Curriculum Vitae

Name: Diptiman Sen

Date of Birth: January 17, 1959

Nationality: Indian

Present Position: Professor, Centre for High Energy Physics,
Indian Institute of Science, Bengaluru 560012

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Academic Qualifications:

1. B.Sc., St. Stephen's College, University of Delhi, 1975-1978.
2. M.S., Princeton University, USA, 1979-1981.
3. Ph.D., Princeton University, USA, 1981-1984.

Postdoctoral Positions:

1. Postdoctoral Associate, Carnegie-Mellon University, Pittsburgh, USA, 1984-1986.
2. Postdoctoral Associate, University of Edinburgh, Edinburgh, UK, 1986-1988.
3. Visiting Fellow, Centre for Theoretical Studies, Indian Institute of Science, Bengaluru, India, 1988-1990.

Faculty Positions:

1. Lecturer, Centre for Theoretical Studies, Indian Institute of Science, Bengaluru, 1990-1992.
2. Assistant Professor, Centre for Theoretical Studies, Indian Institute of Science, Bengaluru, 1992-1998.
3. Visiting Associate Professor, Department of Physics and Astronomy, McMaster University, Hamilton, Canada, 1996-1997.
4. Associate Professor, Centre for Theoretical Studies, Indian Institute of Science, Bengaluru, 1998-2004.

5. Chairman, Centre for High Energy Physics, Indian Institute of Science, Bengaluru, 2002-2009.
6. Professor, Centre for High Energy Physics, Indian Institute of Science, Bengaluru, 2004-2010.
7. Professor in HAG Scale, Centre for High Energy Physics, Indian Institute of Science, Bengaluru, from 2010 onwards.

Academic Recognition and Honours:

1. J. C. Bose Fellowship from DST and SERB for three five-year periods, 2011-2026.
2. Fellow, Indian National Science Academy, New Delhi, elected in 2010.
3. Fellow, The National Academy of Sciences, India, Allahabad, elected in 2009.
4. Fellow, Indian Academy of Sciences, Bengaluru, elected in 2001.
5. Homi Bhabha Fellowship from Homi Bhabha Fellowships Council, 2002-2004.
6. Jaya Jayant Award for Excellence in Teaching in Science given in 2007 by the Indian Institute of Science, Bengaluru.
7. Prof. Rustom Choksi Award for Excellence in Research in Science given in 2016 by the Indian Institute of Science, Bengaluru.
8. Appointed as a member of the Editorial Board of Physical Review Letters for two three-year terms, 2009-2015.
9. Recognised by the American Physical Society as an Outstanding Referee, selected in 2009.
10. Honorary Faculty, Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru.
11. Adjunct Distinguished Professor of the Harish-Chandra Research Institute, Allahabad, for the period 2003-2006.
12. Senior Associate of the S. N. Bose National Centre for Basic Sciences, Kolkata, for the period 2000-2005.
13. Associate Member of the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, for the period 1992-1999.
14. National Science Talent Scholarship, for the period 1975-1978.

Conferences and Schools attended in the last twenty two years:

1. SERC School on 'Field Theories in Condensed Matter Systems', Mehta Research Institute, Allahabad, February 2000. Presented 6 lectures on 'Luttinger Liquids and Bosonization'.

2. Indo-French Workshop on 'Current Trends in Molecular Magnetism', IISc, Bengaluru, December 2000. Invited talk on 'Semiclassical approach to quantum spin systems'.

3. Workshop on 'Strongly Correlated Electron Systems', ISI, Kolkata, February 2001. Presented 4 lectures on 'Nonlinear sigma models, bosonization, and low-energy effective Hamiltonians for spin systems'.

4. Was one of the organizers of a meeting on 'Geometric phases in physics and Foundations of Quantum Mechanics', IISc, Bengaluru, March 2001. Talk on 'Coherent states for $SU(3)$'.

5. Visit to Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, July 2001. Invited talk on 'Quantum spin systems in low dimensions'.

6. Visit to University of Pierre and Marie Curie, Paris, France, July 2001. Invited talk on 'Transport in quantum wires'.

7. Sixty-seventh Annual Meeting of the Indian Academy of Sciences, Sri Venkateswara University, Tirupati, November 2001. Invited talk on 'Conductance of quantum wires'.

8. 'India and Abroad: A Conference on Condensed Matter Physics', Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru, January 2002. Invited talk on 'Conductance of quantum wires'.

9. Visit to Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, July 2002. Invited talk on 'Conductance of quantum wires: the effects of impurities and junctions'.

10. 'National Conference on Theoretical Physics', Indian Association for the Cultivation of Science, Kolkata, January 2003. Invited talk on 'Effect of impurities and junctions on the conductance of quantum wires'.

11. JSPS-DST Symposium on 'Surfaces and Interfaces for Nanostructured Materials', Tokyo, Japan, March 2003. Invited talk on 'Studies of the conductance of quantum wires'.

12. 'International Conference on Nanoscience and Technology', Kolkata, December 2003. Invited talk on 'Effects of interactions and different geometries on conductances of quantum wires'.

13. Indo-Finland Workshop on 'Physics and Techniques below 20 K', IISc, Bengaluru, February 2004. Invited talk on 'Theoretical studies of conductances of quantum wires'.

14. 'Statphys 22: 22nd International Conference on Statistical Physics', Bengaluru, July 2004. Oral presentation on 'Existence of a gapless line and a possible Lifshitz point for the one-dimensional quantum axial next-nearest-neighbor Ising chain'.

