




## Faculty Details proforma for DU Web-site

Title	Prof./Dr./Mr./Ms./Mrs.	First Name	SHYAMA	Last Name	RATH	Photograph
Designation	Professor					
Address	Office: P-24, Department of Physics and Astrophysics, University of Delhi, Delhi-110007					
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<b>Educational Qualifications</b>						
Degree	Institution				Year	
Ph.D.	Indian Institute of Technology, Delhi				1994	
PG	Indian Institute of Technology, Kanpur				1988	
UG	Utkal University, Bhubaneswar				1986	
<b>Career Profile</b>						
University of Delhi	Professor	Feb, 2011-	date	Teaching and Research		
International Atomic Energy	Consultant	Dec, 2017-	March, 2018	Consultancy		
University of Delhi	Associate Professor	Feb. 2008-	Feb, 2011	Teaching and Research		
Chulalongkorn University, Bangkok, Thailand	Visiting Faculty	Aug, 2013-	present	Research		
University of Delhi	Reader	Feb, 2005 to	Feb. 2008	Teaching and research		
I.I.T., Delhi	Young Scientist Principal Investigator	Oct-2002 to	February 2005	Research project		
St. Stephens College, Delhi	Lecturer	Aug, 02 to	Sept, 02	Teaching (Undergraduate)		
Univ of Surrey, U.K.	Research Scientist	Nov, 99 to July,	2002	Post-doctoral Research		
Imperial College, London, U.K.	Research Scientist	Jan, 99 to Nov,	1999	Post-doctoral Research		
Univ. of Electro-communications, Tokyo	Research Scientist	April 96 to	Sep, 1998	Post-doctoral Research		
I.I.T., Delhi	Project Scientist	May, 95 to	Apr, 96	Research project		

<b>Administrative Assignments</b>	
Member of various committees at the departmental and university, member of organizing committees of national and international conferences	
<b>Areas of Interest / Specialization</b>	
<p><u>Broad Area: Experimental Condensed matter physics</u></p> <ul style="list-style-type: none"> <li>(i) Fabrication and characterisation of semiconductor thin films/heterostructures/nanostructures</li> <li>(ii) Optical spectroscopy (Raman, photoluminescence, and spectroscopic ellipsometry)</li> <li>(iii) Metal oxide semiconductors: synthesis, optical and electrical properties</li> <li>(iv) Ion beam modification of materials</li> <li>(v) Optical sensing with porous Si and semiconductor nanoparticles</li> <li>(vi) Photon correlation metrology and quantum optics</li> </ul>	
<b>Subjects Taught</b>	
<ol style="list-style-type: none"> <li>1. Atomic and Molecular Physics (M.Sc Final )</li> <li>2. Quantum Mechanics (M.Sc Previous)</li> <li>3. Nuclear and Particle Physics (M.Sc Final)</li> <li>4. Lasers and Spectroscopy (M.Sc Final)</li> <li>5. Experimental Solid State Physics (M.Sc Phys.)</li> <li>6. Introductory Physics (M.Tech in Nanoscience and Nanotechnology)</li> <li>7. Electromagnetic Theory (B.Sc)</li> <li>8. Waves and Optics (BSc)</li> <li>9. Waves and Optics Lab (M.Sc)</li> <li>10. B.Sc Physics Lab (M.Sc)</li> </ol>	
<b>Research Guidance</b>	
<p>List against each head (If applicable)</p> <ol style="list-style-type: none"> <li>1. Supervision of awarded Doctoral Thesis: : 04</li> <li>2. Ongoing;04</li> </ol>	
<b>Publications Profile (last 5 years)</b>	
<ol style="list-style-type: none"> <li>1. <i>Optimization of the Concentration of Molybdenum Disulfide (MoS<sub>2</sub>) for Formation of Atomically Thin Layers</i>, Vineeta and Shyama Rath, <i>Springer Proceedings in Physics</i>, (accepted)</li> <li>2. <i>High-yield synthesis and liquid-exfoliation of two-dimensional belt like hafnium disulphide"</i> Harneet Kaur; Sandeep Yadav; Avanih Srivastava; Nidhi Singh; Shyama Rath; Jörg Schneider; Om Sinha; Ritu Srivastava, <i>Nano Research</i>, 343-353 <a href="https://doi.org/10.1007/s12274-017-1636-x">https://doi.org/10.1007/s12274-017-1636-x</a> (2018)</li> <li>3. One-step synthesis of Au-coated porous silicon as a surface enhanced Raman scattering substrate for biomolecule detection, Vijayarangamuthu Kalimuthu, Shyama Rath, , <i>Materials Letters</i>, Volume 204, pp. 115–119 (2017) <a href="https://doi.org/10.1016/j.matlet.2017.06.030">https://doi.org/10.1016/j.matlet.2017.06.030</a></li> <li>4. <i>Spectroscopic ellipsometry study of the free carrier absorption and bandgap of ZnO thin films: Effect of nonstoichiometry</i> C. Singh, S.Nozaki, and Shyama Rath <i>J. Appl. Phys.</i> 118 (2015) DOI: 10.1063/1.4935629</li> <li>5. <i>UV photoluminescence from nanocrystalline tin oxide synthesized by a one-step hydrothermal method</i> VijayarangamuthuKalimuthu Shyama Rath <i>Materials Letters</i>157(2015)11–14</li> <li>6. <i>Nanostructured tin oxide as a surface-enhanced- Raman-scattering substrate for detection of nitroaromatic compounds</i>, K.Vijayarangamuthu and Shyama Rath, <i>Int. J. Appl. Ceram. Technol.</i>, (2014) DOI:10.1111/ijac.12266</li> <li>7. <i>Nanoparticle size, oxidation state, and sensing response of tin oxide nanopowders using Raman spectroscopy</i> K. Vijayarangamuthu and Shyama Rath, <i>Journal of Alloys and Compounds</i> 610, 706 (2014),</li> </ol>	

