# Curriculum Vitae

| Name     | : | VIJAY A. SINGH                            | Nationality    | : | Indian         |
|----------|---|---|----------------|---|----------------|
| Position | : | Professor (H)                             | Birth-Date     | : | Jan. 20, 1950  |
| Address  | : | Homi Bhabha Centre for Science Education  | Birth-Place    | : | Bombay, India  |
|          |   | (Tata Institute for Fundamental Research) | Sex            | : | Male           |
|          |   | V. N. Purav Marg, Mankhurd,               | Marital Status | : | Married        |
|          |   | Mumbai - 400088, INDIA                    | Tel. Nos.      | : | (022)-25482104 |
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**EDUCATION**: Ph.D.: Physics, State University of New York at Albany, (1978). Master of Science: Physics, Indian Institute of Technology - Bombay (1973). Bachelor of Science: Physics (Major), Mathematics (Minor) Bombay University (1971). **EMPLOYMENT**: **PROFESSOR (H)** HBCSE, Tata Institute of Fundamental Research, Mumbai, INDIA (January 2004 to present)<sup>1</sup>. FACULTY, Department of Physics, Indian Institute of Technology, Kanpur, India (February 15, 1984 to December 2003; Promoted to Professorial Rank from Mar. 11 1993). Adjunct Professor, Centre for Excellence in Basic Sciences, Mumbai University, 2011 onwards Adjunct Professor, IIT Bombay 2011 onwards. Visiting Astt. Professor, SUNY-Albany, USA (Aug. 1990 to May 1991). Visiting Fellow, Theory Group, Tata Institute of Fundamental Research, Bombay, India (Mid-November 1982 to Mid-February 1984). **Research Scientist**, Solar Energy Research Institute, Colorado, USA (Aug 1980 to Oct 1982) Research Associate, SUNY-Albany, USA (Jan 1979 to Aug 1980). Graduate Teaching Assistant, Computer Science Department: SUNY at Albany, USA (Aug 1975 to Aug 1976). Graduate Teaching Assistant, Physics, Syracuse University and SUNY at Albany USA,

| CHIEF EDITOR: | Bulletin of the Indian Association of Physics Teachers [1997 to 2001].  |
|---------------|---|
| NATIONAL      | 1] Science Olympiads [Nov. 2003 to Present]                             |
| COORDINATOR:  | 2] National Initiative on Undergraduate Science (2004-2012).            |
| LEADER:       | Indian Team, International Physics Olympiads: 1999, 2000, 2001 and 2007 |

Number of Books : Four (4) Number of Publications in Peer Reviewed Technical Journals : Over <u>150</u> Number of Review Articles : Over <u>Fifteen</u> (25) Number of Invited Talks and Abstracts at Conferences : Over <u>Two Hundred</u> (250) Total Teaching Experience : Over Thirty (35) years

(August 1973 — August 1975).

 $<sup>^1 \</sup>mathrm{On}$  deputation at HBCSE from Jan. 2004 to Dec 15 2005

| ORGANIZATION : | Member :<br>Member :<br>Member :<br>Fellow :<br>Fellow :<br>Fellow :<br>Life Member :<br>Life Member :<br>Life Member :<br>Life Member :  | American Physical Society (July 1975 to 2004)<br>Sigma Xi (May 1977 to 1984)<br>American Association of University Professors (1975 to 1982)<br>Institute for the Study of Defects in Solids,<br>SUNY at Albany, Albany, NY, USA<br>New York Academy of Sciences<br>Maharashatra Academy of Sciences<br>Indian Physics Association (December 1982)<br>National Semiconductor Society (India) (1984)<br>Indian Association of Physics Teachers (1997; No.5444 L2626)<br>Indian Association of Chemistry Teachers (2001; LM49) |
|----------------|---|--|
|                | Life Member :<br>Life Member :<br>Life Member :   | (2006; LM19)<br>Bombay Association of Science Teachers (2007; LM724)<br>Marathi Vigyan Parishad (2007; LM2384)   |
| DISTINCTIONS : | <ol> <li>Life Memoer : Marathi Vigyan Parishad (2007; LM2384)</li> <li>Ranked second out of 439 students in the B.Sc. (Hons.) 1971.</li> <li>Recipient of the Dorab Tata Scholarship (1967-1971).</li> <li>Recipient of the National Scholarship for Master's Program (1971-1973)</li> <li>Chairperson of Theory Sessions at the Gordon Research Conference<br/>on "Point Defects, Line Defects, and Interfaces in Semiconductors",<br/>July 8-12, 1985, Plymouth, New Hampshire, USA</li> <li>Consistently received the Director's commendation<br/>for outstanding teaching, I.I.T Kanpur.</li> <li>Chief Editor : Bulletin of the Indian Association of Physics Teachers<br/>[1997 - 2001]</li> <li>International Physics Olympiad, Leader of the Indian Team in 1999,<br/>2000, 2001, and 2007 wherein 18 of the 20 student members returned<br/>with medals which included 7 Gold medals.</li> <li>National Coordinator, Science Olympiads Nov. 2003 to present.</li> <li>National-Coordinator, National Initiative on Undergraduate Science<br/>(2004-2012)</li> <li>Member Board of School of Sciences, Indira Gandhi National<br/>Open University, 2000 - 2002.</li> <li>Member, Bihar Council of Science and Technology 2007 - present.</li> <li>Academic Committees: Kishore Vaigyanik Protsahan Yojana (KVPY),<br/>13.UDAN AWARDS, Navbharat Times 2012</li> </ol> |  |

