plasma wave excitation by two co-propagating super-Gaussian laser beams in collisional nanocluster Plasma: Journal of Theoretical and Applied Physics (JTAP) (2023) 17:5 10.57647/J.JTAP.2023.1705.5
23. **A. Varma**, S. P. Mishra, A. Kumar and A. Kumar, Nonlinear Absorption of Cosh-Gaussian Laser Beam in Arrays of Vertically Aligned Carbon Nanotube. *Plasmonics* **19**, 505–521, (2024).
24. **A. Varma**, S. P. Mishra, A. Kumar and A. Kumar, Electron Bernstein wave aided Hermite cosh-Gaussian laser beam absorption in collisional plasma. *Laser Phys. Lett.* **20** (2023) 076001
25. A. Kumar, S. P. Mishra, S. Kumar, A. Kumar and **A. Varma**, Excitation of electron Bernstein wave by nonlinear interaction of two copropagating Hermite–Gaussian laser beams in collisional plasma with static magnetic field: Opt Quant Electron 55 (2023) 598
26. A. Kumar, S. P. Mishra, A. Kumar and **A. Varma**, Electron Bernstein wave aided cosh-Gaussian laser beam absorption in plasma, *Optik* **273** (2023) 170436
27. A Kumar, A Kumar, S. P. Mishra, M. S. Yadav, and **A. Varma**, “ *Plasma wave aided heating of collisional nanocluster plasma by nonlinear interaction of two high power laser beams*” Optical and Quantum Electronics, (2022), **54** 753.
28. S Babu, A Kumar, R Jeet, A Kumar, and **Ashish Varma*** “*Parametric Instability of an X-mode laser off a lower hybrid wave*”_Iran J Sci Technol Trans Sci 46, 1719–1726 (2022). <https://doi.org/10.1007/s40995-022-01373-8>
29. S Babu, A Kumar, R Jeet, A Kumar, and **Ashish Varma*** “*Decay instability of X-mode laser in a magnetized plasma embedded with clusters*” **Optical and Quantum Electronics** (2022), **55**, 2.
30. S Babu, A Kumar, R Jeet, A Kumar, and **Ashish Varma***, “*Decay instability of X- mode laser into upper hybrid and electron Bernstein waves in a plasma*” **Optical and Quantum Electronics** (2022), **54**, 710.

31. **A. Varma** and Asheel Kumar, “*Electron Bernstein wave aided heating of collisional nanocluster plasma by nonlinear interactions of two super-Gaussian laser beams*” LASER PHYSICS (2022), **32** 016001
32. A Kumar, A Kumar, and **Ashish Varma**, “*Excitation of electron Bernstein wave by beating of two cosh-Gaussian laser beams in a collisional plasma*” LASER PHYSICS (2021), **31** 106001
33. **Ashish Varma***, A Kumar, “*Electron Bernstein wave aided beat wave of Hermite-cosh-Gaussian laser beam absorption in a collisional nanocluster plasma*” Optik - International Journal for Light and Electron Optics, (2021), 254, 167702.
34. S Babu, A Kumar, R Jeet, A Kumar, and **Ashish Varma***, “*Stimulated Raman Scattering of X-Mode Laser in a Plasma Channel*” Laser and Particle Beams (2021),10, 9919467.
35. **A. Varma***, A Kumar, “*Electron Bernstein wave excitation by beating of two copropagating super-Gaussian laser beam in a collisional nanocluster plasma*” Optik- International Journal for Light and Electron Optics, (2021), 240, 166872.
36. R. Jeet, A. Kumar, S. Babu, A. Kumar and **A.Varma***, A Kumar, and A Kumar, “*Acceleration of electrons by a lower hybrid wave in a magnetic mirror*” Journal of the Korean Physical Society 78, 1179–1184, (2021).
37. **Ashish Varma***, A Kumar, and A Kumar, “*Nonlocal Theory of Excitation of Electron Bernstein Waves by a Relativistic Electron Beam in Plasma with Loss-Cone Distribution of Electron*” Brazilian Journal of Physics, (2021), 51, pages 661–666.
38. **Ashish Varma***, and A Kumar, “*Excitation of lower hybrid wave by counterpropagating cosh Gaussian laser beams in a magnetized plasma*” OPTIK (2021), 231, 166326.
39. **Ashish Varma***, and A Kumar, “*Electron Bernstein wave excitation and heating by nonlinear interactions of Laguerre and Hermite Gaussian laser beams in a magnetized plasma*” OPTIK (2021), 228, 166212.
40. S Yadav, P Chaudhary, K N Uttam, **Ashish Varma***, M Vashishtha, and B C Yadav, “*Facile synthesis of molybdenum disulfide (MoS₂) quantum dots and its*