15. Indo-French Workshop on 'Nanoscience and Nanotechnology', IISc, Bengaluru, October 2004. Invited talk on 'Conductances of quantum wires: effects of interactions, scattering points and junctions'.

16. Symposium on 'Mesoscopic Physics', JNU, New Delhi, March 2005. Invited talk on 'Analytical and numerical studies of conductances of quantum wires'.

17. Indo-Israeli Conference on 'Condensed Matter Physics', Puri, April 2005. Invited talk on 'Conductances of quantum wires: effects of interactions, scattering and junctions'.

18. Conference on 'Physics 2005: 100 Years After Einstein's Revolution', IIT, Kanpur, November 2005. Invited talk on 'Numerical approaches to electronic transport in one dimension and the problem of bound states'.

19. SERC School on High-Energy Physics, IISc, Bengaluru, October-November 2006. Presented 12 lectures on 'Quantum Field Theory'.

20. International Workshop on 'Physics of Mesoscopic and Disordered Materials', IIT, Kanpur, December 2006. Invited talk on 'Equation of motion approach to quantum charge pumping'.

21. Discussion meeting on 'Novel Quantum Phenomena in Graphene', IMSc, Chennai, December 2006. Invited talk on 'Luttinger liquids'.

22. Second International Workshop on 'Emergent Phenomena in Quantum Hall Systems', Pennsylvania State University, USA, June 2007. Presented a poster on 'Inter-edge interactions and novel fixed points at a junction of quantum Hall line junctions'.

23. 2nd SERC Summer School in Solid State and Materials Chemistry, IISc, Bengaluru, June-July 2007. Presented 1 lecture on 'Superconductivity'.

24. Conference on 'Frontiers in Theoretical Sciences: Sixty years after India's Independence', IACS, Kolkata, August 2007. Invited talk on 'Curiosities in quantum spin chains'.

25. School on 'Numerical Quantum Many-Body Methods in Physics and Chemistry', JNCASR, Bengaluru, October 2007. Invited talk on 'Analytical approaches to the study of quantum spin models'.

26. Programme on 'Correlated Electrons and Frustrated Magnetism', TIFR, Goa, December 2007. Invited talk on 'Quantum charge pumping'.

27. Mini-Symposium at the Poornaprajna Institute of Scientific Research, Bengaluru, January 2008. Invited talk on 'Curiosities in quantum spin chains'.

28. School on 'Low Dimensional Nanoscopic Physics', HRI, Allahabad, January-February 2008. Invited talk on 'Junctions of quantum wires'.

29. Workshop on 'Integrable Systems', IISc, Bengaluru, February 2008. Presented 1 lecture on 'One-dimensional quantum spin models as an example of solvable quantum systems'.

30. K. S. Krishnan Meeting on 'Quantum Matter and Quantum Information', IMSc, Chennai, December 2008. Invited talk on 'Quantum games'.

31. Indian Condensed Matter Workshop ICMW08, TIFR, Mahabaleshwar, December 2008. Invited talk on 'Line junction in a quantum Hall system'.

32. International Workshop on 'Quantum Phase Transition and Dynamics', SINP, Kolkata, February 2009. Invited talk on 'Quenching across quantum critical points'.

33. Workshop on 'Heat conduction in low-dimensional systems', TIFR, Bengaluru, March 2009. Invited talk on 'Scattering of electrons from an interacting region'.

34. Conference on 'Frontiers and Directions in Condensed Matter Physics', IISc, Bengaluru, May 2009. Invited talk on 'Quenching across quantum critical points and lines'.

35. International Conference on 'Interaction, instability, transport and kinetics: glassiness and jamming', IIT, Kanpur, February 2010. Invited talk on 'Quenching across quantum critical points and lines'.

36. American Physical Society March Meeting, Portland, Oregon, USA, March 2010. Talk on 'Quenching across a quantum critical point: non-trivial power laws in different topological sectors'.

37. ICTS Condensed Matter Programme 2010, TIFR, Mysore, December 2010. Invited talks on 'Dynamics of quantum many-body systems'.

38. 2nd RRI school on Statistical Physics, RRI, Bengaluru, March 2011. Invited talks on 'Quantum spin systems, quenching and entanglement'.

39. American Physical Society March Meeting, Dallas, Texas, USA, March 2011. Talk on 'Conductance of Tomonaga-Luttinger liquid wires and junctions with resistances'.

40. ICTS International School on 'Topology in quantum matter', IISc, Bengaluru, June-July 2011. Invited talks on 'Preliminary physics concepts'.

41. IACS-APCTP International Conference on 'Physics of Novel and Emerging Materials', IACS, Kolkata, November 2011. Invited talk on 'Surface properties of topological insulators: transport and STM spectra'.

42. Conference on 'Dynamics of Phase Transformations', JNCASR, Bengaluru, November 2011. Invited talk on 'Quenching dynamics across quantum critical points'.

43. International Nonequilibrium Winter School, 2011, IISER, Kolkata, January 2012. Invited talks on 'Dynamics of quantum many-body systems'.

44. American Physical Society March Meeting, Boston, Massachusetts, USA, February-March 2012. Talk on 'Junction between surfaces of two topological insulators'.

45. K. S. Krishnan Meeting on 'Tensor product states for quantum matter', IMSc, Chennai, March 2012. Invited talk on 'Matrix product states'.

46. Workshop on 'Correlations and Entanglement in Many-body Systems Out of Equilibrium', National Center for Theoretical Sciences, Hsinchu, Taiwan, September 2012. Invited talk on 'Quenching dynamics across quantum critical points: unusual power laws'.

