CURRICULUM VITAE : Dr.Sunita Srivastava

Name: Dr.Sunita Srivastava

Position held: Assistant Professor in Physics

Educational Qualifications: Ph.D. (Physics) Panjab University (1992)
M.Phil. (Physics) Panjab University (1987)
NET(UGC) (1986)
M.Sc. (Physics), Panjab University , (1985)
B.Sc. Panjab University (1983)
AISSCE (+2) CBSE Board, Madras (1980)
Matric CBSE Board, Delhi (1978)
(Throughout First Class)

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Specialization: (i) General Theoretical Physics
(ii) Transport properties of fluids
(iii) Nanoscience
(iv) Computer Simulation and Modelling

Distinctions : IInd Position in M.Sc.(Physics), Panjab University
IInd Position in M.Phil.(Physics), Panjab University

Experience: (20 years after Ph.D.)

- Assistant Professor, Department of Physics, Panjab university, Chandigarh (27 August, 2004 till date).
- Programmer in Physics, Panjab University (20^{th} May, 1999 –26^{th} August, 2004).
- HPSC Lecturer in Govt. College, Naraingarh.
- Lecturer in Physics, DAV Colleges, Chandigarh and Abohar (8 years).
- Research fellow (UGC), Department of Physics, Panjab University, (1986-1991).
- Research Associate (CSIR) at HPU, Shimla.

Publications: International Papers in Journals/Articles: **34**
National Journals/proceedings etc.: **35**
Total: 69
Contributed Chapters in two books

Current Research specialization: Nano Science & Nanofluids

Current Research interests:

Transport properties of fluids flowing through nanochannels with different geometries like rectangular and cylindrical nanochannels, nanocube and nanosphere. Effect of confinement through change in the density profiles and also by considering different structures of wall.

Theoretical modeling by incorporating the effect of fluid parameters such as temperature, pH and mainly the random orientation of nonspherical nanoparticles. And also by developing the appropriate computational models to describe their behavior - an important step for optimizing the performance of nanofluids

Behaviour of the nanofluid using polydisperse nanoparticles in thermal base fluid inside micro or nanosized geometries using molecular dynamics simulations.

One possible avenue is the solar energy harvesting because nanofluids have better absorbance than the existing absorbers so that by tailoring optically better nanoparticles with the help of the density functional theory one could look for nanofluids useful for this purpose.

For the dynamics of soft core particles, one could study the behavior of polymers, DNA, RNA or other biological systems under the effect of elastic and interacting walls. One could also explore different shapes and dimensions of confining geometries.

Research Projects: (1) Major Research Project on "Thermal Conductivity of Nanofluids" Funded by UGC for three years (2008-2011)

Courses Taught:

(1) Mathematical Physics (M.Sc)
(2) Computational Physics (M.Sc)
(3) Classical Electrodynamics (M.Sc)
(4) Classical Mechanics (M.Sc)
(5) Condensed Matter Physics (M.Sc)
(6) Statistics & Thermodynamics (B.Sc.)
(7) Electronics and Optics (B.Sc)
(8) Scientific Computer Simulation (M.Tech: NanoScience and Technology)
(9)Computational Techniques (M.Phil & Pr-Phd.Courses)
(10) Nanofluidics (M.Tech. (NSNT))

Conference/Workshop/Symposia Organized:

- Organized workshop on 'PARALLEL COMPUTING USING HPCC' in 2013 and 2012 in the Department of Physics, Panjab University Chandigarh.
- Member of LOC of Conference ' International Conference on Advances in Condensed and Nano Materials' at Panjab University, Chandigarh (ICACNM 22, 23-26 Feb., 2011)

- Member of LOC of Seminar 'International Seminar on Current Trends in Quantum Gases, BEC and Solitons', Department of Physics, Panjab University, Chandigarh, 3–6 March 2014
- Member of LOC of DST-SERC School on Nonlinear Dynamics, Department of Physics, Panjab University, Chandigarh, January 27- February 18, 2014
- Member of LOC of 2nd IAPT National Student Symposium on Physics, Indian Association of Physics Teachers and Department of Physics, Panjab University, Chandigarh. 17- 19 January, 2014.

Administrative Experience:

Member- Selection committees at University level
Member- Administrative Committee, Academic Committee and Technical committee, Department of Physics
Member- PGAPMEC Department of Physics

Courses Designed: Computational Physics(M.Sc),
M.Tech: **Nano Science and Nano Technology**

Ph.D. Students : (i)Awarded: 04
(ii) Viva Held: 02
(iii) Working: 05

M.Sc. IVth Semester Project Students: 10

Membership: Life member of IPA, IAPT

Invited Lectures as Resource Person: 20

LIST OF PUBLICATIONS: Dr. Sunita Srivastava

Articles/Chapters in Books

1. Variational Perturbation Theory (Sunita Srivastava and Vishwamittar) in a book "***Path Integrals in Quantum Mechanics, Statistics, Polymer Physics and Financial Markets***" Editted by Hagen Kleinert (World Scientific Publishing Co.Pvt.Ltd.,1990).

2. Restricted flow in Nano-Channels (K. Tankeshwar, Sunita Srivastava and Jyoti Sood) in a book "***Nanotechnology Research Progress",*** Editor Julian F. Vogel and Felix T. Jung (Nova Publishers. New York, 2009)

Research Papers in Journals

1. Static and dynamic effects of confinement on self-diffusion (Reena Devi, Sunita Srivastava & K Tankeshwar) Physics and Chemistry of Liquids, DOI: 10.1080/00319104.2014.904860

2. Spin Polarized Electrons in a Metallic Quantum Wire

   (Renu Bala, R. K. Moudgil, Sunita Srivastava and K. N. Pathak)

   Eur. Phys. J. B (2014) 87: 5, DOI: 10.1140/epjb/e2013-40567-3

3. DFT study of structural and electronic properties of endohedral complexes of group V atoms with C60 (Akshu Pahuja and Sunita Srivastava) International Journal of Modern Physics B 27 (2013) 1350152 DOI: 10.1142/S021797921350152X
4. Longitudinal and volume viscosities of fluids confined in nanochannel (Ishu Goyal, A.H.M. Zaheri, Sunita Srivastava & K.Tankeshwar) Physics and Chemistry of Liquids, 2013, http://dx.doi.org/10.1080/00319104.2012.760088

5. Role of Triplet Correlations in Anomalous Self- Diffusion Coefficient (Gaganpreet, Sunita Srivastava, and K. Tankeshw ar) *Chemical Physics, Volume 405, p. 60-66.*

6. Exchange and correlation effects on density excitation spectra of metallic quantum wires at finite temperature (Bala R, Moudgil RK, Srivastava S, Pathak KN.) J Phys Condens Matter. 24 (2012) 245302.

7. Effect of aggregation on thermal conductivity and viscosity of nanofluids (Gaganpreet and Sunita Srivastava) Appl Nanosci **2** (2012) 325–331

8. Effect of Roughness of Confining Surface on Diffusive Motion of Fluid (K. Tankeshwar and Sunita Srivastava) Micro Nano Systems, **4** (2012) 25-28

9. Dynamics of fluids contained in Nanocube (Reena Devi, Sunita Srivastava, K.Tankeshwar) Nano Biomedicine Engineering 3 (2011) 47.

10. Diffusion of fluid confined to nanotube with rectangular cross section (Reena Devi, Jyoti Sood, Sunita Srivastava and K.Tankeshwar) Microfluidics and Nanofluidics 9 (2010) 737.

11. Dynamics of gelling liquids: Algebraic Relaxation: Sunita Srivastava, CN Kumar, K.Tankeshwar J.Phys: Condensed Matter **21** 335106 (2009).

12. Effect of Mass on Shear Viscosity of Binary Fluid Mixture confined to Nanochannel (Roahn Kaushal, Sunita Srivastava and K. Tankeshwar) Int. Journ. Nanosci. **8 (**2009)

13. Effect of Nano-Confinement on Molecular Motion of Fluid (K. Tankeshwar, Sunita Srivastava and Jyoti Sood) Volume 2 Issue 2/3 (Nanotechnology Research Journal) (2008)

14. Longitudinal and Bulk viscosity of Binary fluid Mixtures, A.H.M.Zaheri, Sunita Srivastava and K.Tankeshwar Eur**.** Phys**. J.** B 61, 465-473 (2008).

15. "TEMPOS devices as humidity sensors" M. Saroch, S. Srivastava, D. Fink and A. Chandra, Radiation Effects and Defects in Solids 163 (2008) 645.

16. "Room Temperature Ammonia Gas Sensing using Mixed Conductor based TEMPOS Structures" Mamta Saroch , Sunita Srivastava , Dietmar Fink and Amita Chandra , Sensors Sensors 2008, 8(10), 6355-6370

17. Theoretical evaluation of bulk viscosity: Expression for relaxation time (A.H.M.Zaheri, Sunita Srivastava and K.Tankeshwar) Phys.Rev.E 76 (2007) 041204.

18. Dynamical model for restricted diffusion in nano-channels (with Tankeshwar) Nanotechnology 18 (2007) 485714

19. Longitudinal and Bulk viscosity of expanded Rb (with A.H.M.Zaheri and K.Tankeshwar) J.Phys.Condens.Matter 15 (2003) .6683.

20. Memory function from its equation of motion,(with Shaminder Singh, C.N.Kumar, K.Tankeshwar) Phys.Chem.Liq. (UK)**41** (2003) 567

21. Estimation of Bulk viscosity of expanded Rb (with K.Tankeshwar) Phys.Chem.Liq. (UK) 37 (4) (1999) 351.

22. Energy eigen values of double well oscillator with mixed cubic and quartic anharmonicities (with Meena Bansal, Mamta and Vishwamittar) Chem.Phys.Lett.**195** (1992) 505.

23. Free energies of an oscillator with mixed cubic and quartic anharmonicities (with Vishwamittar) Pramana **39** (1992) 9.

24. A study of energy eigen values of double well oscillators with mixed quartic and sextic anharmonicities (with Meena Bansal and Vishwamittar) Phys.Rev.A(Pub:American Physical Society) **44** (1991) 8012.

25. Determination of free energies of an oscillator with mixed quartic and sextic anharmonicities (with Vishwamittar) Phys.Rev.A(Pub:American Physical Society)**44** (1991) 8006.

26. On the quantization of linearly damped harmonic oscillator (with Vishwamittar and I.S.Minhas) J.Math.Phys.**32** (1991) 1510.

27. Energies of oscillators with mixed quartic and sextic anharmonicities (with Vishwamittar) Mol.Phys.**72** (1991)1285.

28. Renormalised hypervirial pade calculation of energies for V(x)=m($\frac{1}{2}\omega^2x^2$+) (with Vishwamittar) Chem.Phys.Lett. **176** (1991) 266.

29. Applications of perturbation theory to damped sextic oscillator (with Vishwamittar) J.Math.Phys.**30** (1989) 2815.

30. Photon cloud effects on Isomultiplet mass difference of charmed and uncharmed baryons (with R.C.Verma) Phys.Rev.D**38** (1988) 1623.

31. Analysis of magnetic hysteresis loop data for FeScMn and FeSiAl systems (with Vishwamittar) J.Magn.Magn.Mat. **74**(1988)316.

32. Electromagnetic Mass Differences of 1/2 $^+$baryons in quark and Skyrme models (with R.C.Verma) Phys.Rev.D**35** (1987) 965.

33. Revelation of Quantum characteristics in motion of anharmonic oscillator (with Vishwamittar) Phys.Rev.A(Pub:American Physical Society) (to be revised).

34. Effect of second order Doppler shift and Miedema-Vander Woude model coefficients (with Mudita Sud and Vishwamittar) Ind.J.Pure and Appl. Phys.**27** (1989) 800.

(C) OTHER JOURNALS/PROCEEDINGS

35. Effect of Elasticity of wall on Diffusion in Nanochannel (K.Tankeshwar and Sunita Srivastava) AIP Conf. Proc. 1591, 323 (2014); http://dx.doi.org/10.1063/1.4872588

36. Dynamics of Confined Fluid using Memory Function (Reena Devi, Sunita Srivastava and K.Tankeshwar) AIP Conference Proceedings **1591**, 1324 (2014); doi: 10.1063/1.4872946

37. Impact of Empirical Shape Factor on the Thermal Conductivity of Nanofluids (Shilpy Bhullar and Sunita Srivastava) 7th Chandigarh Science Congress, Panjab University, CHASCON-2013, Chandigarh (March 1-3, 2013).pp-41,pg. 183.

38. Encapsulation of Gd Atom in C40 Cage (Akshu Pahuja and Sunita Srivastava) 7th Chandigarh Science Congress, Panjab University, CHASCON-2013, Chandigarh (March 1-3, 2013). Pp. 45, pg.184

39. Systematic Analysis of Endohedral Doping of C_{36} Molecule (Akshu Pahuja and Sunita Srivastava) National Conference on Production and Engineering Material, Deen Bandhu Chotu Ram University, Murthal, (15-17 March, 2013)

40. Effect of Electrically Charged confinement on Diffusion of Ionic Fluid. (Ishu Goyal, Sunita Srivastava and K.Tankeshwar) AIP Conference Proceedings Volume 1393, ICACNM (23-26 Feb.2011), Chandigarh,pp 323-324

41. Self Diffusion of fluid confined in a cylindrical nanotubes of different diameters. (Reena Devi, Sunita Srivastava and K.Tankeshwar) AIP Conference Proceedings Volume 1393, ICACNM (23-26 Feb.2011), Chandigarh,pp 325-326

42. Anomalous behavior of Mori's coefficients for the Gaussian Core fluid (Gaganpreet, Sunita Srivastava and K.Tankeshwar) AIP Conference Proceedings Volume 1393, ICACNM (23-26 Feb.2011), Chandigarh,pp 263-264

43. Nanofluids: Future Industrial Coolants, (Sakshi Arora, Sunita Srivastava and Rajesh Kumari) AIP Conference Proceedings Volume 1393, ICACNM (23-26 Feb.2011), Chandigarh,pp 301-302

44. Molecular dynamic simulations with glue potentials, (Ritu Pasrija and Sunita Srivastava) AIP Conference Proceedings Volume 1393, ICACNM (23-26 Feb.2011), Chandigarh,pp 279-280

45. DFT study of structural and electronic properties of endohedral complexes of group V atoms with C_{60}, (Sunita Srivastava and Akshu Pahuja) AIP Conference Proceedings Volume 1393, ICACNM (23-26 Feb.2011), Chandigarh,pp 327-328

46. Effect of Particle Shape and Interfacial Layer in Thermal Conductivity and Viscosity of Nanofluids (Gaganpreet and Sunita Srivastava) AIP Conf. Proc. 1349, 407 (2011)

47. Thermal Conductivity for a Linear Anharmonic System (Ritu Pasrija, Kanika , and Sunita Srivastava) AIP Conf. Proc. 1349, 1051 (2011).
35. Encapsulation of Sb in C_{60} cage (Akshu Pahuja and Sunita Srivastava)AIP Conf. Proc. 1349, 877 (2011)

48. Dynamics of Fluid in a Nanotube (Reena Devi, Sunita Srivastava, and K. Tankeshwar) AIP Conf. Proc. 1349, 403 (2011)

49. Collective Dynamics of Liquid Potassium Near Melting Point (Ishu Goyal, Jyoti Sood, Sunita Srivastava, and K. Tankeshwar) AIP Conf. Proc. 1349, 573 (2011)

50. Effect of Exchange-correlations and Temperature on Plasmons in Nano-scale Gold Wire (Renu Bala, R. K. Moudgil, Sunita Srivastava, and K. N. Pathak) AIP Conf. Proc. 1349, 433 (2011)

51. Diffusion in Rectangular nano tube (Reena Devi, Sunita Srivastava, K,Tankeshwar) DAE Symp. (2009)

52. Ground state of anharmonic oscillator using a variational Monte Carlo method, R.Devi and S.Srivastava, 3rd Chandigarh Science Congress, Panjab University, CHASCON-09, Chandigarh (26-28 February,2009).

53. Shape optimization using hyperbolic function, Gaganpreet and S.Srivastava, 3rd Chandigarh Science Congress, Panjab University, CHASCON-09**,** Chandigarh (26-28 February,2009)

54. Pressure dependence of thermal conductivity of Nanofluids (with Ritu Pasrija and Manuk Zubin Mehta) Pb.Sc.Congress (2007), 129.

55. On the microconvective contribution to thermal conductivity of Nanofluids (with Manuk Zubin Mehta and Ritu Pasrija) Chd.Sc.Congress (2007) 235

56. Prolate shape of Nanoparticles in Nanofluids (with Navneet Virk and Manuk Zubin Mehta) Chd.Sc.Congress (2007) 237

57. Transport Properties of Nanofluids (oral presentation) National Seminar on 'Theoretical and Experimental Techniques in Nanoscience and Nanotechnology', Chandigarh – TETNN-07 (2007) 18

58. Enhancement of viscosity of fluids in nano channels (with Tankeshwar) DAE Symposium 2007, Mysore

59. Complex Impedance property of humidity sensing TEMPOS devices (with M.Saroch and A.Chandra) DAE Symposium 2007, Mysore.

60. Algebraic Relaxation of time correlation function (with C.N.Kumar and K.Tankeshwar) ICTP Report, IC/2004/33 (2004).

61. A new form of memory function (with Shaminder Singh and C.N.Kumar) DAE Solid State Phys.Symp., Chandigarh (2002)

62. Longitudinal and Bulk Viscosity of expanded Rb., Solid State Phys.Symp. (1997).

63. On the model of glass transition (With Rajneesh K.Sharma and K.Tankeshwar) National Seminar on disordered materials, Jaipur (1994)

64. Information theory for the calculation of transport coefficients of classical fluids (with K.Tankeshwar) Solid State Phys.Symp. **36C** Bombay (1993)

65. A glimpse of history of experience based physics (With Meena Bansal and Vishwamittar) Bull IAPT (1992)

66. Free energies of potential used in phase transition modeling (with Vishwamittar) Solid State Phys. Symp.**33** (1991) 336.

67. Medical profession and Physics: A historical perspective (with Meena Bansal and Vishwamittar) Bull.IAPT **1** (1991) 142.

68. The hypervirial Pade calculations of energies of an anharmonic oscillator (with Vishwamittar) , National Seminar on Chemical Physics (1990)

69. Erwin Schroedinger and his wave mechanics (with Vishwamittar) Bull.IAPT **4** (1987) 283.