

Dr. Santosh Kumar Mahapatra

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Education

- **M. Sc:** Nuclear Techniques
- **Ph. D:** Design & Development of a 20keV Electron Irradiation System & Its Applications in Studies of Charge Dynamics in Insulator

Training

- Refresher Course in Physics, Department of Physics, University of Pune, Pune, INDIA
- Basic Pedagogy Training Programme, Birla Institute of Technology, Mesra, Ranchi, INDIA
- Electron Beam Evaporation, Nano laboratory, University of California Los Angeles, USA
- General Employee Radiological Training, Stanford Linear Accelerator Centre, San Francisco, USA
- Silicon Dry Etching, Nano laboratory, University of California Los Angeles, USA
- Radiation Worker I Training, Stanford Linear Accelerator Centre, San Francisco, USA
- Profilometer Measurement, Nano laboratory, University of California Los Angeles, USA
- SEM, Nano laboratory, University of California Los Angeles, San Francisco, USA
- International Host Laboratory Experiments, University of Pune, Pune, INDIA
- Joint Universities Accelerator School, Centre Universitaire et de Recherche, Archamps, FRANCE
- School on the Physics of Beams, Centre for advanced Technology, Indore, INDIA

Experience

- Dec. 2015 to Till Date : Associate Professor, Central University of Punjab, Bathinda, INDIA
- May 2013 to Dec. 2015 : Associate Professor, Birla Institute of Technology, Mesra, Ranchi, INDIA
- July 2009 to April 2013 : Assistant Professor, Birla Institute of Technology, Mesra, Ranchi, INDIA
- Jan 2009 to June 2009 : Senior Lecturer, Birla Institute of Technology, Mesra, Ranchi, INDIA
- May 2007 to Dec 2008 : Lecturer, Birla Institute of Technology, Mesra, Ranchi, INDIA

Professional Recognition /Awards/Scholarship

- Visiting Scientist, PBPL, University of California Los Angeles, USA
- FACET User, Stanford Linear Accelerator Centre, San Francisco, USA
- Visiting Scientist, Centre of Excellence in Solar Energy Lab., N.C.L, Pune, INDIA
- Post-Doctoral Fellow, Ajou University, Suwon, SOUTH KOREA
- Best Thesis Award, Department of Physics, University of Pune, INDIA
- M. R. Bhide Award, Indian Physics Association, Pune Chapter, INDIA
- R K. Bhalla Award, Indian Physics Association, Pune Chapter, INDIA
- Junior Research Fellow, Department of Physics, University of Pune, INDIA

Research Project

Handled

- Investigation of Plasma Instability and its Correlation with Deposited Species
(Sanctioned by BRNS Mumbai, Rs 22.42 Lakhs, Ref: 2009/34/43/BRNS, dated 26-2-2010)
- Thin Film Technology Used To Enhance Reflecting Surface for Concentrated Solar Power
- Transferred Arc Plasma Modelling & Synthesis of Iron Oxide Nanoparticle for Biomedical Application
(Sanctioned by BRNS Mumbai, Rs 23.12 Lakhs, Ref: 34/14/60/2014-BRNS, dated 31-12-14)

Ongoing

- Development of Solid State Mesoscopic Solar Cells
(Sanctioned by BRNS, Mumbai, Rs 28.59 Lakhs, Ref: 34/14/05/2015/BRNS, dated: 24-6-15)
- Diagnosis of Plasma in ECR Ion Source
(Sanctioned by DST, New Delhi, Rs 50.51 Lakhs, Ref: EMR/2014/000722, dated: 5-10-15)

Peer Recognition

- Member, Plasma Science Society of India
- Member, Indian Power Beam Society
- Jury Member for Rastriya Chalchitra Mela, Vigyan Prasar
- Member, DST- INSPIRE Programme

Teaching Assignments

- Physics-I & II
- Material Science
- Nuclear Physics
- Electromagnetic Theory
- Nano Structure & Nano Device