47. Subrahmanyan Chandrasekhar Lectures and Discussion Meeting, IISc, Bengaluru, December 2012. Invited talk on 'Transport at surfaces of topological insulators'.

48. Conference on 'Diversity & Complexity: Realm of Today's Statistical Physics', SINP, Kolkata, January 2013. Invited talk on 'Generating edge states by potentials varying periodically in time'.

49. American Physical Society March Meeting, Baltimore, Maryland, USA, March 2013. Talk on 'Fidelity susceptibility of one-dimensional models with twisted boundary conditions'.

50. Workshop on 'Transport in topological insulators', HRI, Allahabad, July 2013. Invited talk on 'Majorana end modes and Floquet topological insulators'.

51. Workshop on 'Numerical many body methods in quantum chemistry and physics', Coorg, Karnataka, December 2013. Invited talk on 'Surface states of the topological insulator Bi_2Se_3'.

52. India-UK Scientific Seminar on 'From graphene analogues to topological insulators', IACS, Kolkata, January 2014. Invited talk on 'Junctions of surfaces of topological insulators, metals and superconductors'.

53. American Physical Society March Meeting, Denver, Colorado, USA, March 2014. Talk on 'Floquet generation of Majorana edge modes and topological invariants'.

54. Discussion Meeting on 'Nonequilibrium dynamics and cold atoms', IACS, Kolkata, May 2014. Invited talk on 'Nonequilibrium dynamics: dynamical localization and topological blocking'.

55. ICTS Chandrasekhar Lectures and Discussion Meeting, IISc, Bengaluru, January 2015. Invited talk on 'Majorana end modes: topological invariants, Floquet theory and conductance'.

56. American Physical Society March Meeting, San Antonio, Texas, USA, March 2015. Talk on 'Majorana modes and transport across junctions of superconductors and normal metals'.

57. C. K. Majumdar Lecture Series 2015, IACS, Kolkata, April 2015. Invited series of talks on 'Topological Systems in Physics'.

58. Workshop on 'Topological Particles in Condensed Matter', IISER, Pune, August 2015. Invited talk on 'Majorana modes: topological invariants, Floquet theory and conductance'.

59. Workshop on 'Frontiers in Condensed Matter Physics', IOP, Bhubaneswar, February 2016. Invited talks on 'Introduction to topological systems in physics'.

60. Meeting on 'Advances in Theoretical Condensed Matter Physics', PPISR, Bengaluru, March 2016. Invited talk on 'Topological systems in physics'.

61. School on 'Current Frontiers in Condensed Matter Research', ICTS, Bengaluru, June 2016. Invited talks on 'Aspects of non-equilibrium dynamics of quantum systems' and 'Granular Topological Insulators'.

62. Conference on 'Statphys Kolkata IX', SINP, Kolkata, December 2016. Invited talk on 'Effects of interactions on periodically driven dynamically localized systems'.

63. Conference on 'Recent trends in Condensed Matter and High Energy Physics', IACS, Kolkata, January 2017. Invited talk on 'Studies of topological insulators: edge states and granular films'.

64. American Physical Society March Meeting, New Orleans, Louisiana, USA, March 2017. Talk on 'Observation of a macroscopic topological insulator phase in an assembly of coupled topological insulator nanocrystals'.

65. School on 'Frustrated Magnetism', IMSc, Chennai, April 2017. Invited series of talks on 'The Kitaev model'.

66. School on 'Driven Quantum Systems', IACS, Kolkata, February 2018. Invited series of talks on 'Dynamics of driven quantum systems'.

67. National Conference on Quantum Condensed Matter 'QMAT', IISER, Mohali, July 2018. Overview Lecture on 'Toplogical Systems in Physics'.

68. Indo-French School and Conference on 'Magnetism of Molecular Systems', IISc, Bengaluru, November 2018. Invited talk on 'Low-dimensional magnetism'.

69. Symposium on 'Celebrating the Physics of Anthony Leggett', RRI, Bengaluru, February 2019. Invited talk on 'Josephson junctions of multiple superconducting wires'.

70. American Physical Society March Meeting, Boston, Massachusetts, USA, March 2019. Talks on 'Aperiodically driven integrable systems and their emergent steady states' and 'Spin system on a Kagome lattice with topological magnons'.

71. Discussion Meeting on 'Edge dynamics in topological phases', ICTS, Bengaluru, June 2019. Invited talk on 'Generating a second-order topological insulator with multiple corner states by periodic driving'.

72. Discussion Meeting on 'Novel phases of quantum matter', ICTS, Bengaluru, December 2019. Invited talk on 'Some unusual topological systems — spin waves and Josephson junctions'.

73. Conference on Quantum Condensed Matter Physics 'QMAT3 2020', S. N. Bose National Centre for Basic Sciences, Kolkata, September 2020. Invited talk on 'Periodically driven systems: resonances, freezing and emergent conservation laws'.

74. Conference on Quantum Condensed Matter Physics 'QMAT 2022', IIT, Kanpur, September 2022. Invited talk on 'One-dimensional model with three-spin Ising interaction and a transverse field'.

Publications:

Papers published in refereed journals:

1. D. Sen, *Finite element Hamiltonian Monte Carlo of $SU(2)$*, Phys. Lett. B 129, 239 (1983) (4 pages).

2. D. Sen, *Relationship between proper time and dimensional regularization of QCD*, Phys. Lett. B 129, 248 (1983) (3 pages).