application in humidity sensing”, **Nanotechnology** (2019), 30, 295501.

Book Chapters

1. S. P. Mishra and **Ashish Varma**, “ *Heating of Collisional Nanocluster Plasma: Role of beam Decentred parameter*” **Optical Recent Development and Techniques in Physical Sciences Publisher: Weser Books** (2022), DOI: 10.33545/wb.book.260, ISBN: 978-3- 96492-444-5.
2. S. P. Mishra and **Ashish Varma**, “ *soft x-ray generation through laser nanocluster interaction: sustainable development approach*” **PERSPECTIVE OF ENVIRONMENTAL SCIENCE Publisher: GLOBAL ACADEMIC SOCIETY OF INDIA**, (2022)
3. M. K. Vishwakarma, S. P. Mishra, Arvind Kumar, Asheel Kumar and **Ashish Varma**, “ *Tunable Nonlinear Current Density Generation by Beating of Two High Power Laser Beams in Plasma Embedded with Nanocluster*” **Advancement in Functional Materials Publisher: Shree Publishers & Distributors**, (2024), ISBN: 978-81-19448-43-2.
4. S. P. Mishra, Arvind Kumar, Asheel Kumar and **Ashish Varma**, “ *ENHANCED NONLINEAR PONDEROMOTIVE FORCE BY BEATING OF TWO COPROPAGATING SUPER-GAUSSIAN LASER BEAMS IN NANOCLUSTERED PLASMA*” **Futuristic Trends in Physical Sciences V3B4** (2022), IIP Series, Page No.: 274-280, DOI: 10.58532/V3BKPS4P8CH5, ISBN: 978-93-5747-671-3.

CONFERENCES/ SCHOOL/ WORKSHOP

1. **Ashish Varma***, S. P. Mishra, A. Kumar, and A Kumar, “*Nonlinear Absorption of High Power Cosh-Gaussian Laser Beam in Plasma Embedded with Nanocluster*” **10th National Conference on Nano Science and Instrumentation Technology (July 9-10, 2022).**
2. **Ashish Varma***, and A Kumar, “*Electron Bernstein wave excitation by beating of two laser beams in plasma embedded with cluster*” **2nd International Conference on Plasma Theory and Simulation**, 20 – 22 June, 2022 Department of Physics, University of Lucknow, India.
3. **Ashish Varma***, and A Kumar, “*Electron Bernstein wave assisted laser beat wave heating of collisional nanocluster plasma*” **ICMSS-21 (international Conference),**

Organized by Maharishi School of Science Maharishi University of Information Technology, Sept 2021.

4. **Ashish Varma***, and A Kumar, “*Electron Bernstein wave excitation by beating of two laser beams in plasma*” **RAFAS-21 (international Conference)**, Organized by Lovely Professional University, Punjab, 25-26 June 2021.
5. **Ashish Varma***, A Kumar and A Kumar, “*Non local theory of excitation of electron Bernstein wave in magnetized beam plasma system*” **34th National Symposium on Plasma Science & Technology (PLASMA 2019)**, Organized by VIT, Chennai, India, 3-6 Dec 2019.
6. **Ashish Varma***, and A Kumar, “*Non local theory of excitation of electron Bernstein waves by a relativistic electron Beam in a plasma with loss cone velocity distribution function*” **ICPSA-19 (international Conference)**, Organized by University of Lucknow, India, 11-14 November 2019.
7. Attend the SERB School on “*DST-SERB School on Ultrahigh Intensity Laser Produced Plasmas : Physics and Applications*” organized by RRCAT, Indore - 452013 MP India Jan 7-25 2019.
8. **Ashish Varma**, Abhishek Shukla , Sweta Sharma , Abhi Sarika Bharti , Kamlesh Pandey , R.Gopal and K. N. Uttam, “*SYNTHESIS AND CHARACTERISATION OF MANGANESE FERRITE NANOPARTICLES*” **MMISLIBS-2018**, organized by Department of Physics, University of Allahabad, Allahabad, India.

