

Dr. Harish Kumar Yadav

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Date of Birth 7th Sept. 1980

Nationality Indian

Languages English and Hindi

Currently

- Presently employed as a permanent faculty in the Department of Physics, St. Stephens College, University of Delhi, Delhi - 110007, India.

Research Positions

- Auxillary Research Associate (Nov 2007 – Apr 2008) at *University of Puerto Rico*, P.O. Box 23343, San Juan, PR 00931-3343, USA.
- Senior Research Fellow (SRF) (Sept 2006 – Nov. 2007) in *Deptt. of Physics and Astrophysics, University of Delhi. Delhi- 110007.*
- Junior Research Fellow (JRF) (Sept. 2004 – Sept. 2006) in *Deptt. of Physics and Astrophysics, University of Delhi. Delhi- 110007.*

Teaching Experience (18 years)

- Presently teaching in St. Stephens College, University of Delhi, Delhi 110007, India (01-06-10 to till date). **Permanent faculty**
- Teaching assignments in St. Stephens College, University of Delhi, Delhi 110007, India (22-07-08 to 31-05-10). **Ad hoc faculty**
- Teaching assignments in Kirori Mal College, University of Delhi, Delhi 110007, India (20-08-07 to 30-09-07). **Guest faculty**

Qualifications

- Ph.D. Physics (ZnO Thin films and Nanoparticles), University of Delhi, India.
(Thesis defended successfully (May 2008), awarded March 2009)

Thesis title: *Growth and Characterization of Multifunctional Zinc Oxide (ZnO) Nanoparticles and Thin Films.*

- M.Sc. Physics (2003) (Specialization Electronics), University of Delhi, India, First Division.
- B.Sc. (Hons) Electronics (2001), University of Delhi, India, First Division.

Research Interest

Broad Area of Specialization: Material Science; Thin Films, Ceramics and Nanoparticles

Thin films

Growth and characterization of thin films using RF/Diode magnetron sputtering, pulse laser deposition, spin coating, and metallization by thermal evaporation.

Nanoparticles

Growth and characterization of nanoparticles using chemical method.

Surface Plasmon Resonance

- Exploring the feasibility of SPR technique in quantification of adulterant in liquids.
- Exploring electromagnons excitations in ferromagnetic systems using modified SPR technique for opto-electronic modulators controlled through magnetic field.

Thesis work

Growth and characterization of:

- Mn doped ZnO thin films for spintronics applications
- Li doped ZnO thin films for Ferroelectric studies
- Mg doped ZnO thin films for band gap engineering
- Metal/ZnO bi-layer structure for ultraviolet photodetectors with enhanced responsivity.
- ZnO nanoparticles (Vibrational and photoluminescence studies)
- ZnO thin film from ZnO nanoparticle solution by electrophoretic technique for ultraviolet photodetectors.

Research Experience

More than fourteen years of research experience with hand on skill of operating the following processing and characterization techniques:

RF diode/magnetron sputtering (balanced and unbalanced configurations), Pulse laser deposition (PLD), Thermal evaporation, Spin coating, Ceramic preparation, X-ray diffraction unit, Raman Spectrophotometer, UV-VIS spectrophotometer, Thickness profiler, CRO, Network analyzer, Electrometer, Digital multimeter (DMM), Ferroelectric P-E hysteresis loop setup (thin films), LCR meter

(Dielectric measurements), Low frequency impedance meter, Photoconductivity measurement setup, I-V source meter, Photolithography, Gas sensing test rig set up. Surface Plasmon Resonance.

Awards/Achievements

- Qualified CSIR/UGC NET-JRF (2003-2004).

Projects (Completed)

1. Project titled “***On the Energy, Light Characteristics and Economic Feasibility of LED Luminaries (SSC - 104)***” funded by University of Delhi under DU Innovative Research Scheme (15th May 2012 to 14th May 2013).
2. Project titled “***Devices based on Photo-Microlithography & Soluble Nano-carbon Materials (SSC - 106)***” funded by University of Delhi under DU Innovative Research Scheme (15th May 2012 to 14th May 2013).