3. D. Sen, *Effective action approach to calculation of spin potentials in heavy quarkonium*, Nucl. Phys. B 254, 678 (1985) (19 pages).

4. D. Sen, *Fermions in the space-time $R \times S^3$*, J. Math. Phys. 27, 472 (1986) (11 pages).

5. D. Sen, *Supersymmetry in the space-time $R \times S^3$*, Nucl. Phys. B 284, 201 (1987) (33 pages).

6. D. Sen, *A new eight-vertex model with an infinite number of commensurate phases*, J. Math. Phys. 29, 2682 (1988) (6 pages).

7. T. D. Kieu, D. Sen and S.-S. Xue, *Chiral Schwinger model and lattice fermionic regularizations*, Phys. Rev. Lett. 61, 282 (1988) (4 pages).

8. D. Sen, *Massive chiral Schwinger model*, Phys. Rev. Lett. 61, 791 (1988) (3 pages).

9. D. Sen, *The general massive Schwinger model*, Phys. Lett. B 212, 191 (1988) (7 pages).

10. D. Sen, *Nonabelian chiral gauge theories in two dimensions*, Phys. Rev. D 39, 3096 (1989) (5 pages).

11. D. Sen, *Witten index of supersymmetric chiral theories*, Phys. Rev. D 39, 1795 (1989) (3 pages).

12. D. Sen, *Infrared divergences and confinement in massive* $2+1$*-dimensional QED*, Phys. Rev. D 41, 1227 (1990) (4 pages).

13. D. Sen, *Extended supersymmetry in the space-time* $R \times S^3$, Phys. Rev. D 41, 667 (1990) (5 pages).

14. D. Sen and B. K. Chakrabarti, *Large-S analysis of one-dimensional quantum spin models in a transverse magnetic field*, Phys. Rev. B 41, 4713 (1990) (10 pages).

15. D. Sen, *Large-S analysis of a quantum axial next-nearest-neighbor Ising model in one dimension*, Phys. Rev. B 43, 5939 (1991) (5 pages).

16. D. Sen, *Quantum spin chain realizations of conformal field theories*, Phys. Rev. B 44, 2645 (1991) (6 pages).

17. C. Aneziris, A. P. Balachandran and D. Sen, *Statistics in one dimension*, Int. J. Mod. Phys. A 6, 4721 (1991) (31 pages); Erratum, Int. J. Mod. Phys. A 7, 1851 (1992) (1 page).

18. D. Sen, *Quantum and statistical mechanics of anyons*, Nucl. Phys. B 360, 397 (1991) (12 pages).

19. D. Sen, *Critical quantum spin chains as conformal field theories*, Indian J. Phys. 66 A, 545 (1992) (11 pages).

20. D. Sen and R. Chitra, *Anyons as perturbed bosons*, Phys. Rev. B 45, 881 (1992) (13 pages).

21. R. Chitra, C. Nagaraj Kumar and D. Sen, *Supersymmetry in the two-anyon problem*, Mod. Phys. Lett. A 7, 855 (1992) (9 pages).

22. D. Sen, *Some supersymmetric features in the spectrum of anyons in a harmonic potential*, Phys. Rev. D 46, 1846 (1992) (12 pages).

23. D. Sen, *Spectrum of three anyons in a harmonic potential and the third virial coefficient*, Phys. Rev. Lett. 68, 2977 (1992) (4 pages).

24. R. Chitra and D. Sen, *Ground state of many anyons in a harmonic potential*, Phys. Rev. B 46, 10923 (1992) (8 pages).

25. D. Sen, *Semiclassical analysis of two- and three-spin antiferromagnets and anyons on a sphere*, Mod. Phys. Lett. A 8, 1805 (1993) (10 pages).

26. S. Rao and D. Sen, *Bosonic mean-field theory of the spiral phases of Heisenberg antiferromagnets on a chain*, Phys. Rev. B 48, 12763 (1993) (5 pages).

27. S. Rao and D. Sen, *Non-linear field theory of a frustrated Heisenberg spin chain*, Nucl. Phys. B 424, 547 (1994) (20 pages).

28. D. Sen and R. Chitra, *Large-U limit of a Hubbard model in a magnetic field: chiral spin interactions and paramagnetism*, Phys. Rev. B 51, 1922 (1995) (4 pages).

29. R. Chitra, S. Rao, D. Sen and S. Suresh Rao, *Bosonic mean-field theory for frustrated Heisenberg antiferromagnets in two dimensions*, Phys. Rev. B 52, 1061 (1995) (9 pages).

30. D. Sen and R. K. Bhaduri, *Thomas-Fermi method for particles obeying generalized exclusion statistics*, Phys. Rev. Lett. 74, 3912 (1995) (4 pages).

31. R. Chitra, S. Pati, H. R. Krishnamurthy, D. Sen and S. Ramasesha, *Density-matrix renormalization-group studies of the spin-1/2 Heisenberg system with dimerization and frustration*, Phys. Rev. B 52, 6581 (1995) (7 pages).

32. D. Sen, B. S. Shastry, R. E. Walstedt and R. Cava, *Quantum solitons in the sawtooth lattice*, Phys. Rev. B 53, 6401 (1996) (5 pages).

33. S. Pati, R. Chitra, D. Sen, H. R. Krishnamurthy and S. Ramasesha, *Phase diagram of the spin-1 Heisenberg system with dimerization and frustration*, Europhys. Lett. 33, 707 (1996) (6 pages).

