CURRICULUM VITAE

Name : Dr. Pawan Kumar

Designation : Associate Professor

Department : Physics

University : Gurukula Kangri (Deemed to be University), Haridwar
Haridwar-249404, Uttarakhand, India

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M.Sc. Specialization : Electronics

Research Area : Material Science, Fuel Cell, Thin Film, Solar Cell, Energy Conversion, Li-ion/Li-S Batteries, Energy Harvesting for wearable technologies, Analytical Chemistry

Experience:

- Research Experience: More than 25 Years.
- Teaching Experience: More than 22 Years.
- Visiting Scientist for two months in the session 2018-19 invited by University of Pureto Rico, San Juan, USA .

Courses Taught:

- Solid State Physics, Mathematical Physics, Statistical Physics, Mechanics, Optics, Modern Physics, Thin Film and Nanostuctures.

Research under Guidance:

- Research Publications (In Refereed Journals): 48
- Ph.D. Students : (i) Awarded: 06 (Supervisor), 01 (Co-Supervisor)
  (ii) Going on: 01 (Supervisor), 02 (Co-Supervisor)
- M.Sc. Project Completed : 48

Awards & Honors:

- Departmental fellowship for M.Phil (2000).
- Departmental fellowship for Ph.D. (2001-2003).

- **Raman Post- Doctoral, Fellowship** for one year (2015-2016) Researcher in **USA**, Awarded by University Grant Commission (UGC), New Delhi, India.
- Excellence Teaching Award by SERS and Kasetsart University, **Bangkok, Thailand** in 05/02/2016.
- Invited speaker in Short Term Training Programme on "Synthesis and Characterization of Multifunctional Material", Department of Physics, NIT Srinagar, Uttarakhand, 11-15 November, 2019.
- Invited speaker in **GYAN GANGA** programme in video format Department of Chemistry, Government College Kota, Rajasthan, 2021.

Publication:

- **P. Kumar,** A. Misra, D. Kumar, N. Dhama, T. P. Sharma, P. N. dixit, Structural and Optical Properties of Vacuum evaporated $Cd_xZn_{1-x}S$ thin films, *Optical Materials,* 27 (2004) 261-264.
- **P. Kumar,** D. Kumar, P. N. Dixit, T. P. Sharma, Optical and Electrical Properties of Cadmium Sulphide Vacuum Evaporated thin film" *(Proc. ELECTRO-2005)* 404-406.
- **P. Kumar**, A. Kumar, P.N. Dixit, T. P. Sharma, Optical Structural and Electrical Properties of Zinc Sulphide Vacuum evaporated thin film". *Indian Journal of pure and Applied Physics,* 44 (2006) 690-693.
- **P. Kumar,** A. Kumar, P. N. Dixit, T.P. Sharma, Study of optical constants in $Cd_xZn_{1-x}S$ Vacuum evaporated thin films, *Indian Journal of Engineering & Material Science,* 14 (2007) 313-316.
- **P. Kumar,** A. Kumar, Parvinder, K. Malik, Study of wavelength dependence of optical constants for ZnSe vacuum evaporated thin films, *International Journal of Latest Research in Science and Technology,* 1 (2012) 314-317.
- A. Kumar, **P. Kumar**, Parvinder, K. Malik, Effect of post –deposition annealing on hydrogenated amorphous silicon thin films grown at high power by PECVD, *International Journal of Soft Computing and Engineering,* 2 (2013) 516-519.
- **P. Kumar,** A. Kumar, L. P. Purohit, K. Malik, Parvinder, Structural & optical characterization of $Ge_xSe_{80-x}Pb_{20}$ thin films prepared by thermal evaporation technique, *International Journal of Soft Computing and Engineering,* 3 (2013) 413-415.

