

Dr. Sandeep Kumar

UGC-Assistant Professor

Department of Physics, Central University of Rajasthan

NH-8, Bandarsindri, Rajasthan-305801, INDIA

Email: **sandeepiuac@gmail.com**
sandeep.kumar@curaj.ac.in

Phone: +91-8290686644,

Fax: +91-1463238722,

Research Field: Experimental condensed matter physics

Research Interests

Semiconductor nanowires, Nanoelectronic devices and Nano scale phenomena, Electrical and magnetic properties of nanostructures, Low temperature transport, Spin transport and Nanospintronics, Characterization of defects in semiconductors, Modification of materials using energetic ions

Employment

- April, 2014 to present: UGC-Assistant Professor, Central University of Rajasthan, India
- June, 2011 to Dec, 2013: Researcher, Department of Physics, Lund University, Lund, Sweden/Halmstad University, Sweden

Postdoctoral Experience

- Dec, 2009 to May 2011: Department of Physics, Lund University, Lund, Sweden
Project: Controlled magnetic ion doping and magneto-transport properties of semiconductor nanowires
- December, 2008 to November 2009: Laboratorio Nazionale TASC-INFN, SS 14 Km 163.5, 34012, Trieste, Italy.
Project: Study of the transport properties of semiconductor nanostructures for spintronics

Education

- Inter-University Accelerator Centre (IUAC), New Delhi, India 2003-2008

Ph.D (Physics)

Thesis title: Ion beam modification of metal-silicon junctions

University: Jawaharlal Nehru University, New Delhi, India

- Indian Institute of Technology (I.I.T.) Roorkee, Roorkee, India. 2001-2003

M. Sc. (Physics)

- C.C.S.University, Meerut, India. 1997-2000

B.Sc. (Physics, Chemistry, Mathematics)

Scientific awards and honor

- Selected as UGC-Assistant Professor (Physics) under UGC-Faculty Recharge program
- Guest Scholarship 2010 (Post Doc) from Swedish Institute.
- CSIR Senior Research Fellowship (SRF-2006) in Physical Sciences
- CSIR Junior Research Fellowship (JRF-2003) in Physical Sciences

Other National level exams

- Qualified Graduate Aptitude Test in Engineering GATE-2003, GATE-2005

Presentations

1. **Invited Talk.** "Hopping conduction and Magnetoresistance in (Ga, Mn)As nanowires" 5th Nordforsk network workshop on nanospintronics" Sweden, 2012
2. **Presentation.** "Highly Mn doped GaAs nanowires and their transport properties" ICNANO, New Delhi, India, December, 2011
3. **Seminar.** "A new route towards semiconductor nanospintronics: highly Mn-doped GaAs nanowires realized by ion-implantation under dynamic annealing conditions" Lund University, Sweden, July, 2011
4. **Seminar.** "Influences of ion irradiation on metal-silicon junctions" University of Fribourg, Switzerland, August, 2008
5. **Presentation.** "Modification of Au/n-Si(100) Schottky barrier by argon ion irradiation" SMMIB-15, Mumbai, September 2007

Papers in International Peer Reviewed Journals

Publications on [GoogleScholar](#) (* as cofirst author)