8. *Effect of Thermal Annealing and Swift Heavy Ion Irradiation on the Optical Properties of Indium Oxide Thin Films*, Neeti Tripathi, and Shyama Rath, ECS Journal of Solid State Science and Technology, 3 (3) P21-P25 (2014)
9. *Facile synthesis of ZnO nanostructures and investigation of structural and optical properties*, Neeti Tripathi, and Shyama Rath, Materials Characterization. 86 263 (2013)
10. *Spectroscopic ellipsometry and multiphonon Raman spectroscopic study of excitonic effects in ZnO films*, Chaman Singh and Shyama Rath, J. Appl. Phys. 113 art. no. 163104 (2013)
11. *Antireflection properties of graphene layers on planar and textured silicon surfaces*, R. Kumar, A.K. Sharma, M. Bhatnagar, B.R. Mehta, S. Rath, Nanotechnology 24(16) 165402 (2013)
12. *Effect of Co doping and thermal annealing on the optical properties of tin oxide nanopowders*, K. Vijayarangamuthu and S. Rath, Appl. Phys. A doi 10.1007/s00339-013-7805-1 (2013)

#### Conference Organization/ Presentations (in the last three years)

##### Invited Talks:

- ❖ Micro-spectroscopic profiling of the layer-dependent optical properties of 2D materials, International Conference on Microscope and XXXIX Annual Meeting of Electron Microscope Society of India, Bhubaneswar July, 2018
- ❖ Spectroscopic characterization of wide bandgap oxide semiconductors, International Workshop on Advanced Materials and Device Technology November 22 - 24, 2017 (IWAMDT-2017) Anna University. Centre for International Affairs, Anna University, Chennai - 60002522-24 Nov., 2017
- ❖ Optoelectronic Device Parameters Of Wide Bandgap Semiconductors Determined By Spectroscopic Ellipsometry, 9th International Conference on Materials for Advanced Technologies, Singapore, June 2017
- ❖ Simultaneous determination of the optical and electrical properties of ZnO films using spectroscopic ellipsometry International Conference on Technologically Advanced Materials (ICTAM) and Asian Meeting on Ferroelectricity (AMF10) November, 2016
- ❖ Optical Spectroscopy as a diagnostic tool for microelectronic materials and devices Faculty Development Programme on Advances in Microelectronics and Plasma Diagnostics Delhi Technological University and IEEE EDS Delhi Chapter 2<sup>nd</sup> September, 2016
- ❖ Modulation of electronic and optical properties of 2D-semiconductors by ion beams "Ion Beam-Induced Spatio-temporal Structural Evolution of Matter: Towards New Quantum Technologies" from University of Torino, Italy International Atomic Energy Agency, Vienna 23 -27 May 2016
- ❖ Optical probes for device parameters of ZnO films Symposium, "Thin Film Processing and Devices" International Conference on Advanced Electroaterials, Jeju, Korea, Nov 2015
- ❖ *Higher Education and Social Enterprise* International seminar on "University Engagement" January 2015 at Srinakharinwirot University, Thailand, January 2015
- ❖ Effect of argon pressure on the structural and optical properties of rf-sputtered ZnO thin films: *Sojiphong Chatraphorn, Chaman Singh, Reena Goyal, Shyama Rath*, Siam Physics Congress 2015 May 2015, Thailand