Research publications (in internationally refereed journals)

1. “*Influence of Doping of Different Metals on the Photoconducting Properties of ZnO Thin Films*” A. Rajan, Vinay Gupta, **Harish Kumar Yadav** and Monika Tomar , Advanced Science Letters 20, 994-1000 (2014).
ISSN:1936-6612 American Scientific Publishers
2. “*Role of Au incorporated on the surface of ZnO thin film in enhancing the UV photoresponse*” A. Rajan, Vinay Gupta, **Harish Kumar Yadav** and Monika Tomar Advanced Science Letters 20, 1437-1441 (2014).
ISSN:1936-6612 American Scientific Publishers
3. “*Plasmonic assisted enhanced photoresponse of metal nanoparticle loaded ZnO thin film ultraviolet photodetectors*” A. Rajan, G. Kaur, A. Paliwal, **Harish Kumar Yadav**, Vinay Gupta and Monika Tomar, *Journal of Physics D: Applied Physics* 47, 425102 (2014)
ISSN: 1361-6463 IOP Publishing
4. “*Plasmonic enhancement of optical absorption of UV radiation by Au nanoparticles dispersed on ZnO thin film*”. A. Rajan, Vinay Gupta, **Harish Kumar Yadav** and Monika Tomar, *Applied Physics A: Materials Science and Processing* 116, 913–919 (2014)
ISSN: 0947-8396 Springer
5. “*Sol-gel derived Ag-doped ZnO thin film for UV photodetector with enhanced response*” A. Rajan, **Harish Kumar Yadav**, Vinay Gupta and Monika Tomar, *Journal of Material Science* 48, 7994-8002 (2013)
ISSN: 0022-2461 Springer

6. "A process for the selective removal of arsenic from contaminated water using acetate functionalized zinc oxide nanomaterials" Nahar Singh, S.P. Singh, Vinay Gupta, **Harish Kumar Yadav**, Tarushee Ahuja, S. Swarupa Tripathy, and Rashmi, *Environmental Progress and Sustainable Energy* 32, 1023-1029 (2013)
ISSN: 1944-7450 John Wiley & Sons, Inc.
7. "Temperature dependent dynamics of ZnO nanoparticles probed by Raman scattering: A big divergence in the functional areas of nanoparticles and bulk materials" **Harish Kumar Yadav**, R. S. Katiyar and Vinay Gupta, *Applied Physics Letter* 100, 051906 (2012).
ISSN: 0003-6951 AIP Publishing
8. "A comparative study of UV photoconductivity relaxation in zinc oxide (ZnO) thin films deposited by different techniques" **Harish Kumar Yadav** and Vinay Gupta, *Journal of Applied Physics* 111, 102809 (2012).
ISSN: 0021-8979 AIP Publishing
9. "Composition dependent preferential orientation, dielectric and ferroelectric properties of $Pb(Zr_{1-x}Ti_x)O_3$ thin films derived by sol-gel process" P. Jegatheesan, **Harish Kumar Yadav**, Vinay Gupta, N. V. Giridharan, *Materials Letters* 65, 901– 904 (2011).
ISSN: 0167-577X Elsevier
10. "Modified cascade model of resonant Raman scattering: a case study of UV Raman scattering in $Zn_{1-x}Mn_xO$ thin films" **Harish Kumar Yadav**, R. S. Katiyar and Vinay Gupta, *Journal of Raman Spectroscopy* 42, 2126-2131 (2011).
ISSN: 1097-4555 John Wiley & Sons, Inc.
11. "Softening behavior of acoustic phonon mode in ZnO nanoparticles: the effect of impurities and particle size variation with temperature" **Harish Kumar Yadav**, K. Sreenivas, R. S. Katiyar and Vinay Gupta, *Journal of Raman Spectroscopy* 42, 1620-1625 (2011).
ISSN: 1097-4555 John Wiley & Sons, Inc.
12. "Persistent photoconductivity due to trapping of induced charges in Sn/ZnO thin film based UV photodetector" **Harish Kumar Yadav**, K. Sreenivas, and Vinay Gupta, *Applied Physics Letters* 96, 223507 (2010).
ISSN: 0003-6951 AIP Publishing
13. "Study of Metal/ZnO based thin film ultraviolet photodetectors: the effect of induced charges on the dynamics of photoconductivity relaxation" **Harish Kumar Yadav**, K. Sreenivas, and Vinay Gupta, *Journal of Applied Physics* 107, 044507 (2010).
ISSN: 0021-8979 AIP Publishing
14. "Structural studies and Raman spectroscopy of forbidden zone boundary phonons in Ni doped ZnO ceramics" **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, and R. S. Katiyar, *Journal of Raman Spectroscopy* 40, 381-386 (2009).
ISSN: 1097-4555 John Wiley & Sons, Inc.