Area specializations/Research Interest

- Design of Electron and Ion Sources
- Plasma Parameters and its Chaotic Behaviour
- MOS, MIS and Solar Cell Devices
- Plasma Wake Field Accelerator
- Irradiation Effects on Thin Film and Soft Materials

Publications

Research Papers

1. A 20 keV electron gun system for the electron irradiation experiments, **S K Mahapatra**, S D Dhole and V N Bhoraskar, NIM-A, 536, Issues 1-2, (2005), Pages 222-225.
2. Comparative study of spin coated and sputtered PMMA as an etch mask material for silicon micromachining Dhananjay S Bodas, **S K Mahapatra** and S A Gangal, Sensors and Actuators A, 120, Issue 2, May 2005, P 582.
3. Electron beam induced surface cross-linking of functional monomers coated on silicon substrate, **Santosh Mahapatra**, Dhananjay Bodas, A B Mandale V N Bhoraskar, Materials Letters, Vol.60,11, May 2006, Pages 1360
4. Dependence of charge build-up in the polyimide on the incident electron energy, **S K Mahapatra**, S D Dhole, V N Bhoraskar, Journal of Applied Physics, 100 (2006) 034913-21.
5. Growth and decay of surface voltage on the silver diffused polyimide exposed to 3-15 keV electrons, **S.K.Mahapatra**, S.D.Dhole and V. N. Bhoraskar, Journal of Physics D, 40 (2007) 1097-1102.

6. Formation of Gold and Silver nanoparticles by 5 keV to 15 keV electron irradiation, **S.K.Mahapatra**, S.D.Dhole and V. N. Bhoraskar, *Nanotechnology*, 18 (2007), 135602.
7. Capacitance-Voltage characterization of electron beam induced surface cross-linked functional monomers, **Santosh Mahapatra**, Dhananjay Bodas, S.A. Gangal, V.N. Bhoraskar, *Applied Phys. Letters*, Vol 90, (2007), 133501.
9. Automation of Low Energy Electron Irradiation System for Medical Application, **S.K.Mahapatra**, B. J. Patil, S. T. Chavan, V. N. Bhoraskar, S. D. Dhole, *J. of Medical Physics*, V 31 2006, 211
10. Angular Distribution of Bremsstrahlung radiation from 6 and 15 MeV Pulsed electron beam incident on Tungsten target, B J Patil, **S K Mahapatra**, S N Pethe, S T Chavan, V N Bhoraskar, S D Dhole, *J. of Medical Physics*, 31 (3) 2006, 212.
11. A 20 keV energy electron induced breaks in chromatin materials for dosimetry and radiotherapy applications, **S K Mahapatra**, I Banerjee, P K Barhai, A A Babrekar, B B Nath, V N Bhoraskar, S D Dhole, *J. of Medical Physics*, Vol 32 (3), 2007, 18.
12. Particle size-dependent giant nonlinear absorption in nanostructured Ni-Ti alloys, J K Anthony, H C Kim, H W Lee, **S K Mahapatra**, H M Lee, C K Kim, K Kim, H Lim and F Rotermund, *OPTICS EXPRESS*, Vol. 16 (15) Page: 11193-11202, (2008).
13. Effect of the titanium ion concentration on electro deposition of nanostructure TiNi films, H. M. Lee, **S. K. Mahapatra**, J. K. Anthony, F. Rotermund and C. K. Kim, *J. of Material Science*, Vol 44, pp 3731 - 3735 (2009).
14. Study of the effect of plasma current density on nitrides and oxynitrides titanium thin films prepared by Reactive DC Magnetron Sputtering”, P.K.Barhai, Neelam Kumari, I. Banerjee, S.K.Pabi, **S.K.Mahapatra**, *Vacuum*, 84 (2010) 896
15. Effect of ambient pressure on the axial behavior of Ar-H2 transferred thermal arc plasma column, I. Banerjee, N.K.Joshi, S.Karmakar, N.V.Kulkarni, S.N.Sahasrabudhe, **S. K. Mahapatra**, P K Barhai, S. V. Bhoraskar and A. K. Das, *IEEE Transactions on Plasma Science*, Vol 38, 2010, pp 982
16. Influence of RF power on the electrical and mechanical properties of nano-structured carbon nitride thin films deposited by RF magnetron sputtering”, I. Banerjee, Neelam Kumari, Ashis K. Singh, Mukesh Kumar, Pinaki Laha, A.B. Panda, S.K. Pabi, P.K. Barhai, **S.K. Mahapatra**, *Thin Solid Films*, Vol 518, Issue 24, 2010, 7240.
17. Study of bactericidal efficiency of magnetron sputtered TiO₂ films deposited at varying oxygen partial pressure” A.B. Panda, P. Laha, K. Harish, B. Sarkar, S.V. Chaure, W.A. Sayyad, V.S. Jadhav, G.R. Kulkarni, D. Sasmal, P.K. Barhai, A.K. Das, **S.K. Mahapatra**, I. Banerjee, *Surface and Coatings Technology*, 205 (2010) 1611–1617
18. Effect of leakage current and dielectric constant on single and double layer oxides in MOS structure”, Pinaki Laha, A.B. Panda, S Dahiwal, K Date, K R Patil, P K Barhai, A K Das, I. Banerjee, **S K Mahapatra**, *Thin Solid Films*, 519 (2010) 1530
19. Study of the effect of plasma-striking atmosphere on Fe-oxidation in thermal DC arc-plasma processing, I. Banerjee, Y.B. Kholam, **S K Mahapatra**, A K Das and S.V. Bhoraskar, *J. of Vacuum Science and Technology A*, 28,6, 1399, 2010
20. 6 MeV electron irradiation effects on electrical properties of Al/TiO₂ / n -Si MOS capacitors, Laha P, Dahiwal S.S, Banerjee I, Pabi S.K, Kim D, Barhai P.K, Bhoraskar V.N, **Mahapatra S.K** *NIMB*, 269 (23), p.2740-2744, Dec 2011
21. Effects of 6 MeV electron irradiation on electrical properties and device parameters of Al/Al₂O₃/ TiO₂/n-Si MOS capacitors, Laha P, Banerjee I, Barhai P.K, Das A.K, Bhoraskar V.N, **Mahapatra, S. K**, *NIMB*, 283, p.9, Jul 2012
22. Synthesis of magnetically active interpenetrating polymer network for drug release, S. Goswami, K. Kiran, A. B. Panda, P.P. Sharma, **S. K. Mahapatra**, S. V. Bhoraskar, I. Banerjee, *Int.J.Nano Dim.* 2(1): 37-48, (2011)
23. Development of rf plasma sputtered Al₂O₃-TiO₂ multilayer broad band antireflecting coatings and its correlation with plasma parameters, Laha P, Panda A.B, **Mahapatra S.K**, Barhai, P.K, Das A.K, Banerjee, I., *Applied Surface Science*, 258 (7), p.2275-2282, Jan 2012
24. Understanding of gas phase deposition of reactive magnetron sputtered TiO₂ thin films and its correlation with bactericidal efficiency, Panda A.B, **Mahapatra S. K**, Barhai P.K, Das A.K, Banerjee I, *Applied Surface Science*, Volume 258, Issue 24, 1 October 2012, Pages 9824-9831
25. Irradiation effects of 6 MeV electron on electrical properties of Al/Al₂O₃/n-Si MOS capacitors, Laha P, Banerjee I, Bajaj A, Chakraborty P, Barhai P.K, Dahiwal S.S, Das A.K Das, V.N. Bhoraskar, **Mahapatra S. K**, *Radiation Physics and Chemistry*, 81, 1600-1605, 2012
26. Wakefields in photonic accelerator structures, B Naranjo, G Andonian, E Arab, S Barber, K Fitzmorris, A Fukusawa, P Hoang, **S K Mahapatra**, B O’Shea, A Valloni, O Williams, C Yang & J B Rosenzweig, *AIP Conf. Proc.* 1507, 600, 2012
27. Bactericidal efficiency of nano structured Al-O/Ti-O composite thin films prepared by dual magnetron reactive co-sputtering technique, A.B. Panda, S. Gopikishan, **S.K. Mahapatra**, P.K. Barhai, A.K. Das, I. Banerjee, *Ceramics International*, DOI 10.1016/j.ceramint.2013.08.141, (2013)

28. Electropolymerization of polyaniline thin films, Ashwini B. Rohon, Priyanka U. Londhe, **S. K. Mahapatra**, S. K. Kulkarni and N. B. Chaure, High Performance Polymers 26(6), sept 2014, page 641-647
29. Progress on the hybrid gun project at UCLA, A. Fukasawa, H. To, **S. K. Mahapatra**, B. Baumgartner, A. Cahill, K. Fitzmorris, R Li, P Musumeci, J B Rosenzweig, B Spataro, D Alesini, L Ficcadenti, A Valloni, L Palumbo, Physics Procedia, 52, 2014, 2-6.
30. Experimental investigation of quasi periodic-chaotic-quasi periodic-chaotic transition in a DC magnetron sputtering plasma, G Sabavath, P K Shaw, A N S Iyengar, I Banerjee and **S K Mahapatra**, PHYSICS OF PLASMAS 22, 082121 (2015)
31. Development of CuInTe₂ thin film solar cells by electrochemical route with low temperature (80°C) heat treatment procedure, Manorama Lakhe, **S K Mahapatra**, Nandu B. Chaure, Materials Science and Engineering B 204 (2016) 20–26

Book Chapters

- Study of Drug Transport Properties of Acrylic-Based Iron (III) Oxide-Filled IPN, Nanomedicine and Drug Delivery, **ISBN: 9781926895178, Apple Academic Press, Canada,** <http://www.appleacademicpress.com/title.php?id=9781926895178>
- Study of Plasma Induced Gas Phase Growth Mechanism of TiO₂/Al₂O₃ Multilayer Thin Films and Its Correlation with Its Morphological and Electrical Properties, Advanced Nanomaterials Synthesis, Properties, and Applications, **ISBN: 9781926895796, Apple Academic Press, Canada,** <http://www.appleacademicpress.com/title.php?id=9781926895796>

Workshop/Conferences

Organised

- SERC School on Processing Plasma Science, 15-27 December 2008
- DST-INSPIRE Program-I, 27-31 January 2010
(Sanctioned by DST, New Delhi Rs 9.75 Lakhs, Ref No: SR/INSPIRE/2009, dated 5/1/2010)
- DST-INSPIRE Program-II, 20-24 December 2010
(Sanctioned by DST, New Delhi Rs 9.75 Lakhs, Ref No: SR/INSPIRE/2010, dated 8/11/2010)
- Vigyan Prasar -Multidisciplinary Workshop for VIPNET Clubs, 24-26 March 2015,
(Sanctioned by Vigyan Prasar, New Delhi, Rs 4.59 Lakhs, Ref: VP/058/34/A&A/14, dated 5/3/2015)
- DST-PAC Meeting on Plasma, High Energy, Nuclear, Astrophysics & Nonlinear Dynamics, 1-2 May 2014
(Sanctioned by SERB, DST Rs 11.5 Lakhs, Ref No: SR/S9/Z-01/2012-II/PHENNA dated 11/4/2014)

Invited Talk

- 7th International Conference on Industrial Tribology, Steel Authority of India Limited, Ranchi, INDIA
- Fusion Neutronics Laboratory, Institute Plasma Research, Ahmedabad, INDIA
- Nurturance Program for NTS Awardees, Birla Institute of Technology, Mesra, Ranchi, INDIA
- National Symposium on Nonlinear & Complex Phenomena organized by IASST, Guwahati, INDIA
- National Workshop on Radiation, Central University of Jharkhand, Ranchi, INDIA
- National Symposium on Emerging Plasma Techniques for Materials Processing, Pune University, INDIA
- Advanced Materials Processing Analysis Centre and Nanoscience and Technology, University Of Central Florida, Orlando, USA

Reviewer

- Vacuum
- Surface Coating and Technology
- Surface Review and Letters
- DST-SERB Projects