

CURRICULUM VITAE

Dr. SANJEEV KUMAR SRIVASTAVA

Associate Professor, Department of Physics, IIT Kharagpur

Specialization	Current Research Interest
1. Materials Engineering and Characterization using Ion Beams. 2. Nuclear Condensed Matter Physics. 3. Local Magnetism. 4. Quantum Criticality.	1. Phase separation and nanostructure formation in liquid-immiscible alloy thin films using ion beams. 2. Electron correlations (Non-Fermi Liquid and Quantum Critical State) in solids. 3. <i>Ab-initio</i> DFT computations of electronic properties of solids.

Date of Birth: 01.04.1974

EDUCATIONAL QUALIFICATION:

- **Ph. D. – (Physics/Materials Science)** “Synthesis of Compounds and Nanophases by Swift Heavy Ions” [Oct. 2002, Inter-University Accelerator Centre/Jawaharlal Nehru University, New Delhi]

AWARDS/FELLOWSHIPS/SCHOLARSHIPS:

- Young Physicist’s Award in YPC-08 by The Indian Physical Society, Kolkata.
- Max Planck Post-doctoral Fellowship Oct. 2002 – Oct 2004.
- NSC Project Fellowship (IUAC, New Delhi) Aug. 2002 – Oct 2002.
- CSIR-NET JRF’ship (CSIR) Aug. 1998 – Aug. 2002.
- Integrated Scholarship (U.P. Government) July 1986 – June 1988.

MEMBERSHIP:

- The Indian Physical Society, Kolkata
- The Indian Science Congress Association, Kolkata

ACADEMIC POSITIONS:

June 2013 – present	Associate Professor , Department of Physics and Meteorology, Indian Institute of Technology Kharagpur, INDIA
May 2007 – June 2013	Assistant Professor , Department of Physics and Meteorology, Indian Institute of Technology Kharagpur, INDIA
Mar. 2007 – April 2007	Scientist – D , UGC-DAE Consortium for Scientific Research, University Campus, Khandwa Road, Indore, INDIA Activity: Characterization of thin films using X-ray reflectivity (XRR) technique.
Dec. 2004 – Mar. 2007	Visiting Fellow , Dept. of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai, INDIA Activities: Studies of static and dynamic magnetism over short length and time scales in pure metals as well as in dilute and concentrated metallic alloys” using the nuclear technique Time Differential Perturbed Angular Distribution (TDPAD).

Oct. 2002 – Oct. 2004

Guest Scientist, Max-Planck Institut für Metallforschung, Stuttgart, GERMANY

Activities: Application of high-resolution (1-10 Å) Rutherford backscattering spectrometry (HRBS) and elastic recoil detection analysis (HERDA) techniques for elemental depth profiling of near-surface layers of materials and of thin films and multilayers.

Aug. 2002 – Oct. 2002

Project Assistant, Inter-University Accelerator Centre, New Delhi, INDIA

Project: Synthesis of SiC at room temperature by SHI irradiation of Si/C₆₀ multilayers.

TEACHING:

- The regularly assigned Physics courses of the institute since joining.

Ph. D. GUIDANCE:

- 1 – “Magnetic behavior of isolated impurities in solids” (**completed**).
- 2 – “Exploring quantum criticality in metal binaries” (continuing).
- 3 – “Exploring phase transitions in doped rare earth – transition metal Laves phase compounds” (continuing).
- 4 – “Tailoring ion beam mixing strength by manipulating electron-phonon coupling” (recently started).
- 5 – “Phase separation by swift heavy ions” (work to start).
- 6 – “Magnetism in binary metal-graphene composites” (work to start).
- 7 – “Heusler alloys” (topic yet to be defined properly).

M. Tech. PROJECT GUIDANCE:

- Six completed.

CURRENT DEPARTMENTAL ACTIVITY:

- Departmental Time Table In-charge.
- In-charge, XPS facility.

INSTITUTE RESPONSIBILITY:

- Ex Assistant Warden, Radhakrishnan Hall of Residence, IIT Kharagpur.

PROJECTS:

1. DST-FIST project for the Department: In-charge of the XPS/UPS facility under DST-FIST project.
2. SRIC, IIT KGP Project: “STUDY OF QUANTUM CRITICALITY IN ALLOYS VIA LOCAL IMPURITY MAGNETISM”. (*Finished*)
3. DST FAST TRACK Project: “SWIFT HEAVY ION INDUCED PHASE SEPARATION AND NANOSTRUCTURE FORMATION IN ALLOY THIN FILMS”. (*Finished*.)
4. UGC-DAE CSR Project: “STUDY OF PHASE TRANSITIONS IN ALLOYS AND COMPOUNDS” (running).

Publications

1. Patra, Paramita and **Srivastava, S.K.**, Temperature dependent electron–phonon coupling and heat capacity in thin slabs of topological insulator Bi_2Te_3 as pertinent to the thermal spike model, Nucl. Instr. Meth. Phys. Res. B 379 (2016) 9.
2. Pannu, C., Bala, M., Singh, U.B., **Srivastava, S.K.**, Kabiraj, D., and Avasthi, D.K., Phase decomposition of AuFe alloy nanoparticles embedded in silica matrix under swift heavy ion irradiation, Nucl. Instr. Meth. Phys. Res. B 379 (2016) 206.
3. Das, Rakesh, Das, G.P. and **Srivastava, S.K.**, Electronic structure and local magnetism of 3d–5d impurity substituted CeFe_2 , J. Phys. D: Appl. Phys. 49 (2016) 165004.
4. Pannu, C., Bala, M., Khan, S.A., **Srivastava, S.K.**, Kabiraj, D., and Avasthi, D.K., Synthesis and characterization of Au–Fe alloy nanoparticles embedded in a silica matrix by atom beam sputtering, RSC Adv. 5 (2015) 92080.
- 5.
6. Swain, P., Srivastava, Sunil K. and **Srivastava, Sanjeev K.**, Quantum phase transition and Fermi liquid behavior in $\text{Pd}_{1-x}\text{Ni}_x$ nanoalloys, Phys. Rev. B 91 (2015) 045401.
7. Dey, C.C., Das, Rakesh and **Srivastava, S.K.**, Electric field gradients at ^{181}Ta probe in ZrNi : Results from perturbed angular correlation and first-principles calculations, J. Phys. Chem. Solids 82 (2015) 10.
8. Venkatesh, Ch., **Srivastava, S.K.** and Rao, V.V., First principle investigations on Boron doped Fe_2VAl Heusler alloy, Physica B 448 (2014) 237.
9. Grover, V., Shukla, R., Kumari, Renu, Mandal, B. P., Kulriya, P. K., **Srivastava, S. K.**, Ghosh, S., Tyagi, A. K., and Avasthi, D. K., Effect of grain size and microstructure on radiation stability of CeO_2 : an extensive study, Phys. Chem. Chem. Phys. 16 (2014) 27065.
10. **Srivastava, S.K.**, Khan, S.A., Sudheer Babu, P., and Avasthi, D.K.: Swift heavy ion induced nano-dimensional phase separation in liquid immiscible binary Mn–Bi, Nucl. Instr. Meth. Phys. Res. B 332 (2014) 377.
11. Mohanta, S.K., Mishra, S.N., and **Srivastava, S.K.**: First principles density functional calculation of magnetic moment and hyperfine fields of dilute transition metal impurities in Gd host, J. Magn. Magn. Mater. 355 (2014) 142.
12. Gupta, S., Agarwal, D.C., Khan, S.A., Neeleshwar, S., Ojha, S., **Srivastava, S.**, Tripathi, A., Amrithapandian, S., Panigrahi, B.K., and Avasthi, D.K.: PbTe nanocrystal formation by interface mixing of Te/Pb bilayer using low energy ions, Mat. Sc. Engg. B 184 (2014) 58.
13. Dey, C.C. and **Srivastava, S.K.**: Electric quadrupole and magnetic dipole interactions at ^{181}Ta impurity in Zr_2Ni_7 intermetallic compound: Experiment and first-principles calculations, Physica B 427 (2013) 126.
14. Mohanta, S.K., Mishra, S.N., Davane, S.M., Kumar, Neeraj, Thamizhavel, A., Layek, S., Hossain, Z. and **Srivastava, S.K.**: Local probe studies of Fe hyperfine field in CaFe_2As_2 by time differential perturbed angular distribution (TDPAD) spectroscopy and ab initio methods, Nucl. Instr. Meth. Phys. Res. B 299 (2013) 71.
15. Venkatesh, Ch., Srinivas, V., Rao, V.V., **Srivastava, S.K.** and Sudheer, P.: Effect of site disorder on the electronic properties of Fe_2VAl Heusler alloy, J. Alloys Compounds 577 (2013) 417.

16. Khan, Saif A., **Srivastava, S.K.**, and Avasthi, D.K.: Synthesis of an embedded metal nanoparticle planar assembly by low-energy ion irradiation of a thin discontinuous metal film sandwiched in silica, *J. Phys. D: Appl. Phys.* **45** (2012) 375304.
17. Gupta, Srashti, Agarwal, D.C., Prakash, Jai, Khan, S.A., Tripathi, S.K., Tripathi, A., Neeleshwar, S., **Srivastava, S.K.**, Panigrahi, B.K., Chandra R. and Avasthi, D.K.: PbTe formation by swift heavy ion beam induced interface mixing of Te/PbO bilayer. *Nucl. Instr. Meth. Phys. Res. B* **289** (2012) 22.
18. Mohanta, S.K., Mishra, S.N., Davane, S.M. and **Srivastava, S.K.**: Defect induced magnetism in highly oriented pyrolytic graphite (HOPG) by ¹⁹F hyperfine interaction. *J. Phys.: Cond. Matter* **24** (2012) 085601-7.
19. Mishra, S.N., Mohanta, S.K., Davane, S.M. and **Srivastava, S.K.**: Defect induced magnetic interactions in highly oriented pyrolytic graphite (HOPG): A local investigation using TDPAD method. *Hyperfine Interactions* **197** (2010) 71-75.
20. Mohanta, S.K., Mishra, S.N., **Srivastava, S.K.** and Rots, M.: First-principles calculation of the electric field gradient and magnetic hyperfine field in rare-earth metals (Gd-Lu) and dilute alloys with Cd. *Solid State Communications* **150** (2010) 1789.
21. **Srivastava, S.K.** and Avasthi, D.K.: Swift heavy ion induced mixing. *Defence Science Journal* **59** (2009) 425-435.
22. **Srivastava, S.K.** and Mishra, S.N.: Evidence of Quantum Criticality at Finite Temperatures in Pd-Ni Alloys via Impurity-Lattice Interaction. *Physics Teacher* **50** (2008) 10-16.
23. Mishra, S.N. and **Srivastava, S.K.**: Electronic structure and magnetic properties of 3d impurities in antiferromagnetic Cr. *J. Phys.: Cond. Matter* **20** (2008) 285204 (pp 1-8).
24. **Srivastava, S.K.** and Mishra, S.N.: Magnetic behaviour of isolated Cu impurities in Cr: experiment and theory. *J. Phys.: Cond. Matter* **20** (2008) 015214 (pp 1-6).
25. Bahramy, M.S., **Srivastava, S.K.**, Mishra, S.N., Das, G.P. and Kawazoe, Y.: Ab-initio study of giant moment reduction of Fe impurity in dilute Pd_{0.95}V_{0.05}. *J. Magn. Magn. Mater.* **310** (2007) e541.
26. **Srivastava, S.K.**, Mishra, S.N. and Das, G.P.: Spin fluctuations of isolated Fe impurities in Pd based dilute alloys: Effect of ferromagnetic host spin polarization. *J. Phys.: Cond. Matter* **18** (2006) 9463-9470.
27. **Srivastava, S.K.**, Avasthi, D.K. and Pippel, E.: Swift heavy ion induced formation of nano columns of carbon clusters in a Si based polymer. *Nanotechnology* **17** (2006) 2518-2522.
28. **Srivastava, S.K.**, Kumar, R., Kabiraj, D., Patel, R.S., Majumdar, A.K., Gupta, A. and Avasthi, D.K.: Swift heavy ion induced mixing of Fe/Ni multilayer. *Nucl. Instr. Meth. Phys. Res. B* **243** (2006) 304-312.
29. **Srivastava, S.K.**, Avasthi, D.K., Assmann, W., Wang, Z.G., Kucal, H., Jacquet, E., Carstanjen, H.D. and Toulemonde, M.: Test of the hypothesis of transient molten state diffusion for swift heavy ion induced interface mixing. *Phys. Rev. B* **71** (2005) 193405: 1-4.
30. Avasthi, D.K., Ghosh, S., **Srivastava, S.K.** and Assmann, W.: Existence of transient temperature spike induced by SHI: evidence by ion beam analysis. *Nucl. Instr. Meth. Phys. Res. B* **219-220C** (2004) 206-214.
31. **Srivastava, S.K.**, Plachke, D., Szökefalvi-Nagy, A., Major, A. and Carstanjen, H.D.: Counting individual atom layers in graphite – high-resolution RBS experiments on HOPG (highly oriented pyrolytic graphite). *Nucl. Instr. Meth. Phys. Res. B* **219-220C** (2004) 364-368.
32. **Srivastava, S.K.**, Kabiraj, D., Schattat, B., Carstanjen, H.D. and Avasthi, D.K.: Swift Heavy Ion Induced Modification of Si/C₆₀ Multilayers. *Nucl. Instr. Meth. Phys. Res. B* **219-220C** (2004) 815-819.

33. Kumar, Sarvesh, Chauhan, R.S., Singh, R.P., Kabiraj, D., Sahoo, P.K., Rumbolz, C., **Srivastava, S.K.**, Bolse, W. and Avasthi, D.K.: Mixing in Cu/Ge system by swift heavy ions. Nucl. Instr. Meth. Phys. Res. B 212 (2003) 242-245.
34. Tripathi, A., Khan, S.A., **Srivastava, S.K.**, Kumar, M., Kumar, S., Nageswara Rao, S.V.S., Laxmi, G.B.V.S., Bajwa, N., Nagaraja, H.S., Siddiqui, A.M., Mittal, V.K., Szoekfalvi, A., Kurth, M., Pandey, A.C., Avasthi, D.K. and Carstanjen, H.D.: Electronic Sputtering from HOPG: A Study of Angular Dependence. Nucl. Instr. Meth. Phys. Res. B 212 (2003) 402-406.
35. Ghosh, S., Avasthi, D.K., Som, T., Tripathi, A., **Srivastava, S.K.**, Grüner, F. and Assmann, W.: Ion velocity, charge state and substrate dependent electronic sputtering of fullerene. Nucl. Instr. Meth. Phys. Res. B 212 (2003) 431-435.
36. Avasthi, D.K., Assmann, W., Tripathi, A., **Srivastava, S.K.**, Ghosh, S., Grüner, F. and Toulemonde, M.: Transient enhanced diffusion of oxygen in Fe mediated by large electronic excitation. Physical Review B 68, (2003) 153106 (1-4).
37. Mavani, K.R., Rayaprol, S., Rana, D.S., Thaker, C.M., Kuberkar, D.G., John, J., Pinto, R., Rao, S.V.S., Khan, S.A., **Srivastava, S.K.**, Dogra, A. and Kumar, R.: Study of 200 MeV Ag ion irradiation effects on the oxygen stoichiometry of La-2125-type superconducting thin films using ERDA. Radiation Measurements 36 (2003) 733-736.
38. Dogra, A., **Srivastava, S.K.**, Singh, M., Kumar, N., Sen, P. and Kumar, R.: Mössbauer studies of 190 MeV Ag ion-irradiated $\text{NiMn}_{0.05}\text{Fe}_{1.95}\text{O}_4$ Ferrite. Radiation Measurements 36 (2003) 667-670.
39. Khadke, U.K., Kerur, B.R., Hangodimath, S.M., Lagare, M.T., **Srivastava, S.K.**, Nageswara Rao, S.V.S., Mandal, A. and Avasthi, D. K.: The Effect of Temperature on the behaviour of Semiconductor Silicon Surface Barrier detector. Radiation Measurements 36 (2003) 625-628.
40. Bhattacharya, D., **Srivastava, S.K.**, Sahoo, P.K., Som, T., Kulkarni, V.N., Principi, G. and Avasthi, D.K.: Swift heavy ion induced modification of the Co/Si interface; cobalt silicide formation. Surface Coat. Techn. 158-159C (2002) 59-63.
41. Pathak, A.P., Siddiqui, A.M., Lakshmi, G.B.V.S., Nageswara Rao, S.V.S., **Srivastava, S.K.**, Ghosh, S., Bhattacharya, D., Avasthi, D. K., Goswami, D. K., Satyam, P., Dev, B. N. and Torus, A.: Ion beam studies in strained layer super lattices. Nucl. Instr. Meth. Phys. Res. B 193 (2002) 319-323.
42. Ghosh, S., Som, T., Tripathi, A., **Srivastava, S.K.**, Gruener, F., Assmann, W. and Avasthi, D.K.: Studies of electronic sputtering of fullerene under swift heavy ion impact. Nucl. Instr. Meth. Phys. Res. B 190 (2002) 169-172.
43. Asokan, K., **Srivastava, S.K.**, Kabiraj, D., Jan, J.C., Pong, W.F., Mookerjee, S. and Avasthi, D.K.: Study of Ion Beam Mixing in C/Si Multilayers by X-Ray Absorption Spectroscopy. Nucl. Instr. Meth. Phys. Res. B 193 (2002) 324-328.
44. **Srivastava, S.K.**, Avasthi, D.K. and Pivin, J.C.: Mechanism of H release from Si-based polymers under ion irradiation. Nucl. Instr. Meth. Phys. Res. B 191 (2002) 718-722.
45. Ghosh, S., Tripathi, A., Som, T., **Srivastava, S. K.**, Ganesan, V., Gupta, A. and Avasthi, D. K.: Evolution of nitrogen from copper nitride films under swift heavy ion impact. Radiation Effects and Defects in Solids 154 (2001) 151-163.
46. Pivin, J.C., Pippel, E., Woltersdorf, J., Avasthi, D.K. and **Kumar, S.**: Structural transformations induced by swift heavy ions in polysiloxanes and polycarbosilanes. Zeitschrift für Metallkunde 92 (2001) 712-715.
47. **Srivastava, S.K.**, Ghosh, S., Gupta, A., Ganesan, V., Assmann, W., Kruijer, S. and Avasthi, D.K.: Conversion electron Mössbauer study of mixing induced by swift heavy ions at Fe/Si interface. Hyperfine Interactions 133 (2001) 53-57.