15. “Temperature dependence of the dynamics of zone boundary phonons in ZnO:Li” **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, and R. S. Katiyar, *Journal of Applied physics* 104,113523 (2008).
ISSN: 0021-8979 AIP Publishing
16. “Low-frequency zone-boundary phonons in Li doped ZnO ceramics” **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, and R. S. Katiyar, *Journal of Applied Physics* 104, 053507 (2008).
ISSN: 0021-8979 AIP Publishing
17. “Raman Spectroscopy and Dielectric Studies of Multiple phase Transitions in ZnO:Ni” **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, J. F. Scott and R. S. Katiyar, *Applied Physics letters* 92, 122908 (2008).
ISSN: 0003-6951 AIP Publishing
18. “Defect induced activation of Raman silent modes in rf co-sputtered Mn doped ZnO thin films” **Harish Kumar Yadav**, K. Sreenivas, R. S. Katiyar and Vinay Gupta, *Journal of Physics D: Applied Physics* 40, 6005-6009 (2007).
ISSN: 1361-6463 IOP Publishing
19. “Effect of surface defects on the visible emission from ZnO nanoparticles” **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, S. P. Singh, and R. S. Katiyar, *Journal of Material Research* 22, 2404-2409 (2007).
ISSN: 0884-2914 Material Research Society
20. “Enhanced Response from metal/ZnO bi-layer Ultraviolet (UV) photodetector” **Harish Kumar Yadav**, K. Sreenivas, and Vinay Gupta, *Applied Physics letters* 90, 172113 (2007).
ISSN: 0003-6951 AIP Publishing
21. Erratum: “Low frequency Raman scattering from acoustic phonons confined in ZnO nanoparticles” **Harish Kumar Yadav**, Vinay Gupta, K. Sreenivas, S. P. Singh, B. Sundarakannan and R. S. Katiyar, *Physical Review Letters* 98, 029902 (2007).
ISSN: 0031-9007 American Physical Society
22. “Low frequency Raman scattering from acoustic phonons confined in ZnO nanoparticles” **Harish Kumar Yadav**, Vinay Gupta, K. Sreenivas, S. P. Singh, B. Sundarakannan and R. S. Katiyar, *Physical Review Letters* 97, 085502 (2006).
ISSN: 0031-9007 American Physical Society
23. “Influence of post deposition annealing on the structural and Optical properties of cosputtered Mn doped ZnO thin films”, **Harish Kumar Yadav**, K. Sreenivas & Vinay Gupta, *Journal of Applied Physics* 99 083507(2006).
ISSN: 0021-8979 AIP Publishing

Research publications (in internationally refereed conference proceedings)

24. “*Influence of the Particle Size on Acoustic Phonon Modes of ZnO nanocrystals*”, **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, S. P. Singh, B. Sundarakannan, and R. S. Katiyar, **Mater. Res. Soc. Symp. Proc. Vol. 957 © 2007 Materials Research Society (0957-K10-27)**.
25. “*ZnO-Sn bilayer Ultraviolet (UV) Photon Detector with Improved Responsivity*”, **Harish Kumar Yadav**, K. Sreenivas, and Vinay Gupta, **Mater. Res. Soc. Symp. Proc. Vol. 957 © 2007 Materials Research Society (0957-K07-14)**.
26. “*Fast response ultra-violet photodetectors based on Sol gel derived Ga-doped ZnO*” A. Rajan, **Harish Kumar Yadav**, V. Gupta, M. Tomar, 94, 44-51 (2014) **Procedia Engineering**,
ISSN:1877-7058 Elsevier
27. “*Copper doped ZnO thin film for ultraviolet photodetector with enhanced photosensitivity*” A. Rajan, K. Arora, **Harish Kumar Yadav**, Vinay Gupta, and Monika Tomar, *Proceedings Material Research Society Symposium 1494*, 43-49 (2013)
ISSN: 1946-4274 Cambridge University Press

International Conferences

1. Participated in “*Indo-European Conference on Quality Assurance in Higher Education*” held at the conference center, University of Delhi, on 6th and 7th May, 2010.
2. “*Influence of the Particle Size on Acoustic Phonon Modes of ZnO nanocrystals*”, **Harish Kumar Yadav**, K. Sreenivas, Vinay Gupta, S. P. Singh, B. Sundarakannan, and R. S. Katiyar, **MRS fall meeting, 27 Nov – 1 Dec 2006, Boston, MA, USA**.
3. “*ZnO-Sn bilayer Ultraviolet (UV) Photon Detector with Improved Responsivity*”, **Harish Kumar Yadav**, K. Sreenivas, and Vinay Gupta, **MRS fall meeting, 27 Nov – 1 Dec 2006, Boston, MA, USA**.