- **P. Kumar,** A. Kumar, Parvinder, K. Malik, Optical and structural properties of ZnSeTe Thin Film deposited on glass & ITO Substrates, *Proceedings of National conference on Upcoming Trends in Chemical Science UTCS*, (2013) 124-127.
- **P. Kumar,** A. Kumar, Parvinder, K. Malik, Investigation of Optical and Structural Properties of ZnTe thin film, *Proceedings of National Conference on Upcoming Trends in Chemical Science (UTCS),* (2013) 134-136.
- K. Malik, Parvinder**, P. Kumar**, A. Gupta, A Kumar, Effect of Annealing on Optical & Electrical Properties Of $Se_{66}Te_{30}Pb_4$ Thin Film Chalcogenide Glass, *Proceedings of International Conference on Optics & Optoelectronics (ICOL),* (2014).
- K. Malik, Parvinder**,** A. Gupta, **P. Kumar,** Dispersive Optical Constants of Thermally Evaporated $Se_{70-x}Te_{30}Pb_x$ Thin films, *Journal of Ovonic Research* 11 (2015) 61-72.
- Parvinder, K. Malik, **P. Kumar**, Optical and Electrical Properties of $Cd_xZn_{8-x}Te_{92}$ Chalcogenide Thin Films Deposited by Thermal Evaporation AT Low Temperature, *Journal of Non- Oxide Glasses*, 7 (2015) 23-31.
- **P. Kumar,** A. Kumar, Ellipsometry analysis CdS_xSe_{1-x} Thin Films Prepared by Thermal Evaporation Technique, *International Journal of Engineering Research & Management Technology*, 2 (2015) 118-123.
- R. Sharma, B. D. Indu, **P. Kumar**, Scattering Events and Heat Conductivity of Layered $La_{2-x}Sr_xCuO_4$ Superconductors, *International Journal of Physics*, 4 (2016) 106-112.
- B. Tripathi, **P. Kumar**, R. K. Katiyar, Ram S. Katiyar**,** Aligned MWNT channels in free standing polymer nanocomposite as an electrode for Li-ion battery, *Appliled Physics Letters*, 110 (2017) 173902.
- **P. Kumar**, A. Kumar, R. K. Katiyar, A. Instan, M. K. Bhattarai, R. S. Katiyar, Influence of S on Optical and Structural Dispersion Parameters of Thermally Evaporated Non-crystalline CdS_xSe_{1-x} Thin Films, *Journal of Applicable Chemistry*, 8, (2019) 760-768.
- **P. Kumar**, A. Kumar, , A. Instan, R. K. Katiyar, Structural, Optical and Raman Characterization of Nano-Crystalline Cu Doped Zno Thin Films Deposited by Pulse Laser Deposited Technique, *Global Journal of Science Frontier Research*, 21 (2019).