34. M. V. N. Murthy, R. K. Bhaduri and D. Sen, *Novel correlations in two dimensions: some exact solutions*, Phys. Rev. Lett. 76, 4103 (1996) (4 pages).

35. D. Sen, *A multispecies Calogero-Sutherland model*, Nucl. Phys. B 479, 554 (1996) (21 pages).

36. D. Sen, *Three anyons in a harmonic potential and the third virial coefficient*, Comm. in Theor. Phys. 5, 145 (1996) (14 pages).

37. S. Pati, R. Chitra, D. Sen, S. Ramasesha and H. R. Krishnamurthy, *A comparative study of the phase diagrams of spin-1/2 and spin-1 antiferromagnetic chains with dimerization and frustration*, J. Phys. Condens. Matter 9, 219 (1997) (12 pages).

38. S. Rao and D. Sen, *Field theories of frustrated antiferromagnetic spin chains*, J. Phys. Condens. Matter 9, 1831 (1997) (9 pages).

39. B. S. Shastry and D. Sen, *Majorana fermion representation for an antiferromagnetic spin-1/2 chain*, Phys. Rev. B 55, 2988 (1997) (7 pages).

40. R. K. Bhaduri, A. Khare, J. Law, M. V. N. Murthy and D. Sen, *Novel correlations in two dimensions: two-body problem*, J. Phys. A 30, 2557 (1997) (20 pages).

41. S. K. Pati, S. Ramasesha and D. Sen, *Low-lying excited states and low-temperature properties of an alternating spin-1−spin-1/2 chain: a density-matrix renormalization-group study*, Phys. Rev. B 55, 8894 (1997) (11 pages).

42. D. Sen and B. S. Shastry, *A Majorana fermion $t-J$ model in one dimension*, J. Phys. Condens. Matter 9, 7963 (1997) (17 pages).

43. S. Pati, S. Ramasesha and D. Sen, *A density matrix renormalization group study of low-energy excitations and low-temperature properties of alternating spin systems*, J. Phys. Condens. Matter 9, 8707 (1997) (20 pages).

44. D. Sen and R. K. Bhaduri, *Applications of the collective field theory for the Calogero-Sutherland model*, Ann. Phys. (N.Y.) 260, 203 (1997) (21 pages).

45. K. Tandon, S. Lal, S. K. Pati, S. Ramasesha and D. Sen, *Magnetization properties of some quantum spin ladders*, Phys. Rev. B 59, 396 (1999) (15 pages).

46. D. Sen, *Perturbation theory for singular potentials in quantum mechanics*, Int. J. Mod. Phys. A 14, 1789 (1999) (19 pages).

47. B. S. Shastry and D. Sen, *A solvable model of interacting fermions in two dimensions*, J. Phys. A 32, L 169 (1999) (7 pages).

48. D. Sen and R. K. Bhaduri, *Density-density correlations in a Luttinger liquid: lattice approximation in the Calogero-Sutherland model*, Can. J. Phys. 77, 327 (1999) (15 pages).

49. D. Sen and S. Lal, *One-dimensional fermions with incommensuration*, Phys. Rev. B 61, 9001 (2000) (13 pages).

50. C. Raghu, I. Rudra, S. Ramasesha and D. Sen, *Evaluation of low-energy effective Hamiltonian techniques for coupled spin triangles*, Phys. Rev. B 62, 9484 (2000) (9 pages).

51. D. Sen and S. Lal, *One-dimensional fermions with incommensuration close to dimerization*, Europhys. Lett. 52, 337 (2000) (7 pages).

52. R. K. Bhaduri and D. Sen, *Comment on "Low-dimensional Bose liquids: beyond the Gross-Pitaevskii approximation"*, Phys. Rev. Lett. 86, 4708 (2001) (1 page).

53. I. Rudra, S. Ramasesha and D. Sen, *Magnetization of Mn_{12} acetate in a slowly varying magnetic field: a quantum mechanical study*, Phys. Rev. B 64, 014408 (2001) (8 pages).

54. C. Raghu, I. Rudra, D. Sen and S. Ramasesha, *Properties of low-lying states in some high nuclearity Mn, Fe and V clusters: exact studies of Heisenberg models*, Phys. Rev. B 64, 064419 (2001) (9 pages).

55. S. Lal, S. Rao and D. Sen, *Transport through quasi-ballistic quantum wires: the role of contacts*, Phys. Rev. Lett. 87, 026801 (2001) (4 pages).

56. M. Mathur and D. Sen, *Coherent states for $SU(3)$*, J. Math. Phys. 42, 4181 (2001) (16 pages).

57. R. K. Bhaduri, S. Ghosh, M. V. N. Murthy and D. Sen, *Solitons in a one-dimensional interacting Bose-Einstein system*, J. Phys. A 34, 6553 (2001) (12 pages).

58. I. Rudra, S. Ramasesha and D. Sen, *An alternate model for magnetization plateaus in the molecular magnet V_{15}*, J. Phys. Condens. Matter 13, 11717 (2001) (9 pages).

59. S. Lal, S. Rao and D. Sen, *Conductance through contact barriers of a finite-length quantum wire*, Phys. Rev. B 65, 195304 (2002) (20 pages).

60. S. Sarkar and D. Sen, *Field theoretical study of a spin-1/2 ladder with unequal chain exchanges*, Phys. Rev. B 65, 172408 (2002) (4 pages).

61. I. Rudra, S. Ramasesha and D. Sen, *Model exact low-lying states and spin dynamics in ferric wheels: Fe_6 to Fe_{12}*, Phys. Rev. B 66, 014441 (2002) (9 pages).

62. S. Lal, S. Rao and D. Sen, *Junction of several weakly interacting quantum wires: a renormalization group study*, Phys. Rev. B 66, 165327 (2002) (12 pages).

63. A. Dutta and D. Sen, *Gapless line for the anisotropic Heisenberg spin-1/2 chain in a magnetic field and the quantum axial next-nearest-neighbor Ising chain*, Phys. Rev. B 67, 094435 (2003) (7 pages).

64. B. Basu-Mallick, T. Bhattacharyya and D. Sen, *Novel multi-band quantum soliton states for a derivative nonlinear Schrödinger model*, Nucl. Phys. B 675, 516 (2003) (17 pages).

65. D. Sen, *The fermionic limit of the δ-function Bose gas: a pseudopotential approach*, J. Phys. A 36, 7517 (2003) (15 pages).

66. B. Basu-Mallick, T. Bhattacharyya and D. Sen, *Bound and anti-bound soliton states for a quantum integrable derivative nonlinear Schrödinger model*, Phys. Lett. A 325, 375 (2004) (6 pages).

67. A. Dutta, L. Fritz and D. Sen, *Coulomb gap in one-dimensional disordered electronic systems*, Phys. Rev. B 69, 132416 (2004) (4 pages).

68. B. Basu-Mallick, T. Bhattacharyya and D. Sen, *Quantum bound states for a derivative nonlinear Schrödinger model and number theory*, Mod. Phys. Lett. A 19, 2697 (2004) (10 pages).

69. V. Ravi Chandra, D. Sen, N. B. Ivanov and J. Richter, *Antiferromagnetic sawtooth chain with spin-1/2 and spin-1 sites*, Phys. Rev. B 69, 214406 (2004) (13 pages).

70. S. Das, S. Rao and D. Sen, *Renormalization group study of the conductances of interacting quantum wire systems with different geometries*, Phys. Rev. B 70, 085318 (2004) (15 pages).

71. V. Ravi Chandra, S. Ramasesha and D. Sen, *Magnetic properties of a helical spin chain with alternating isotropic and anisotropic spins: magnetization plateaus and finite entropy*, Phys. Rev. B 70, 144404 (2004) (8 pages).

72. S. Rao and D. Sen, *Tunneling through two resonant levels: fixed points and conductances*, Phys. Rev. B 70, 195115 (2004) (6 pages).

73. B. Basu-Mallick, T. Bhattacharyya and D. Sen, *Multi-band structure of a coupling constant for quantum bound states of a generalized nonlinear Schrödinger model*, Phys. Lett. A 341, 371 (2005) (9 pages).

74. A. Agarwal and D. Sen, *Conductance of quantum wires: a numerical study of effects of an impurity and interactions*, Phys. Rev. B 73, 045332 (2006) (14 pages).

75. V. Ravi Chandra, S. Rao and D. Sen, *A multi-channel fixed point for a Kondo spin coupled to a junction of Luttinger liquids*, Europhys. Lett. 75, 797 (2006) (7 pages).

76. A. Dhar and D. Sen, *Nonequilibrium Green's function formalism and the problem of bound states*, Phys. Rev. B 73, 085119 (2006) (14 pages).

77. S. Das, S. Rao and D. Sen, *Interedge interactions and fixed points at a junction of quantum Hall line junctions*, Phys. Rev. B 74, 045322 (2006) (5 pages).

78. A. Agarwal and D. Sen, *Equation of motion approach to non-adiabatic quantum charge pumping*, J. Phys. Condens. Matter 19, 046205 (2007) (13 pages).

79. A. Das, K. Sengupta, D. Sen and B. K. Chakrabarti, *Infinite-range Ising ferromagnet in a time-dependent transverse field: quench and AC dynamics near the quantum critical point*, Phys. Rev. B 74, 144423 (2006) (10 pages).

80. V. Ravi Chandra, S. Rao and D. Sen, *Renormalization group study of the Kondo problem at a junction of several Luttinger wires*, Phys. Rev. B 75, 045435 (2007) (14 pages).

81. M. Kumar, S. Ramasesha, D. Sen and Z. G. Soos, *Scaling exponents in spin-1/2 Heisenberg chains with dimerization and frustration studied with the density-matrix renormalization group*, Phys. Rev. B 75, 052404 (2007) (4 pages).

82. V. Ravi Chandra, D. Sen and N. Surendran, *Gapless points of dimerized quantum spin chains: analytical and numerical studies*, Phys. Rev. B 74, 184424 (2006) (9 pages).

83. D. Sen and N. Surendran, *Spin-1 chain with spin-1/2 excitations in the bulk*, Phys. Rev. B 75, 104411 (2007) (7 pages).

84. A. Agarwal and D. Sen, *Charge transport in a Tomonaga-Luttinger liquid: effects of pumping and bias*, Phys. Rev. B 76, 035308 (2007) (9 pages).

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Supervised the M.S. and Ph.D. work of Abhiram Soori who obtained a Ph.D. from IISc in 2013. The Ph.D. thesis title was "Electronic transport in low-dimensional systems - quantum dots, quantum wires and topological insulators". He is a faculty member of the University of Hyderabad.

Supervised the Ph.D. work of Manisha Thakurathi who obtained a Ph.D. from IISc in 2016. The Ph.D. thesis title was "Topological phase transitions, Majorana modes and transport in one-dimensional systems". She is a faculty member of IIT, Delhi.

Supervised the Ph.D. work of Oindrila Deb who obtained a Ph.D. from IISc in 2017. The Ph.D. thesis title was "Studies of topological phases of matter: presence of boundary modes and their role in electrical transport". She is a faculty member of the University of Bristol, UK.

Supervised the Ph.D. work of Ranjani Seshadri who obtained a Ph.D. from IISc in 2018. The Ph.D. thesis title was "Living on the edge - a study of boundary modes in two-dimensional topological systems". She is a Postdoctoral Researcher in Ben-Gurion University of the Negev, Israel.

Currently supervising the Ph.D. work of Adithi Udupa, Samudra Sur and Sreemayee Aditya.

Supervised the final year project work of Siddhartha Saha and Shankar N. Sivarajan who obtained their B.S. (Research) from IISc in 2017. The B.S. thesis title was "Topological Phases of Matter - Floquet Generation of Edge States by Periodic Driving". They are pursuing their Ph.D.'s in the USA.

Postdoctoral Fellows:

Naveen Surendran worked under the DST project "Quantum spin systems in low dimensions" from 2005 to 2007. He is a faculty member of Indian Institute of Space Science and Technology, Thiruvananthapuram.

Sourin Das worked under the DST project "Electronic transport in low dimensional systems" from 2008 to 2009. He is a faculty member of IISER, Kolkata.

Anirban Dutta worked as a SERB National Post-Doctoral Fellow from 2017 to 2019. He is a faculty member of BHU, Varanasi.

Courses taught in IISc:

1. Quantum Field Theory, 1988-89 (January semester)

2. Quantum Field Theory, 1990-91 (August semester)

3. Mathematical Methods of Physics, 1991-92 (August semester)
4. Quantum Field Theory, 1992-93 (August semester)
5. Quantum Mechanics I, 1993-94 (August semester)
6. Quantum Mechanics II, 1994-95 (January semester)
7. Quantum Mechanics I, in 1995-96 (August semester)
8. Mathematical Methods of Physics, 1997-98 (August semester)
9. Mathematical Methods of Physics, 1998-99 (August semester)
10. Quantum Mechanics III, 1999-00 (August semester)
11. Quantum Mechanics III, 2000-01 (August semester)
12. ISI's B. Math. Physics I, 2000-01 (August semester), shared with Prof. H. R. Krishnamurthy
13. Quantum Mechanics I, 2001-02 (August semester)
14. Quantum Mechanics I, 2002-03 (August semester)
15. Quantum Mechanics II, 2002-03 (January semester), shared with Prof. H. R. Krishnamurthy and Prof. T. V. Ramakrishnan
16. Quantum Mechanics II, 2003-04 (January semester)
17. Quantum Mechanics II, 2004-05 (January semester)
18. Classical Mechanics, 2006-07 (August semester)
19. Quantum Mechanics II, 2007-08 (January semester)
20. Quantum Mechanics III, 2008-09 (August semester)
21. Mathematical Methods of Physics, 2009-10 (August semester)
22. Mathematical Methods of Physics, 2010-11 (August semester)
23. Introductory Classical Mechanics (undergraduate course), 2011 - 12 (August semester)
24. Intermediate Classical Mechanics (undergraduate course), 2012 - 13 (January semester)
25. Intermediate Classical Mechanics (undergraduate course), 2013 - 14 (January semester)
26. Quantum Mechanics I, 2014-15 (August semester)
27. Quantum Mechanics I, 2015-16 (August semester)

28. Quantum Mechanics I, 2016-17 (August semester)
29. Quantum Mechanics I, 2017-18 (August semester)
30. Quantum Mechanics I, 2018-19 (August semester)
31. Quantum Mechanics II, 2019-20 (January semester)
32. Quantum Mechanics II, 2020-21 (January semester)
33. Quantum Mechanics II, 2021-22 (January semester)
34. Quantum Mechanics I, 2021-22 (May semester)
35. Quantum Mechanics I, 2022-23 (Aug semester)

Other Academic Activities:

1. Over the last thirty years, I have taught at eight different DST-SERC Schools in CUSAT Cochin, PRL Ahmedabad, IP Bhubaneswar, HRI Allahabad and IISc (four times). I have lectured and conducted tutorials on topics such as quantum field theory, quantum chromodynamics, anyons, applications of quantum field theoretic techniques (such as bosonisation) in condensed matter systems, and superconductivity.
2. I gave some pedagogic talks to research students on 'Field theory aspects of quantum spin chains' in the Winter School on 'Integrable Systems and Low Dimensional Many Body Problems' in Bharathidasan University, Tiruchirapalli in December 1995.
3. I gave some pedagogic talks to research students on 'Nonlinear sigma models, bosonisation and low-energy effective Hamiltonians for spin systems' in the Workshop on 'Strongly Correlated Electron Systems' in ISI, Kolkata in February 2001.
4. I have participated in tutorial sessions for about 30 high school students in the Orientation Programme for the Physics Olympiad in the Jawaharlal Nehru Planetarium, Bengaluru in October 2001 and January 2002.
5. In January 2002, I gave some talks on 'Superconductivity: Old and New' to about 70 college students and teachers in the Lecture Workshop in Physics in the C. M. S. College, Kottayam. This workshop was organised in collaboration with the Indian Academy of Sciences, Bengaluru.
6. I have participated in the Extension Lecture Programme of the Centre for Continuing Education, IISc, and have given talks in some high schools in Bengaluru on Elementary Particle Physics.