# NATIONAL CO-ORDINATOR, SCIENCE OLYMPIADS :

India began participating in the International Physics Olympiad since 1998, in Chemistry since 1999 and in Biology since 2000. I have been involved as a Lecturer, Evaluator and Academic Co-ordinator Theory for a core group of very bright high-school students across the nation at the Homi Bhabha Center for Science Education, Bombay since the begining of the program in 1998. I have been National Coordinator for Science Olympiads (Physics, Chemistry, Biology) from Nov. 2003. Since 2004 almost all students who have represented India have come back with medals. I have been the Delegation Leader of Indian team of 5 students to the following International Physics Olympiads :

- 1. July 1999, Padua, Italy : 4 Silver and 1 Bronze.
- 2. July 2000, Leicester, England : 2 Gold and 2 Bronze
- 3. June 2001, Antalay, Turkey : 3 Gold and 2 Silver
- 4. July 2007, Isfahan, Iran : 2 Gold and 2 Silver

## TEACHING at IIT Kanpur 1984 - 2003 :

- 1. Developed over 20 user-friendly IBM-PC compatible software packages for use in undergraduate physics.
- 2. Detailed teaching list includes:
  - (a) Undergraduate Physics, Syracuse University, Aug. 1973-Aug. 1974.
  - (b) Undergraduate Physics, State University of New York at Albany, USA, Aug 1974 Aug 1975.
  - (c) Undergraduate Computer Science, State University of New York at Albany, USA Aug. 1975 to Aug. 1976.
  - (d) Graduate Level Seminar Course on Frontiers of Condensed Matter Theory. SUNY-Albany, U.S.A. Jan. 1979 to Dec. 1979.
  - (e) Undergraduate Classical Mechanics and Quantum Mechanics: State University of New York at Albany, USA Aug. 1990 to May 1991.
  - (f) Dept. of Physics, I.I.T. Kanpur, India Mid-February 1984 to present :
    - i. Review of Stat. Mech. and Solid State Physics Review of Classical Mechanics Review of Quantum Mechanics (Ph.D. Level)
    - ii. Mathematical Physics (Master Level)
    - iii. Disordered Systems (Master Level)
    - iv. Computer Programming (Master Level-Physics)
    - v. Laboratory Physics (Undergraduate)
    - vi. Statistical Mechanics (Master Level) vii. Advanced Condensed Matter Physics

    - viii. Feynman Path Integrals (Masters/PhD Level) ix. Advanced Quantum Mechanics (Master's/PhD Level)
      - x. Physics Halliday & Resnick Vol. II
    - xi. Undergraduate Physics Tutorial Halliday and Resnick I and II Laboratory Instructor
    - xii. Undergraduate Physics Instructor-in-Charge Phy 102 Summer Course 1990.
    - xiii. Undergraduate Physics Instructor-in-Charge Phy 101 July-Dec. 1992.
    - xiv. M.Sc. Experimental Projects mainly in semiconductor physics. Six Students.
    - xv. Undergraduate Physics Instructor-in-Charge BSO203 Quantum Mechanics Course July-Dec. 1997.
    - xvi. Undergraduate Physics Instructor-in-Charge BSO203 Quantum Mechanics Course July-Dec. 1998.
    - xvii. Graduate Course in Biophysics 2001.
    - xviii. Introduction to Physics as a Profession Course 2002

