# Dr. Tushar Sant

## Personal Details


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## Overview

- 10+ years of research experience
- Developing experimental investigation techniques for structure investigation using synchrotrons and X-ray free electron lasers
- Designing and building complex experimental setups
- Experimental data analysis, Simulation of underlying physical phenomena

## Education

**Oct 2005 – Jun 2009**

PhD (Dr. rer. nat.) in Physics
University of Siegen, Germany
Advisor: Prof. U. Pietsch
Dissertation title: *Reconstruction of surface morphology from coherent scattering of white synchrotron radiation in hard x-ray regime*
Magna cum laude

**Jun 1996 – Jun 1998**

Master of Science in Physics
University of Pune, India
First Class (62.20%)

**Jun 1993 – May 1996**

Bachelor of Science in Physics
University of Pune, India
First Class with Distinction (73.66%)

## Professional Experience

**Aug 2019 – present**

Assistant Professor, National Centre for Nanoscience and Nanotechnology, University of Mumbai, India

- Independent research activities along with collaborative research
- Research area: Wide band gap semiconductors
- Teaching at postgraduate level – Mathematical Methods in Physics, Numerical Recipes and Methods, Python Programming
- Mentoring PhD students in their research

**Aug 2017 – Jan 2019**

Quality Assurance Scientist, EBV Systems, Siegen, Germany

- Planning and implementing strategies for quality management and testing.
- Responsible for assessing the quality, specifications and technical designs of electronic PCB products and feedback to the manufacturing department.

**May 2014 – Apr 2017**

Post-doctoral Scientist at X-ray Physics Group, University of Siegen, Germany

- Performing X-ray scattering measurements at synchrotrons (BESSY II, DELTA) and X-ray free electron lasers (FERMI, FLASH)
- Study of light induced pico-second dynamics of magnetic thin films and multilayer samples using SAXS, GISAXS and XMCD at Co and Fe M-edge
- Designing and planning of experiments, building and controlling complex setups, experimental data collection and analysis, simulation of physical

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| | processes in MATLAB |
| Jul 2011 – Apr 2014 | Visiting Scientist at Center for Advanced Technology, Indore, India<br>▪ In-charge of Energy Dispersive-XRD Beamline at Indus-2 synchrotron, India<br>▪ Structural analysis of thin films and powder samples using XRD, Grazing incidence XRD, time-resolved measurements<br>▪ Performing own research and supporting external users |
| Jul 2009 – Jun 2011 | Post-doctoral scientist at Solid State Physics Group, University of Siegen, Germany<br>▪ System simulation and designing strategies for calibration of high speed (5KHz) X-ray detector for the upcoming XFEL at Hamburg<br>▪ Tutor for Solid State Physics for Masters course in Nanoscience |
| Oct 2005 – Jun 2009 | Doctoral fellow at Solid State Physics Group, University of Siegen, Germany<br>▪ Development of an experimental technique to reconstruct surface morphology from Coherent X-ray Scattering at Energy Disperive Beamline at BESSY II, Berlin<br>▪ Development of a programming code in MATLAB along with theory behind it<br>▪ Supervisor for Advanced Laboratory Course in Physics for Bachelor students |
| Oct 2004 – Sep 2005 | Research fellow at Structure Analysis Group, University of Potsdam, Germany<br>▪ Development of a technique to determine size and polydispersity of nanoparticles from SAXS data at synchrotron source of BESSY II, Berlin, Germany |
| Jun 1999 – Sep 2004 | Lecturer at Engineering College in Pune, India<br>▪ Applied Physics course for Bachelor students |
| Jul 1998 – May 1999 | Research fellow at Thin Films Group at Department of Physics, University of Pune, India<br>▪ Development of a moisture sensor for polymer (provided by Defense Research and Development Organization of India) in casing of fuel tank in rockets |

## Awards and recognition

- Award for Outstanding Academic Achievement for the PhD thesis of University of Siegen for the year 2009
- *Graduation Scholarship* of DAAD (German Academic Exchange Service) for the year 2009

## Publications

1. Sandip Hinge, Tahir Rojgoli, Tushar Sant, Vaibhav Kadam, Kashinath Bogle, Suhas M. Jejurikar, "Low temperature growth of semi-polar InN on non the crystalline substrate by plasma-assisted laser ablation technique", *Applied Surface Science*, 152519 (2022). https://doi.org/10.1016/j.apsusc.2022.152519
2. Kalyani Date, Harshawardhan Bhatkar, Suhas M. Jejurikar, Tushar Sant, "Investigation for conductance behavior of single walled carbon nanotubes decorated with UNCD and graphitic spherules using STM/STS", *Applied Surface Science Advances*, 5, 100107 (2021). https://doi.org/10.1016/j.apsadv.2021.100107
3. Prashant A Borade, Md Azahar Ali, Sanjida Jahan, Tushar Sant, Kashinath Bogle, Rahul Panat, Suhas M Jejurikar, "MoS2 Nanosheet-Modified NiO Layers on a Conducting Carbon Paper for

Glucose Sensing", *ACS Applied Nano Materials,* 4, 6609 (2021). https://doi.org/10.1021/acsanm.1c00122