- **P. Kumar**, A. Kumar, R. K. Katiyar, A. Instan, Ram S. Katiyar, Structural, Raman and Electrical Characterization of Nano-Crystalline of CdSe Thin Films Deposited by Pulse Laser Deposited Technique, *Global Journal of Science Frontier Research* 19 (2019).
- D. Singh, **P. Kumar**, J. Singh, D. Veer, A. Kumar, Ram S. Katiyar, Structural, thermal and electrical properties of composites electrolytes $(1-x)CsH_2PO_4/xZrO_2 (0 \leq x \leq 0.4)$ for fuel cell with advanced electrode, *Journal of S N Applied Sciences*, 3 (2021) 46.
- Flavia P. N. Inbanathan, **P. Kumar,** K. Dasari, Ram S. Katiyar, J. Chen, W. M. Jadwisienczak, Ellipsometry study of CdSe thin films deposited by PLD on ITO substrates, *Journal of MDPI*, 14 (2021) 3307.
- **P. Kumar,** D. Kumar, A. Kumar, Ram S. Katiyar, Effect of Post Growth Annealing Process on Optical Properties of CdSe Thin Films on Si-type Substrate Deposited by Pulsed Laser Deposition Technique, *The International Journal of Analytical and Experimental Modal Analysis*, 13 (2021) 3016-3028.
- D. Singh, J. Singh, **P. Kumar,** D. Veer, D. Kumar, Ram S. Katiyar, A. Kumar, A. Kumar, The Influence of TiO_2 on the Proton Conduction and Thermal Stability of CsH_2PO_4 Composite Electrolytes, *South African J Chem Eng.*, 37 (2021) 227–236.
- D. Veer, **P. Kumar,** D. Singh, D. Kumar, Ram S. Katiyar, Conduction and stability performance of CsH_2PO_4 with NaH_2PO_4/ZrO_2 for fuel cell, *Material Research Express*, 8 (2021) 115501.
- D. Veer, **P. Kumar,** D. Singh, D. Kumar, A. Kumar, Ram S. Katiyar, Phase Behaviour and Ionic Conduction in the Composite Electrolytes $CsH_2PO_4/SDP.2H_2O$, *Russian Journal of Inorganic Chemistry*, 66 (2021) 2059-2067.
- D. Veer, **P. Kumar,** D. Singh, D. Kumar, Ram S. Katiyar, A synergistic approach to achieving high conduction and stability of $CsH_2PO_4/NaH_2PO_4/ZrO_2$ composites for fuel cells, *Material Advances.*, 3 (2022) 409–417.
- D. Singh, J. Singh, D. Veer, **P. Kumar,** Ram S. Katiyar, Structural, thermal, and transport properties of nanocomposite $CsH_2PO_4/NaH_2PO_4/TiO_2$: A novel proton-conducting electrolyte for fuel cells, *Results in Chem.*, 4 (2022) 100262.
- D. Singh, J. Singh, D. Veer, **P. Kumar,** Ram S. Katiyar, Synergistic effect of SiO2 on proton conduction and thermal behavior for nanocomposite electrolyte CsH_2PO_4 fuel cells, *Journal of Materials Science: Materials in Electronics*, 33 (2022) 6524–6535.

- **P. Kumar,** Nisha, P. Sarkar, S. Singh, B. C. K. Mishra, Ram S. Katiyar, The Influence of Post-Growth Heat Treatment on the Optical Properties of Pulsed Laser Deposited ZnO Thin Films, *Applied Physics A,* 128 (2022) 372.
- D. Singh, J. Singh, D. Veer, **P. Kumar,** Ram S. Katiyar, Influence of NaH_2PO_4 and TiO_2 on the Proton Conduction and Thermal Properties of Nanocomposite Electrolyte CsH_2PO_4 for Fuel Cells, *Russian Journal of Inorganic Chemistry,* 67 (2022) 598–607.
- D. Veer, **P. Kumar,** D. Singh, Ram S. Katiyar, Study of proton mobility and thermal stability of novel orthophosphate-based composite electrolyte for conductivity improvement, *Ionics,* 28 (2022) 3357–3366.
- D. Veer, D. Singh, D. Kumar, **P. Kumar,** Ram S. Katiyar, Structural, thermal, and superprotonic behavior of a new phosphate $NaH_2PO_4.2H_2O/ZrO_2$, *Inorganic Chemistry Comminication,* 146 (2022) 110195.
- **P. Kumar,** D. Kumar, A. Kumar, Ram S. Katiyar, Study of CdSSe Thin Film Using Different Substrates Deposited by Pulsed Laser Deposition Technique, *Journal of Electronic Materials,* 51 (2022) 5759–5769.
- Nisha, **P. Kumar,** P. Sarkar, Ram S. Katiyar, Influence of S/Sn ratio on microstructural, morphological and optical properties of tin monosulfide thin films, *Optical Materials,* 133 (2022) 112792.
- M. K. Malik, V. Kumar, P. P. Sharma, J. Singh, S. Fuloria, V. Subrimanyan, N. K. Fuloria, **P. Kumar,** Improvement in Digestion Resistibility of Mandua Starch (Eleusine coracana) after Cross-Linking with Epichlorohydrin, *ACS Omega*, 7 (2022) 27334−27346.
- P. Sarkar, Nisha, **P. Kumar,** Ram S. Katiyar, The role of vast off stoichiometry of SnSe thin film on structural, morphological, optical, and electrical properties for photovoltaic applications, *Journal of Materials Science: Materials in Electronics*, 34, (2023) 1372.
- **P. Kumar,** P. Sarkar, Nisha, Ram S. Katiyar, The impact of annealing on the electrical properties of ITO/n-CdSe Schottky junctions deposited by pulsed laser deposition technique, *Indian Journal of Physics,* 97 (2023) 1417–1435.
- D. Kumar, C. Lal, D. Veer, D. Singh, **P. Kumar,** Ram S. Katiyar, Investigation the effect of dopant Te on CdSe thin films deposited by RF magnetron sputtering method, *Physica Scripta,* 98 (2023) 055930.

- D. Kumar, C. Lal, D. Veer, D. Singh, **P. Kumar,** Ram S. Katiyar, Study the hall effect and DC conductivity of CdSe and Te doped CdSe thin films prepared by RF magnetron sputtering method, *Materials Letters:X*, 18 (2023) 100204.
- P. Sarkar, Nisha, **P. Kumar,** Ram S. Katiyar, Enhanced Opto-Electrical Properties of Chalcogenide-Rich Tin Selenide Thin Film after Incorporatin Sulfur Yielding Tin Sulfoselenide, *ChemisrtySelect*, 8 (2023) 1-8.
- C. Lal, J. Singh, D. Kumar, P. Sarkar, **P. Kumar,** Ram S Katiyar, Effect of different substrates on microstructural and optoelectrical properties of thermally evaporated CdSe thin films, *Materials Letters:X*, 20 (2023) 100222.
- **P. Kumar,** D. Veer, D. Singh, A. Kumar, R. S. Katiyar, Role of cerium pyrophosphate for improving protonic conduction and stabilization of $SDP.2H_2O$ composite electrolytes, *Inorg Chem Commun.*, 158 (2023) 111614.
- **P. Kumar,** D. Veer, D. Singh, S. L. Meena, A parametric study of crystal structure, phase stability, and conductivity of the novel phosphate-based composite electrolyte, *Applied Physics A: Materials Science and Processing*, 130 (2024) 249.
- Nisha, P. Sarkar, **P. Kumar,** Ram S. Katiyar, Impact of post deposition treatment on optoelectrical and microstructural properties of tin sulfide thin film for photovoltaic applications, *Physica Scripta*, 99 (2024) 075922.
- P. Singh, A. K. Sharma, **P. Kumar,** D. Veer, D. Kumar, D. Singh, R. S Katiyar, Role of Pyrophosphate Source for Improving Proton Conductivity and Stability of Sodium Dihydrogen Phosphate, *Russian Journal of Inorganic Chemistry*, (Accept 2024).
- P. Singh, A. K. Sharma, **P. Kumar,** Review of the Literature on the Thermal Stability and Conductivity of Solid Acid Fuel Cells, *Macromolecular Symposia*, 413 (2024) 2400119.
- P. Singh, A. K. Sharma, **P. Kumar,** Phase, porosity, and conductivity analysis of RbH_2PO_4/CeP_2O_7 nanocomposites, *Ionics*, 31 (2024) 2291-2301.

Conferences Attended:

- Participated in U.G.C. sponsored International Conference on Advance Material Science Related Areas. by Department of Physics Ch. Charan Singh University, Meerut (Dec. 26-28, 2000.)

- Participated in Second National Conference on thermo- Physical Properties Sponsored by Department of Physics, University of Rajasthan, Jaipur-302004.(September 19-21, 2002).
- Participated in National Conference on Laser & Spectroscopy Sponsored by Physics Department, Meerut College Meerut. (February 25-28, 2003).
- Participated in National Symposium on engineering optics Sponsored by Physics Department, Meerut College Meerut (April 6-7, 2003).
- Participated in National Conference on Perspective in Engineering and Spectroscopy Sponsored by Department of Physics Ch. Charan Singh University, Meerut.
- Participated in National Symposium on recent Advances in Electro- ceramics. Sponsored by physics Department, Meerut College Meerut (April 8, 2004).
- Poster Paper Presentation in International Symposium on Advances in Physics. Sponsored by department of Physics, N.A.S. College (C.C.S. University) Meerut (Feb. 25, 2006).
- Participated in International Conference on perspective in Vibrational Spectroscopy by Department of Physics, Meerut College Meerut. (Feb. 25-28, 2006).
- Participated in PHYSICS WORKSHOP, Delhi Public School- Ranipur (6th &7th April 2007).
- Participated in National Conference on Semiconductor Materials and Technology by Department of Physics, G.K.V. Haridwar. (16- 18 October 2008).
- Participated in 3rd Uttarakhand State Science Congress (November 10th- 11th, 2008).
- Participated in Short Term Programme on Advanced Antenna Engg. Through Experimentation, National Institute of Technical Teachers Training and Research, Sponsored by Ministry of Human Resource Development, Government of India by F.E.T., Gurukula Kangri University, Haridwar (9th – 20th Feb, 2009).
- Participated in National Programme Commission of Scientist and Technology vocabulary, Ministry of Human Resource Development (Higher Education Department) Ramkirsan purem, New Delhi- 110066, by Chemistry Department C.C.S. University, Meerut (29th- 30thJan. 2010).
- Participated in National Symposium on Characterization and Properties of Exotic Materials by Materials Research Society of India, Allahabad Chapter & Department of Physics, University of Allahabad, Allahabad (January 10-12, 2011).

- Poster Paper Presentation in National Conference on Advancement of Nano Materials & its Applications by Department of Physics, D.A.V. College, Kanpur (Feb. 15-16, 2011).
- Participated in Indo – Japan Conference On Frontier Nanomaterials for Energy by School of Engineering and Technology Sharda University Greater Noida U.P. India (FNE-2012) 9-11 January 2012.
- Participate in National Workshop on Advancement of Nano Material and its Applications by Department of physics. D.A-V College, Kanpur U.P. India (February. 09-11, 2012.
- Participate in International Conference on Green Technologies for Environmental Rehabilitation (GTER-2012), by Faculty of Engineering & Technology Gurukula Kangri University, Haridwar (Uttarakhand), India, (February 11-13, 2012).
- Participate in National Conference on Progress in Electronic & Allied Science (Peas-2012) by Faculty of Engineering & Technology Gurukula Kangri University, Haridwar (Uttarakhand), India, (November 3-4, 2012).
- Participate in national seminar on Role of Ion Beam in Material Science and Acquaintance Programme on Ion Beam Facilities at IUAC New Delhi, on 20-09-2013.
- Participate in International Conference on Optics and Optoelectronic, (ICOL-2014) by Instruments R&D Establishment, Raipur Road Dehradun, India (5-8 March-2014).
- Participate in National Conference on "Innovation in Science and Technology for Inclusive Development" by The Indian Science Congress Association Haridwar Chapter & Department of Chemistry, Chaudhary Charan Singh University, Meerut, India (22-23, March, 2014).
- Participate in National Workshop on Harnessing Intellectual Property & Its Management for Growth and Prosperity" by Department of FMS Gurukula Kangri University, Haridwar, India (17^{th} May, 2014).
- Participate in National Symposium on Instrumentation (NSI-39) by Jointly Organized Faculty of engineering & Technology Gurukula Kangri University, Haridwar & Instrument Society of India Department of Instrumentation Indian Institute of science, Bangalore, India (October 15-17, 2014).
- Participate in National Conference on Application of Mathematics in Engineering & Sciences (AMES-2014) Organized by Department of Mathematics, Motilal Nehru National Institute of technology Allahabad, India (November 29-30, 2014).

- Participate in Inter- National Conference on advance techniques & Devices in Mathematics & Physical science Organized by Department of Mathematics & Physical Science SRM University, Delhi-NCR Campus, Ghaziabad, U.P. (January 23-25, 2015).
- Presented a Paper in Inter- National Conference on Emerging Areas of Mathematics for Science & Technology Organized by Department of Mathematics Punjabi University, Patiala (30^{th} January 1^{st} February 2015).
- Presented a Paper in National Conference on Science & Technology for Human Development Organized by The Indian Science Congress Association: Haridwar Chapter & Department of Ancient Indian History, Culture & Archaeology, Gurukula Kangri Vishwavidyalaya, Haridwar (March 20-21,2015).
- Participate in Workshop & hands on Training Synthesis and Characterization of Thin Films Organized by Department of Physics Gurukula Kangri Vishwavidyalaya, Haridwar (31^{th} March- 1^{th} April 2015).
- Presented a Paper in International Conference, Scientific & Educational Researcher Society (SERS), Meerut (UP) India in Collaboration with **Kasetsart University, Bangkok, Thailand** (01^{st} – 05^{th} Feb, 2016).
- Presented a Paper in International Conference on Global Initiatives in Applied Sciences and Green Technologies Scientific & Educational Research Society (SERS), Meerut (UP) India in Collaboration with SRM University Delhi-NCR Campus Modinagar, Ghaziabad U.P. (09-11 Sep 2016).
- Presented a Paper in International Conference, Material Research Society, **Phoenix, Arizona, USA** (17- 21 April, 2017).
- Participate in National workshop Department of Zoology and Environment Science, Gurukula Kangri University, Haridwar (04^{th} – 13^{th} October, 2018).
- Presented a Paper in National Seminar On Plastic Waste Free India, Pandit Deendayal Upadhyay Smriti Manch & Manyawar Kanshiram Government Degree College Ghaziabad, U.P.(29 Jan 2019).
- Presented a Paper in 24^{th} International Conference of International Academy of Physical Sciences on Innovations In Physical Sciences, Faculty of Science Chaudhary Charan Singh University, Meerut, India, 09-11 August, 2019.

- Presented a Paper in 32th International Conference of Advanced Materials World Congress 02-05 February, 2020, **Sydney, Australia.**
- Oral Talk in the National Conference on Materials & Devices (NCMD-2020) on electrical conductivity and thermal analysis of CsH_2PO_4(CDP)/NaH_2PO_4/ZrO_2 composites electrolyte for fuel cell, Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 18-19 Dec. 2020.
- Participate in the National Conference on Materials & Devices (NCMD-2020) on Study of stability and protonic conductivity of composites electrolytes (1-x)CsH_2PO_4/xZrO_2 for fuel cell, Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 18-19 Dec. 2020.
- Participate in the National Conference on Materials & Devices (NCMD-2020) on Study of stability and protonic conductivity of composites electrolytes (1-x)CsH_2PO_4/xZrO_2 for fuel cell, Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 18-19, Dec. 2020.
- Oral Presentation in the 2nd National Conference on Materials & Devices (NCMD-2021) on Study of CdSSe Thin Film Using Different Substrates Deposited by Pulsed Laser Deposition Technique, Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 16-17 Sep. 2021.
- Oral Presentation in the 2nd National Conference on Materials & Devices (NCMD-2021) on Study of Structural and Optical Properties of Pulsed Laser Deposition Technique ZnSe Thin Films on Al_2O_3 Substrate at different annealing Temperatures, Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 16-17 Sep. 2021.
- Oral Presentation in the 2nd National Conference on Materials & Devices (NCMD-2021) on Investigation of Heating Effect on the Electrical Properties and Electronic Energy Level diagram of Pulsed Laser Deposited ITO/n-CdSe Schottky Junction, Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 16-17 Sep. 2021.
- The influence of post-growth heat treatment on the optical properties of pulsed laser deposited Zno thin films, 2nd International Conference on Plasma Theory and Simulation

(PTS-2022) organized Department of Physics, University of Lucknow, India held on 20-22 June, 2022.

- Resource Person Revisiting Indian Knowledge System in the Light of Modern Science Department of Botany & Mathematics, Chaman Lal Mahavidhyalaya, Landhora Haridwar (Uttarakhand) India, 13-15 March, 2023.
- Physics Application trends on knowledge, cultural traditions, & Practices of India Knowledge, cultural traditions, & Practices of India Gurukula Kangri (Deemed to be University), Haridwar, India, 29-31 March, 2023.
- Oral Presentation as Invited Person in the 4th National Conference on Materials & Devices (NCMD-2023) on "Property & Thermal Stability NaH2PO4.2H2O/CeP2O7 Composite Electrolytes", Department of Physics, Faculty of Engineering and Computing Sciences Teerthanker Mahaveer University, Moradabad, 28-29 Dec. 2023.
- A Chair Person on Vedic Physics (Oral) in the International Conference on "Veda-Vijnana & Sanskriti Mahakumbha" held at Gurukula Kangri (Deemed to be University) Haridwar, Bharat, 23-25 December, 2023.
- Poster Presentation as Invited Person in the Inter National Conference on Recent Advancement in Sustainable Nano-Science and Technology on "Conduction & Stability Performance of CsH2PO4 with ZrP2O7 For Intermediate Temperature Fuel Cell", IIS (deemed to be University), Jaipur, 30-31 Jan. 2024.
- Participated in **INUP Users' Meet for Indian Nanoelectronics Users' Programme – Idea to Innovation,** held at Dept. of Electrical Engineering, **Indian Institute of Technology (IIT) Bombay,** 10 August 2024.

Workshops:

- Participate in National Workshop as an Assistant Convener/ Treasurer on "Recent Trends in Atmospheric and Environmental Sciences" by Department of Physics Gurukula Kangri University, Haridwar, India (4-5 April 2014).
- Resource Person Synthesis and Characterisation of Nanocomposites and User Acquaintance Programme, Faculty of Science, Gurukula Kangri (Deemed to be University), Haridwar, India, 17 October, 2022.
- Workshop on Revisiting Indian Knowledge System in the Light of Modern Science, sponsored by Indian Council of Philosophical Research (ICPR), New Delhi, organized by

Department of Botany & Mathematics, Chaman Lal Mahavidhyalaya, Landhora Haridwar (Uttarakhand) held on 13-15 March, 2023.

Projects Completed/On-Going/Submitted:

- Development and Characterization of Amorphous Chalcogenide based phase change material applicable to optical memories, University Grant Commission, New Delhi, 2010-2013 **(Completed).**
- Synthesis and Characterization of CdS_xSe_{1-x} Semiconductors Based Thin Films for optoelectronic applications, Instrument Research & Development Establishment (IRDE), Dehradun, Uttarakhand, 2012-2014 **(Completed).**

Association with Professional Bodies /Societies:

- Member Indian Science Congress Association (ISCA).
- Member Research Degree Committee (R.D.C.) in Physics, G. K. V. Haridwar.
- Member, Haridwar Chapter-Indian Science Congress Association.
- Member, Department Research Committee (D.R.C.) in Physics, G. K. V. Haridwar.

Technical Skills:

- Thin film deposition technique in high vacuum (HV) and ultra-high vacuum (UHV) Chambers.
- Nanoparticles synthesis method -Solution combustion, Sol-gel method, Sonication method, Solid state reaction method, hydrothermal method.
- Synthesis of Dye synthesized solar cell using Doctor Blade Method.
- Surface morphology studies using SEM and Atomic Force Microscopy (AFM).
- Interpretation and measurements using various spectroscopic techniques X-ray diffraction (XRD), UV-Vis spectroscopy, Fourier Transform Infra-red Analysis (FTIR) and Raman Spectroscopy, X-ray photoelectron spectroscopy (XPS), etc.
- Experience in ion beam irradiation experiments and simulations.
- Thin film deposition technique Pulse Laser Deposition (PLD) in high vacuum (HV) and ultra-High vacuum (UHV) chambers.

(Dr. Pawan Kumar)