## TEACHING at HBCSE (TIFR) 2004 to present :

- 1. Six courses at HBCSE which included developing two new courses
  - Foundation Course in Science (a)
  - (b) Evaluation Methodologies in Science Education
  - (c) Two reading courses
- 2. Two courses in the Graduate School at TIFR: Quantum Mechanics II and Disordered Systems (an Advanced Topics Course). Six Undergraduate Courses at the Centre for Excellence in Basic Sciences, Mumbai University
- which includes Introductory Mechanics, Statistical Mechanics and Solid State Physics. 4. Two courses at IIT Bombay: Advance Solid State Physics and Semiconductor Physics.

# NATIONAL CO-ORDINATOR, National Initiative on Undergraduate Science HBCSE (TIFR) 2004 to 2012. Some Highlights :

- 1. Organized over 100 camps for UG students in Physics, Chemistry and Biology.
- 2. Initiated UG Research in 5 Non-Metropolitan Colleges of India
- 3. Over 60 UG publications in International Journals and Proceedings of International Conferences. Personally guided over 20 of these.

| Ph.D. Thesis:    | The Electronic Structure of Strongly Scattering Liquid and |
|------------------|--|
|                  | Amorphous Metals in the Muffin-Tin Model. [1978]           |
|                  | (Advisor : Professor Laura M. Roth)                        |
| Master's Thesis: | Equilibrium Properties of Superconductors [1973]           |
|                  | (Advisor: Professor C.M. Srivastava)                       |

### **PUBLICATIONS**: (Partial List)

# THIS LIST INCLUDES ONLY THOSE ARTICLES PUBLISHED IN PEER-REVIEWED TECHNICAL JOURNALS. ABSTRACTS AND INVITED PAPERS AT CONFER-ENCES ARE NOT INCLUDED.

1. "Comment on Spin-Wave Excitations in Amorphous Ferromagnets", L.M. Roth and V.A. Singh, Phys. Lett. **59A**, 49-51 (1976) and also in "Proceedings of International Conference on the Structure and Excitation of Amorphous Solids", Williamsburg, VA (1976).

2. "Self-Consistent Approach to the Electronic Structure of a One-Dimensional Correlated Liquid Metal", Vijay A. Singh and L.M. Roth, Phys. Rev. B 15, 3694-3699 (1977).

3. "Vibrational and Electronic Structure of Hydrogen-Related Defects in Silicon Calculated by the Extended Huckel Theory", Vijay A. Singh, C. Weigel, J.W. Corbett and L.M. Roth, Phys. Stat. Sol.(b) **81**, 637-646 (1977).

4. "Spin Waves in Amorphous Ferromagnets", Vijay A. Singh and L.M. Roth, J. Appl. Phys. Part II, **49**, 1642-1644 (1978).

5. "Semi-Empirical Calculations of Hydrogen Defects in Silicon", Vijay A. Singh, C. Weigel, J.W. Corbett and L.M. Roth, Phys. Lett. **65A**, 261-263 (1978).

6. "Path-Integrals with a Periodic Constraint: Entangled Strings", A. Inomata and Vijay A. Singh, J. Math. Phys. **19**, 2318-2323 (1978).

7. "Studies of the States of Hydrogen in Silicon", R.L. Kleinhenz, Y.H. Lee, Vijay A. Singh, P.M. Mooney, A. Jaworowski, L. M. Roth, J.C. Corelli, and J.W. Corbett, Inst. Phys. Conf. Ser. No. 46, Chapter, 3, 200-204 (1979). (1979).

8. "Feynman Path Integral Approach to the Aharonov-Bohm Effect", C. Gerry and Vijay A. Singh, Phys. Rev. D. **20**, 2550-2554 (1979).

9. "Muffin-tin Model in Amorphous and Liquid Metals: General Formalism and Calculations for an s-Phase-Shift Model", Vijay A. Singh and L.M. Roth, Phys. Rev. B **21**, 4403-4412 (1980).

10. "The Multiple Scattering Approach to the Electronic Structure of Amorphous and Liquid Metals", Vijay A. Singh and L.M. Roth, Phys. Rev. **B22**, 4089-4091 (1980).