1. *Magnetoresistance in Mn ion-implanted GaAs:Zn nanowires* W. P. Jr, [Sandeep Kumar](#), D. Jacobsson, A. Johannes, V. Jain, C. M. Canali, A. Pertsova, C. Ronning, K. A. Dick, L. Samuelson, H. Pettersson **Appl. Phys. Lett.** 104, 153112 (2014).*
2. *Magnetic polarons and large negative magnetoresistance in GaAs nanowires implanted with Mn ions* [Sandeep Kumar](#) W. P. Jr, A. Johannes, D. Jacobsson, C. Borschel, A. Pertsova, C-H, Wang, M. k. Wu, C. M. Canali, C. Ronning, L. Samuelson and H. Pettersson **NanoLetters** 13, 5079 (2013).
Feathered as Technology Update news at nanotechweb.org, Nov. 2013
3. *Hopping conduction in Mn ion implanted GaAs nanowires* W. P. Jr, [Sandeep Kumar](#), C. Borschel, P. Wu, C. M. Canali, C. Ronning, L. Samuelson and H. Pettersson, **NanoLetters** 12, 4838 (2012).*
4. *Thermoelectric Characterization of Electronic Properties of GaMnAs Nanowires* P. Wu, W. P. Jr, [Sandeep Kumar](#), C. Borschel, C. M. Canali, C. Ronning, L. Samuelson, H. Pettersson and H. Linke **J. Nanotechnol.** 2012, 480813(2012).
5. *A new route towards semiconductor nanospintronics: highly Mn-doped GaAs nanowires realized by ion-implantation under dynamic annealing conditions* C. Borschel, M. E. Messing, M. T. Borgström, W. Paschoal Jr, J. Wallentin, [Sandeep Kumar](#), K. Mergenthaler, K. Deppert, C. M. Canali, H. Pettersson, L. Samuelson and C. Ronning **NanoLetters** 11, 3935 (2011).
6. *Synthesis of Controlled Diluted Magnetic Semiconductor by Ni Implantation in ZnO Crystal* D. K. Mishra, P. Kumar, [Sandeep Kumar](#), S. Mohapatra, I. Sulania, A. Tripathi, S. Varma, M. K. Sharma, R. Chatterjee and D. Kanjilal **Adv. Sci. Lett.** 2, 324 (2009).
7. *Effects of thermal and athermal processing on the formation of buried SiC layers* Y. S. Katharria, [Sandeep Kumar](#), D. Kanjilal, D. Chauhan, J. Ghatak, U. Bhatta and P. V. Satyam **J. Appl. Phys.** 105, 014301 (2009).

8. *Ion beam pattering of nano-grating on SiC surface* Y. S. Katharria, Sandeep Kumar, A. T. Sharma and D. Kanjilal, **Surf. Coat. Tech.** 203, 2442 (2009).
9. *Effect of ion irradiation on current-voltage characteristics of Au/n-GaN Schottky diodes* V. Baranwal, Sandeep Kumar, A. C. Pandey and D. Kanjilal **J. Alloys and Compounds** 480, 962 (2009).
10. *In-situ current-voltage analysis of Au/GaAs Schottky diode under nitrogen ion irradiation* A.T. Sharma, Shahnawaz, Sandeep Kumar, Y. S. Katharria, P. Kumar and D. Kanjilal **Surf. Coat. Tech.** 203, 2667 (2009).
11. *Ion-beam-induced modification in GeO_x thin films: A phase separation study* Y. Batra, D. Kabiraj, Sandeep Kumar and D. Kanjilal, **Surf. Coat. Tech.** 203, 2415 (2009).
12. *Swift heavy ion irradiation induced defects and electrical characteristics of Au/n-Si Schottky structure* Sandeep Kumar, Y. S. Katharria and D. Kanjilal, **J. Phys D: Appl. Phys.** 41, 105105 (2008).
13. *Setup for in situ deep level transient spectroscopy of semiconductors during swift heavy ion irradiation* Sandeep Kumar, Sugam Kumar, Y. S. Katharria, C. P. Safvan and D. Kanjilal **Rev. of Sci. Instrum.** 79, 056103 (2008).
14. *Influence of 100 MeV oxygen ion irradiation on Ni/Si (100) Schottky barrier characteristics* Sandeep Kumar, Y. S. Katharria and D. Kanjilal, **J. Appl. Phys.** 103, 044504 (2008).
15. *Inhomogeneities in 130 MeV Au ion irradiated Au/n-Si structure* Sandeep Kumar, Y.S. Katharria, Y. Batra and D. Kanjilal, **Appl. Surf. Sci.** 254, 3277 (2008).
16. *Pulsed laser deposition of SiC thin films at medium substrate temperatures* Y. S. Katharria, Sandeep Kumar, R. Prakash, R.J. Choudhary, F. Singh, N. P. Lalla, D. M. Phase, D. Kanjilal, **Thin Solid Films** 516, 6083 (2008).
17. *Point defect creation by low fluence swift heavy ion irradiation-induced low energy electrons in YBa₂Cu₃O_{7-y}* R. Biswal, J. John, D. Behera, P. Mallick, Sandeep Kumar, D. Kanjilal, T. Mohanty, P. Raychaudhuri and N. C. Mishra, **Supercond. Sci. Technol.** 21, 085016 (2008).
18. *Elastic Recoil Detection (ERD) Analysis of GeO_x thin films* Y. Batra, S.A. Khan, D. Kabiraj, Sandeep Kumar and D. Kanjilal, **Nucl. Instr. And Meth. B** 266, 1697 (2008).
19. *Effect of swift heavy ion irradiation on deep levels in Au/n-Si (100) Schottky diodes studied by deep level transient spectroscopy* Sandeep Kumar, Y.S. Katharria, Sugam Kumar and D. Kanjilal, **J. Appl. Phys.** 102, 113709 (2007).
20. *Influence of swift heavy ion irradiation on electrical characteristics of Au/n-Si(100) Schottky structure* Sandeep Kumar, Y.S. Katharria, Y. Batra and D. Kanjilal, **J. Phys. D: Appl. Phys.** 40, 6892 (2007).

