Dr. Hemant Jatav

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Research Profile

Experimental condensed matter physicist specializing in ion-beam modification of nanomaterials, plasmonic alloy nanoparticles, and functional materials for extreme environments. Research integrates advanced electron microscopy (TEM/STEM), synchrotron-based GISAXS/GIWAXS, XPS, and ion irradiation to establish structure–property relationships in confined nanoscale systems. Founder and Principal Investigator of the NEST Research Group focused on materials for energy and nuclear applications.

Academic Positions

Assistant Professor (Jan 2024 – Present)
School of Physics, Devi Ahilya Vishwavidyalaya (DAVV), Indore

Senior Research Fellow (2018 – 2023)
Inter-University Accelerator Centre (IUAC), New Delhi

Education

Ph.D. in Physics and Materials Science, IUAC (Affiliated to JNU), 2023
M.Sc. Physics, Indian Institute of Technology (IIT) Delhi, 2018
B.Sc. Physics, University of Delhi, 2015

Funded Research Projects

• Seed Money Project (PI), DAVV – Silica-embedded plasmonic alloy nanoparticles (Completed 2025)
• CRS Project (PI), UGC-DAE CSR – Nonlinear optical properties of plasmonic nanocomposites (2025–26)
• UFR Scheme (Co-PI), IUAC – Ion beam enhanced photoelectrocatalysis for green hydrogen (2025)

Research Expertise

- Ion beam irradiation (swift heavy ions, low energy implantation, RBS, damage profiling)
- Transmission Electron Microscopy (JEOL JEM F-200), STEM-EDS, EELS, SAED
- Synchrotron-based GISAXS/GIWAXS and XPS (DESY, Germany)
- Nanoparticle synthesis: sputtering, ion implantation, chemical reduction, laser ablation
- Optical characterization: UV-Vis spectroscopy and photoluminescence
- Data analysis tools: GMS 3, CASA XPS, ImageJ, SRIM/TRIM, Python, MATLAB

Teaching & Student Supervision

Courses taught: Classical Electrodynamics, Electricity & Magnetism, Electronics, Digital Signal Processing, Laser Applications, Digital Electronics.
Supervision: Guiding M.Sc. and B.Sc. research projects in nanomaterials synthesis, electron microscopy, and ion-beam modification studies.

International Exposure & Recognition

Guest Scientist at DESY (Germany) – Synchrotron GISAXS/GIWAXS experiments (2021, 2022).
Best Poster Award – ICTP-IAEA-MAMBA School on Materials Irradiation, Italy (2025).
Young Scientist Travel Grant – SERB, Govt. of India (MC 2023, Germany).