Course works/ /FIP/RC/FDC:

- 🌈 “NEP 2020 Orientation & Sensitization Programme” Malaviya Mission Teacher Training Programme (MM-TTP) of University Grants Commission(UGC) organized by Mahatma Hansraj Malaviya Mission Teacher Training Centre (MH-MMTTC), Hansraj College, University of Delhi in collaboration with Government Degree College during 2024-10-01 to 2024-10-10
- 🌈 ONLINE TWO - WEEK REFRESHER COURSE in “PHYSICS” Teaching Learning Centre Ramanujan College, University of Delhi (Accredited Grade 'A++' by NAAC) under the aegis of MINISTRY OF EDUCATION PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND TEACHING during 2023-02-27 to 2023-03-13
- 🌈 ONLINE TWO - WEEK REFRESHER COURSE in “PHYSICS” Teaching Learning Centre, Ramanujan College University of Delhi under the aegis of MINISTRY OF EDUCATION PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND

TEACHING during 2022-07-28 to 2022-08-11

- ✚ 4-Week Induction/Orientation Programme for “Faculty in Universities/Colleges/Institutes of Higher Education” Teaching Learning Centre, Ramanujan College University of Delhi under the aegis of MINISTRY OF EDUCATION PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND TEACHING, during 2022-04-20 to 2022-05-19
- ✚ Online Inter-Disciplinary two-week Refresher Course in “Managing Online Classes & Co-creating MOOCS Teaching Learning Centre Ramanujan College, University of Delhi (Accredited Grade 'A++' by NAAC) under the aegis of MINISTRY OF EDUCATION PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND TEACHING during 2023-11-11 to 2023-11-25
- ✚ “Managing Online Classes & Co-creating MOOCS” Three days **National workshop** on “**Inspiration for Research: YOU CAN**” at MNNIT, Allahabad.
- ✚ After M.Sc. Physics (Jul 2017 to Oct 2018) worked on “Synthesis and characterization of cobalt, manganese, nickel and copper ferrite nanoparticles by co-precipitation and hydrothermal methods” under the guidance of Dr. K N Uttam at Physics Department, University of Allahabad.
- ✚ One day WOKSHOP on **Best Practice in Scientific Publishing, December 20, 2018** organized by J.K. Institute of Applied Physics and Technology, UoA, Prayagraj

PhD Supervised:

S.No.	Name of Student	Title of Thesis	Year	Supervisor/ Co-Supervisor	Status
1.	Manoj Kumar Vishwakarma	Nonlinear Interaction of High Power Laser Beam with Plasmas and Nanoparticles	2026	Co-Supervisor	Submitted
2.	Asfiya Ansari	Nonlinear Interaction of Laser Beam with Nanoparticles		Co-Supervisor	Ongoing

Membership of society/Position held in society:

S.No.	Name of Professional Bodies	Grade of Membership	Membership no
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1.	Plasma Science Society of India	Life Member	1699
2.	Division of Plasma Physics, the Association of Asia Pacific Physical Societies (AAPPS-DPP),	Life Member	3141

Reviewer of Journals:

-  Optical and Quantum Electronics, Springer
-  Interactions, Springer
-  Progress In Electromagnetics Research (E-ISSN: 1559-8985), The Electromagnetic Academy (USA)
-  Fusion Science and Technology - Taylor & Francis
-  Physics of Plasmas, American Institute of Physics
-  Optik: International Journal for Light and Electron Optics, Elsevier
-  Optics Communications, Elsevier

Details of Invited talks / expert lecture delivered:

-  Invited talk on “Excitation of plasma wave by two copropagating super Gaussian laser beams in collisional nanocluster plasma” at the 3rd National Conference on Materials and Devices (3rd NCMD-2022) held on 10– 11 November-2022.