4. A Mandal, SK Adhi, BP Joshi, SD Shinde, AG Banpurkar, AV Limaye, KP Adhi, T Sant, SM Jejurikar, "Luminescent behavior of pulsed laser deposited Pr doped ZnO thin films", Physica B: Condensed Matter, 618, 413202 (2021). https://doi.org/10.1016/j.physb.2021.413202
5. P. A. Borade, Tushar Sant, A. Gokarna, R. P. Panat, K. U. Joshi, and S. M. Jejurikar, "Role of defects in modulating the near band edge emissions of sub-micron ZnO crystals", *Opt. Mater.* 109, 110348 (2020). https://doi.org/10.1016/j.optmat.2020.110348
6. M. Khan, V. Kadam, Tushar Sant, S. M. Jejurikar, K. Joshi, S. R.Bhopale, M. A. More, D. Late, "Highly stable field emission from micron sized homogeneous β-$Ga_2O_3$ sheets grown using vapor phase transport route", *Mater. Chem. Phys.* 254, 123512 (2020). https://doi.org/10.1016/j.matchemphys.2020.123512
7. T. Sant, D. Ksenzov, F. Capotondi, E. Pedersoli, M. Manfredda, M. Kiskinova, J. Lüning, U. Pietsch, C. Gutt, "Measurements of ultrafast spin-profles and spin-difusion properties in the domain wall area at a metal/ferromagnetic film interface", *Scientific Reports*, 07, 15064 (2017). https://doi.org/10.1038/s41598-017-15234-7
8. C. Gutt, T. Sant, D. Ksenzov, F. Capotondi, E. Pedersoli, L. Raimondi, I.P. Nikolov, M. Kiskinova, S. Jaiswal, G. Jakob, M. Kläui, H. Zabel, U. Pietsch, "Probing ultrafast changes of a vertical spin density profile with resonant XUV magnetic reflectivity at the free-electron laser FERMI", *Structural Dynamics* 4, 055101 (2017). https://doi.org/10.1063/1.4990650
9. P.K. Yadav, T. Sant, C. Mukharjee, M. Nayak, G.S. Lodha, S. M. Sharma, "Influence of ion-to-atom ratio on the microstructure of evaporated molybdenum thin films grown using low energy argon ions", *J.Vac. Sci.Technol. A*, 32, 021509-1-7 (2014). https://doi.org/10.1116/1.4862141
10. D. Kumar, A. Gupta, P. Patidar, K.K. Pandey, T.Sant, S.M. Sharma, "Interface induced perpendicular magnetic anisotropy in Co/CoO/Co thin film structure: An in-situ MOKE investigation", *J. Phys. D. Appl. Phys.* 47, 105002 (2014). https://doi.org/10.1088/0022-3727/47/10/105002
11. H. Srivastava, T. Ganguli, S.K. Deb, T. Sant, H. Poswal, S.M. Sharma, "In-situ study energy dispersive x-ray diffraction study of the growth of CuO nanowires by annealing method", *J. Appl. Phys.*, 114, 144303 (2013). https://doi.org/10.1063/1.4824177
12. H. Srivastava, T. Ganguli, S.K. Deb, T. Sant, H. Poswal, S.M. Sharma, "In-situ study of the growth of CuO nanowires by energy dispersive x-ray diffraction", *57th DAE SSP Symposium proceedings AIP Conf. Proc.* 1512, 306 (2013). https://doi.org/10.1063/1.4791033
13. D. Kumar, P. Patidar, T. Sant, K. K. Pandey, A. Gupta, S. M. Sharma, "Textured Growth of Co Film on CoO (fcc) Layer; Structural Studies Using EDXRD Beamline at Indus-2", *56th DAE SSP Symposium proceedings, AIP Conf. Proc.* 1447, 721 (2012). https://doi.org/10.1063/1.4710206
14. G. Weidenspointner, R. Andritschke, S. Aschauer, P. Fischer, S. Granato, K. Hansen, P. Lechner, G. Lutz, D. Moch, M. Porro, C. Sandow, T. Sant, and L. Strüder, "Strategy for Calibrating the Non-Linear Gain of the DSSC Detector for the European XFEL" *IEEE NSS/MIC proceedings*, 468-473 (2011). https://doi.org/10.1109/NSSMIC.2011.6153648
15. Tushar Sant, Tobias Panzner, Ullrich Pietsch, "Capabilities of using white x-rays for the reconstruction of surface morphology from coherent reflectivity", *Appl. Surf. Sci.*, 257, 266 (2010). https://doi.org/10.1016/j.apsusc.2010.06.083
16. Beate Reinhold, Thomas Geue, Patrick Huber, Tushar Sant, Ullrich Pietsch, Michael Sztucki, "In-situ and ex situ SAXS investigation of colloidal sedimentation into laterally patterned support", *Langmuir* 25, 814 (2009). https://doi.org/10.1021/la803078b
17. Tobias Panzner, Gudrun Gleber, Tushar Sant, Wolfram Leitenberger, Ullrich Pietsch, "Coherence experiments at the white-beam beamline of BESSY II", *Thin Solid Films* 515, 5563 (2007). https://doi.org/10.1016/j.tsf.2006.12.002