- ❖ Modelling and experimental investigations of irradiation effects in Si radiation detectors Siam Physics Congress 2015 May 2015, Thailand
- ❖ Resource Person: Seminar on *Nanotechnology and Nanomaterial Overview*, July, 2014, Asian Institute of Technology, Thailand.
- ❖ Session Chair: Symposium Thin Film Processing and Devices, ICAE 2015, Nov 2015, Jeju, Korea

##### Conference Presentations:

1. *Effects of non-stoichiometry and Al-doping on the optical and electrical properties of ZnO thin films*, SIAM Physics Congress held in March, 2014 in Thailand

2. "Improvement in room temperature UV emission in sol-gel synthesized tin oxide nanoparticles by doping", *International Conference on Advanced Materials and Nanotechnologies*, Hanoi, Vietnam, December, 2012

**Research Projects (Major Grants/Research Collaboration)**

<b>Research Projects: S.No</b>	<b>Name of Agency</b>	<b>Title of project</b>	<b>Period of support</b>	<b>Completed/on-going</b>
1.	International Atomic Energy Agency, Vienna	Utilization of Ion Accelerators for Studying and Modelling of Radiation Induced Defects in Semiconductors and Insulators	2011-2016	completed
2.	Defence Research Development Organisation, India	Synthesis & characterization of metal, metal-oxide, and polymeric substrates for detection of nitroaromatic compounds	2010-2012	completed
3.	University Grants Commission, India	Nanocrystalline porous silicon for optical biosensing	2008-2011	completed
4.	Inter-University Accelerator Centre, India	Swift heavy ion modification of In <sub>2</sub> O <sub>3</sub> films	2008-2011	completed
5.	Univ. of Delhi, R & D Grant,	Nanomaterials Research and Optical Metrology	2007-13	ongoing

**Awards and Distinctions**

1. University Position in Physics Honours (Bachelor of Science) in Utkal University, India in 1986
2. National Scholarship by Ministry of Human Resource and Development, during Masters' course
3. Qualified JRF CSIR Fellowship 1988
4. Graduate Aptitude Test in Engineering (GATE) Fellowship in 1988
5. Monbusho Fellowship by Government of Japan in 1996
6. Royal Society, U.K.- Dept. of Science & Technology for *Indo-U.K.* Networking Meetings (April-May, 2004)
7. Funding under Japan Society for Promotion of Science –Indian National Science Academy Bilateral Collaboration (October-November, 2011)
8. Consultancy with International Atomic Energy Agency, Dec, 2017-2018

#### Association With Professional Bodies

1. *Reviewer: American Institute of Physics, Institute of Physics, U.K., Elsevier, Springer. Taylor & Francis Journals,, Japanese Journal of Applied Physics,*
2. Review Committee Member of NCERT Physics textbook for Class 12.
3. Review Committee Member of NCERT Physics textbook Exemplar Problems in Physics for Class 11.

#### 4 Memberships

Materials Research Society, India (Life Member)  
Indian Laser Association (Life member)

#### Other Activities