11. "Transport Properties in Liquid and Amorphous Metals", L.M. Roth and Vijay A. Singh, J. Physique, **41**, C8 459 - 462 (1980).

12. "Semi-Empirical Calculations of Lithium-Related Defects in Silicon", Vijay A. Singh, C.Weigel, and J.W. Corbett, Phys. Stat. Sol. (b) **100**, 533-539 (1980).

## <u>**Partial List of Publications**</u> $(Continued)^2$

13. "EHT Calculations of Positron Lifetimes in Irradiated Silicon", N.D. Wilsey, J.P. Karins, J.B. Shapiro, Vijay A. Singh, and J.W. Corbett, Inst. Phys. Conf. Ser. No. **59**, pp. 169-174 (1980).

14. "Defects in Silicon", J.W. Corbett, A.E. Jaworowski, J.P. Karins, R.L. Kleinhenz, L.J. Lindstrom, P.M. Mooney, G.S. Oehrlein, L.M. Roth, Vijay A. Singh, K.L. Wang, E. Weber and N.D. Wilsey in Proceedings of the International Conference on Radiation Physics of Semiconductors and Related Materials, (Sept. 13-19, 1979) ed. G.P. Kekelidze and V.T. Shakhovtsov, Pg. 42-63 (Tbilisi State University Press, Tbilisi 1980). [REVIEW ARTICLE].

15. "Path-Integral Formulation of Scattering Theory: Central Potentials", C. Gerry and Vijay A. Singh, Phys. Rev. D. **21**, 2979-2985 (1980).

16. "Path Integrals and Constraints: Particle in a Box", Akira Inomata and Vijay A. Singh, Phys. Lett. **80A**, 105-108 (1980).

17. "Electronic States in Amorphous Metals: Comparison of Effective Medium Theories with 'Exact' Calculations", Mary-Ann Aloisio, Vijay A. Singh and L.M. Roth, J. Phys. **F11**, 1823-1832 (1981).

18. "Analytic (Unitarity-Preserving) Approximation for the Electronic Structure of Amorphous Systems", Vijay A. Singh, Phys. Rev. B 24, 4852-4854 (1981).

19. "The Vacancy in Cubic Tetrahedrally Coordinated Materials", R.L. Kleinhenz, S.N. Sahu, Vijay A. Singh and J.W. Corbett, Phys. Lett. **83A**, 291-293 (1981).

20. "Conductivity in Liquid Metals: Vertex Corrections in the Effective Medium Approximation", L.M. Roth and Vijay A. Singh, Phys. Rev. **B** 25, 2522-2531 (1982).

21. "Evaluation of Tight-Binding Models for Deep Defect Levels in Semiconductors", Vijay A. Singh, U. Lindefelt and Alex Zunger, Phys. Rev. B, **25**, 2781-2785 (1982).

22. "Correlation Between the Observed Infrared Stretching Frequency and the Bond Character of the Si-H Bond", S.N. Sahu, T.S. Shi, P.Ge, A. Hiraki, T. Imura, M. Tashiro, Vijay A. Singh and J.W. Corbett, J. Chem. Phys. **77**, 4330-4332 (1982).

23. "On the Experimental Consequences of the Winding Numbers of the Aharonov-Bohm Effect", C. Gerry and Vijay A. Singh, Phys. Lett. **92A**, 11-12 (1982).

24. "Real Space Renormalization Transformations for the Free Energy of the Hubbard Hamiltonian", K. Subbarao and Vijay A. Singh, Phys. Rev. B26, 3788-3791 (1982).

25. "Phenomenology of Solid Solubilities and Ion-Implantation Sites: An Orbital-Radii Approach", Vijay A. Singh and Alex Zunger, Phys. Rev. B **25**, 907-921 (1982).

26. "Self-Consistent Approach to an Inhomogenous Elastic Medium", Vijay A. Singh, Phys. Rev. B. **26**, 1456-1458 (1982).

27. "New Method for Self-Consistency in Disordered Systems", Vijay A. Singh and Paul Bendt, Phys. Rev. B 27, 6464-6468 (1983).

28. "Reversal in the Order of Impurity Binding Energies with Atomic Binding Energies", Vijay A. Singh, Alex Zunger, and U. Lindefelt, Phys. Rev. B (RAPID COMM.) **27**, 1420-1423 (1983).

29. "Electronic Structure of Substitutional Chalcogen Impurities in Silicon", Vijay A. Singh, U. