




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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	Residence					
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Educational Qualifications						
Degree		Institution			Year	
Ph.D.		Indian Institute of Technology, Delhi			1994	
PG		Indian Institute of Technology, Kanpur			1988	
UG		Utkal University, Bhubaneswar			1986	
Career Profile						
University of Delhi		Associate Professor	Feb. 2008-present	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		
Administrative Assignments						
Member of various university and departmental committees including Deputy Superintendent of M.Sc						

Physics exams, Member of Committee of Courses, member of organizing committees of national and international conferences	
Areas of Interest / Specialization	
<p>Broad Area: Experimental Condensed matter physics</p> <ul style="list-style-type: none"> (i) Fabrication and characterisation of semiconductor thin films/heterostructures/nanostructures (ii) Optical spectroscopy (Raman, photoluminescence, and spectroscopic ellipsometry) (iii) Metal oxide semiconductors: synthesis, optical and electrical properties (iv) Ion beam modification of materials (v) Optical sensing with porous Si and semiconductor nanoparticles (vi) Photon correlation metrology and quantum optics 	
Subjects Taught	
<ul style="list-style-type: none"> 1. Atomic and Molecular Physics (M.Sc Final) 2. Quantum Mechanics (M.Sc Previous) 3. Nuclear and Particle Physics (M.Sc Final) 4. Lasers and Spectroscopy (M.Sc Final) 5. Solid State Physics (M.Sc Final) 6. Introductory Physics (M.Tech in Nanoscience and Nanotechnology) 7. Electromagnetic Theory (B.Sc) 8. Waves and Optics (BSc) 9. Waves and Optics Lab (M.Sc) 	
Research Guidance	
<p><i>List against each head (If applicable)</i></p> <ul style="list-style-type: none"> 1. <i>Supervision of awarded Doctoral Thesis: : 04</i> 	
Publications Profile (last 5 years)	
<p>14. <i>One-step synthesis of Au-coated porous silicon as a surface enhanced Raman scattering substrate for biomolecule detection</i>, Vijayarangamuthu Kalimuthu and Shyama Rath, Materials Letters, Volume 204, pp. 115–119 (2017) https://doi.org/10.1016/j.matlet.2017.06.030</p> <p>13. <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, (2017) Jörg Schneider, Om Sinha, Ritu Srivastava, Nano Research (2017 accepted)</p> <p>12. <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 J. Appl. Phys. 118 (2015) DOI: 10.1063/1.4935629</p> <p>11. <i>UV photoluminescence from nanocrystalline tin oxide synthesized by a one-step hydrothermal method</i> VijayarangamuthuKalimuthu Shyama Rath Materials Letters157(2015)11–14</p> <p>10. <i>Nanostructured tin oxide as a surface-enhanced- Raman-scattering substrate for detection of nitroaromatic compounds</i>, K.Vijayarangamuthu and Shyama Rath, Int. J. Appl. Ceram. Technol., (2014) DOI:10.1111/ijac.12266</p> <p>9. <i>Nanoparticle size, oxidation state, and sensing response of tin oxide nanopowders using Raman spectroscopy</i> K. Vijayarangamuthu and Shyama Rath, Journal of Alloys and Compounds 610, 706 (2014),</p> <p>8. <i>Effect of Thermal Annealing and Swift Heavy Ion Irradiation on the Optical Properties of Indium Oxide Thin Films</i>, Neeti Tripathi, and Shyama Rath, ECS Journal of Solid State Science and Technology, 3 (3) P21-P25 (2014)</p> <p>7. <i>Facile synthesis of ZnO nanostructures and investigation of structural and optical properties</i>, Neeti</p>	

Tripathi, and **Shyama Rath**, *Materials Characterization*. **86** 263 (2013)

6. *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)

5. *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)

4. *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)

3. *Evolution of ripple morphology on Si(100) by 60 keV argon ions*, S.K.Garg, V Vengopal, T. Basu, O.P. Sinha, **S. Rath**, D. Kanjilal, T. Som, *Applied Surface Science* **258** (9) , (2012) 4135

2. *A spectroscopic ellipsometric study of the tunability of the optical constants and thickness of GeOx films with swift heavy ions* K. Vijayarangamuthu, C. Singh, D. Kabiraj, **S. Rath**, *J. Appl. Phys* **110** (6) , (2011) art. no. 063512

1. *Determination of generalised Stokes parameters for unpolarised, polarised, and partially polarised light beams*, B. Kanseri, **S. Rath**, H.C. Kandpal, *Proc. SPIE The International Society for Optical Engineering* **8173** , (2012) art. no. 817318

Conference Organization/ Presentations (in the last three years)

Invited Talks:

- ❖ *Optoelectronic Device Parameters of Wide Bandgap Semiconductors Determined by Spectroscopic Ellipsometry*, ICMAT, 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, 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" in University of Torino, Italy, May 2016
- ❖ *Optical probes for device parameters of ZnO films* Symposium, "Thin Film Processing and Devices" International Conference on Advanced Electromaterials, 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)				
Research Projects: S.No	Name of Agency	Title of project	Period of support	Completed/on-going
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 ₂ O ₃ films	2008-2011	completed
5.	Univ. of Delhi, R & D Grant,	Nanomaterials Research and Optical Metrology	2007-13	completed
Awards and Distinctions				
<ol style="list-style-type: none"> 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. Funding by Royal Society, U.K.- Dept. of Science & Technology for <i>Indo-U.K.</i> Networking Meetings (April-May, 2004) 7. Funding under Japan Society for Promotion of Science –Indian National Science Academy Bilateral Collaboration (October-November, 2011) 				
Association With Professional Bodies				
<p>1.Reviewer: American Institute of Physics, Institute of Physics, U.K., Elsevier, Springer. Taylor &Francis Journals,, Japanese Journal of Applied Physics,</p>				

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

- ❖ . Judge of various Inter-college competitions , for example, 'Redefining Science Teaching: Future of Education' at University of Delhi, South Campus, from 7-9 March, 2013 organized by Acharya Narendra Dev College.
- ❖ Organizing Committee of **Engineering Student Talent Award, 2015** held in Bangkok, Thailand and which saw participation from students of Thailand, Laos, Cambodia, and others
- ❖