National conferences

1. Participated (poster Presentation) in 2nd **National Conference on Multifunctional Advanced Materials** held at Shoolini University, Solan, H. P. from June 11-13, 2014.
2. Participated in **The Academic Congress** titled: **Enabling The Young : Redefining Education**” organized by the University of Delhi on 6th and 7th September, 2012.
3. “*UV photodetector based on electrophoretically grown ZnO nanoparticulate thin film*” **Harish Kumar Yadav**, Astha Sagar, S. P. Singh, K. Sreenivas and Vinay Gupta, **National Seminar on Multifunctional Nanomaterials Nanostructures and Applications (MNNA)**, 22-23 December 2006 (Poster presentation).

4. “*Raman and PL spectroscopy studies on ZnO nanoparticles*” **Harish Kumar Yadav**, S. P. Singh, B. Sundarakannan, R. S. Katiyar, K. Sreenivas and Vinay Gupta, ***National Seminar on Multifunctional Nanomaterials Nanostructures and Applications (MNNA)***, 22-23 December 2006 (**Poster presentation**).
5. “*Vibrational and luminescence properties of ZnO nanocrystals*”, **Harish Kumar Yadav**, Vinay Gupta, K. Sreenivas, S.P. Singh, B. Sundarakannan and R.S. Katiyar, Proceedings ***14th National Seminar on Ferroelectrics and Dielectrics, NSFD XIV***, 18-21 December, 2006, IIT Kharagpur, pp. 82 (**Poster presentation**).
6. Participated in the Thirteen “***National Seminar on Ferroelectrics and Dielectric (NSFD-XIII)***” held at Department of Physics and Astrophysics, University of Delhi, Delhi – 110007 during November 23-25, 2004.

Workshop/Courses Attended

1. Participated in a one day workshop on "Observing Nuclear Processes from Zeptosecond to Picosecond Time Scale" organized by the IUAC in association with NASI-Delhi Chapter on 18th February 2017.
2. Attended ***workshop*** on **3D Printing** jointly organized by Centre for Science Education & Communication and Cluster Innovation Centre, University of Delhi from 28th Feb to 01st March 2015.
3. Participated in UGC sponsored 5th three-weeks ***Refresher Course*** in Basic Sciences (Interdisciplinary) organized by UGC-HRDC, Jamia Millia Islamia, New Delhi, from 5th to 25th May 2015.
4. Participated in **DST sponsored workshop** “*Indigenously developed low cost Surface Plasmon Resonance Technique and its Applications*” held on 8th and 9th May 2014 in the Department of Physics and Astrophysics, University of Delhi.
5. Attended ***workshop*** on the “**Phoenix Board**”, organized by ***Inter University Accelerator Centre*** in collaboration with the Department of Physics, St Stephen’s College on 10th of Dec 2012).
6. Participated in the ***Orientation Programme (OR-69)*** organized by Centre for Professional Development in Higher Education, ***Institute of Lifelong Learning***, University of Delhi, from 13th December 2011 to 09th January 2012.
7. Training program titled: ***C and C++ Programming Language*** organized by ***Institute of Lifelong Learning***, University of Delhi, from 08th June 2011 to 15th June 2011.

7. Participated in "*Indo-European Conference on Quality Assurance in Higher Education*" held at the conference center, University of Delhi, on 6th and 7th May, 2010.

Membership on Learned bodies/ Societies

1. Life member of **Indian Association of Physics Teachers (IAPT)**, India.

Others

1. Member of the Hall management committee for the **Delhi University 95th annual convocation** held on 19th Nov 2018.
2. Member of the Local organizing committee and **Co-Chair of the Student Poster Committee** for the "**International Symposium on Integrated Functionalities (ISIF - 2017)**" organized in Shangri-La's Eros Hotel, New Delhi, India from 10-13 December 2017.
3. Member of the **Technical Term Selection committee for the Development of Fundamental Glossary of Electronics** (English-Hindi) held in department of Physics and Astrophysics, University of Delhi from 10th to 14th March 2014.
4. Member **Governing Body** of the College as teacher (elected) representative under 10 years of experience (period 2013-14)
5. Member **Governing Body** of the College as teacher (elected) representative under 10 years of experience (period 2014-15).
6. Member **Governing Body** of the College as teacher (on-rotation) representative under 10 years of experience (period 2015-16).