21. *Self-organization of 6H-SiC (0001) surface under keV ion Irradiation* Y. S. Katharria, Sandeep Kumar, P. S. Lakshmi, D. Kanjilal and A. T. Sharma, **J. Appl. Phys.** 102, 044301 (2007).
22. *Nano and micro-scale patterning of Si under ion erosion* Y. S. Katharria, Sandeep Kumar, A. T. Sharma and D. Kanjilal, **Appl. Surf. Sci.** 253, 6824 (2007).
23. *Characterizations of pulsed laser deposited SiC thin films* Y. S. Katharria, Sandeep Kumar, R. Prakash, R.J. Choudhary and D. Kanjilal, **J. of Non-Crystalline Solids** 353, 4660 (2007).
24. *Influence of SHI irradiation on the formation of buried SiC* Y. S. Katharria, Sandeep Kumar, and D. Kanjilal, **Nucl. Instru. And Meth. B**, 260, 563 (2007).
25. *Ion-beam-induced phase separation in GeO_x thin films* Y. Batra, D. Kabiraj, Sandeep Kumar and D. Kanjilal, **J. Phys. D: Appl. Phys.** 40, 4568 (2007).
26. *Effect of swift heavy ion irradiation on electrical characteristics of Au/n-GaAs Schottky diodes* A. T. Sharma, Sahanawz, Sandeep Kumar, Y. S. Katharria and D. Kanjilal, **Appl. Surf. Sci.** 254, 459 (2007).
27. *Barrier modification of Au/n-GaAs Schottky diode by swift heavy ion irradiation* A. T. Sharma, Sahanawz, Sandeep Kumar, Y. S. Katharria and D. Kanjilal, **Nucl. Instr. And Meth. B**, 263, 424 (2007).
28. *Temperature dependent barrier characteristics of swift heavy ion irradiated Au/n-Si Schottky structure* Sandeep Kumar, Y.S. Katharria, Sugam Kumar and D. Kanjilal, **J. Appl. Phys.** 100, 113723 (2006).
29. *Synthesis of buried SiC using energetic ion beam* Y. S. Katharria, Sandeep Kumar, F. Singh, J.C. Pivin and D. Kanjilal, **J. Phys. D: Appl. Phys.** 39, 3969 (2006).
30. *Temperature dependence of barrier height of swift heavy ion irradiated Au/n-Si Schottky structure* Sandeep Kumar, Y.S. Katharria, S. Kumar and D. Kanjilal, **Solid State Electron.** 50, 1835 (2006).
31. *Barrier height modification of Au/n-Si Schottky structures by swift heavy ion irradiation* Sandeep Kumar and D. Kanjilal, **Nucl. Instr. And Meth. B**, 248, 109 (2006).