Conference/Symposia Proceedings:

48. Mohanta, S.K., Mishra, S.N. and **Srivastava, S.K.**: Magnetic behavior of 3d impurities in ferromagnetic Gd. DAE Solid State Physics Symposium, BARC, Mumbai, Dec. 2005.
49. **Srivastava, S.K.** and Mishra, S.N.: Investigation of half-metallicity in half-Heusler alloys FeRuX (X = Si, B). Abstract booklet of DAE-BRNS Theme Meeting on Materials Modeling at Different Length Scales (MMM-2006) page 71.
50. **Srivastava, S.K.** and Mishra, S.N.: Spin Fluctuation and Local Magnetism of Isolated Fe impurities in $\text{Pd}_{1-x}\text{V}_x$ Alloys: A Study Using Heavy Ions. Proceedings of the DAE Solid State Physics Symposium 50 (2005) 815-816.
51. **Srivastava, S.K.** and Mishra, S.N.: Magnetic behaviour of isolated Cu impurities in Cr. Proceedings of the DAE Solid State Physics Symposium 50 (2005) 813-814.
52. Nageswara Rao, S.V.S., Lakshmi, G.V.B.S., Siddiqui, A.M., Ghosh, S., **Srivastava, S.K.**, Avasthi, D.K., Jain, R.K., Eichhorn, F. and Pathak, A.P.: Swift Heavy Ion Mixing in $\text{In}_{0.12}\text{Ga}_{0.88}\text{As}/\text{GaAs}$ Strained Layer Superlattice. Proceedings of the DAE Solid State Physics Symposium 44 (2001) 505-506.
53. Ghosh, S., Som, T., Tripathi, A., **Srivastava, S.K.**, Nageswara Rao, S.V.S., Gruener, F., Assmann, W. and Avasthi, D.K.: Electronic sputtering of fullerene films by swift heavy ion impact. Proceedings of the DAE Solid State Physics Symposium 43 (2000) 280-281.
54. Bhattacharya, D., **Srivastava, S.K.**, Kabiraj, D., Sahoo, P., Kulkarni, V.N. and Avasthi, D.K.: Swift heavy ion induced mixing at the Co-Si interface. Proceedings of the DAE Solid State Physics Symposium 43 (2000) 170-171.
55. **Srivastava, S.K.**, Kumar, R., Arora, S.K., Kabiraj, D., Bhattacharya, D., Patel, R.S., Majumdar, A.K., Gupta, A. and Avasthi, D.K.: Swift heavy ion induced mixing in Fe/Ni multilayer. Proceedings of the DAE Solid State Physics Symposium 43 (2000) 360-361.
56. **Srivastava, S.K.**, Kabiraj, D., Sahoo, P., Kulkarni, V.N., Chakraborty, B.R., Chauhan, R.S., Avasthi, D.K. and Raychoudhuri A.K.: Swift heavy ion induced mixing at Si/Cr interface. Proceedings of the DAE Solid State Physics Symposium 42 (1999) 231-232.

Papers Presented in Conferences but Not Published:

57. **Srivastava, S.K.**, Kumar, R., Bhattacharya, D., Kabiraj, D. and Avasthi, D.K.: Swift heavy ion induced mixing at Fe/Ni interface. Presented at XIIIth Colloque GANIL, Belgodère, Corsica, France, September 17 - 22, 2001.
58. **Srivastava, S.K.**, Carstanjen, H.D., Gupta, A., Tripathi, A., Bhattacharya, D., Kabiraj, D., Bolse, W. and Avasthi, D.K.: Effect of interfacial free energy on swift heavy ion induced mixing in Fe/Si multilayers. Presented in Spring Meeting (Solid State Physics) of the German Physical Society, 24-28th March 2003, Dresden, Germany.