7. In November 2004, I gave some talks on 'Quantum Field Theory' to about 70 college students and teachers in a National Seminar in Mar Thoma College, Tiruvalla. This seminar programme was organised in collaboration with the Indian Academy of Sciences, Bengaluru.

8. In January 2005, I gave a talk on the 'Special Theory of Relativity' as part of the Inaugural Event of the year-long programme in the Indian Institute of Science, Bengaluru for the 'World Year of Physics - 2005'.

9. In September 2005, I gave a talk on 'Quantum Mechanics' to about 50 high school students in the National College, Bengaluru.

10. In November 2005, I gave the Popli Memorial Lectures to about 60 B.Sc. students in St. Stephen's College, Delhi. These consisted of three talks on 'Physics in less than three dimensions'.

11. In November 2005, I gave a talk on the 'Special Theory of Relativity' to about 50 M.Sc. students in Bangalore University for the 'World Year of Physics - 2005'.

12. In December 2005, I gave a talk on 'Einstein - Life and Work' to about 110 high school students in Maharani Lakshmi Ammanni College for Women, Bengaluru.

13. In December 2006, I gave a talk in IISc on 'Rigid body motion' to about 40 college teachers as part of a refresher course on 'Tensors and their Applications in Engineering Sciences' organised by the Indian Academy of Sciences, Bengaluru.

14. In May 2007, I gave a talk on 'Quantum Mechanics' to about 25 KVPY Fellows in the Harish-Chandra Research Institute, Allahabad.

15. In August 2007, I gave some talks on 'Quantum Mechanics' to about 130 college students and teachers in a Lecture Workshop in Mar Ivanios College, Thiruvananthapuram. This workshop was organised in collaboration with the three Science Academies of India.

16. In September 2007, I conducted a talk and a discussion session on some topics in 'Classical Mechanics' for about 20 high school teachers in Christ College, Bengaluru. This was organised by the Indian Academy of Sciences.

17. In September 2007, I gave a talk on 'Superconductivity' to about 180 high school students and teachers in a Science Workshop for Pre-University Students in MES College, Bengaluru. This workshop was organised in collaboration with the three Science Academies of India.

18. In March 2008, I gave a talk on 'Electrical transport in low dimensions' to about 60 M.Sc. students in Bangalore University in the 'Frontier Lectures in Physics'. This workshop was organised in collaboration with the three Science Academies of India.

19. In June 2009, I gave some talks on 'Euler equations, Euler angles and rigid body dynamics' to 12 B.Sc. and M.Sc. students in the Second PPISR Summer School in Physics in the Poornaprajna Institute of Scientific Research, Bengaluru.

20. In June 2010, I gave a talk on 'Rigid body motion' to about 25 Class XII students in the Jawaharlal Nehru Planetarium, Bengaluru as part of the REAP programme in Physics.

21. In July 2010, I gave 5 talks as a module on 'Rigid body motion' to about 15 B.Sc. students in the Jawaharlal Nehru Planetarium, Bengaluru as part of the REAP programme in Physics.

22. In April 2012, I gave 2 talks on 'Special theory of relativity' to 8 students in the Asian Physics Olympiad training camp in IISc.

23. In March 2015, I gave talks on 'Topological Systems in Physics' and 'Majorana fermions in one dimension' in BHU, Varanasi.

24. Over the years, I have guided the projects of 27 summer students who have come to IISc from all over India through programmes organised by the Centre for High Energy Physics, the IISc Young Fellowship in Science, the Jawaharlal Nehru Centre for Advanced Scientific Research, and the Indian Academy of Sciences. The projects have been of different kinds, including some lectures given by me and some reading projects.

25. In June 2000, I organised and lectured in a week-long retraining programme in the campus of IISc for about 60 high school teachers of Physics from around Bengaluru. A total of 12 faculty members of IISc and Bangalore University taught in this programme which was funded by Infosys.

26. I was a member of the Programme Committee of the IISc Young Fellowship in Science from 1999 to 2006. I organised the Physics part of this programme and gave lectures in it every summer from 2000 to 2007.

27. I was a member of the Science Education Panel of the Indian Academy of Sciences during the period 2004-09. This panel coordinates many activities of the Academy such as summer fellowships for students and teachers, and lecture programmes and refresher courses for teachers at colleges and university departments throughout the country.

28. I have been on the Editorial Board of the IISc Lecture Notes Series since 2008.

29. I have participated in setting the Physics question paper for different exams such as GATE, IISc Integrated Ph.D. Entrance examination, and KVPY.

30. I have refereed more than 330 research papers for several journals such as Physical Review Letters, Physical Review B and D, Journal of Physics A, Journal of Physics: Condensed Matter, and Pramana.

The American Physical Society recognised me as an Outstanding Referee in 2009 for my work as a referee for a number of APS journals over many years.

31. So far I have evaluated 35 Ph.D. thesis, refereed 36 DST, CSIR, IFCPAR and NSF Projects, and reviewed 13 books for various journals.

Research Projects held as Principal Investigator:

1. CSIR Project on "Effects of incommensuration, impurities and junctions on strongly correlated quantum systems in one dimension" for the period November 2000 - October 2003 with a sanctioned amount of Rs. 6,03,000/-.

2. DST Project on "Quantum spin systems in low dimensions" for the period May 2003 - May 2007 with a sanctioned amount of Rs. 11,80,800/-.

3. DST Project on "Electronic transport in low dimensional systems" for the period July 2007 - July 2011 with a sanctioned amount of Rs. 17,57,400/-.

Date: 4th January, 2023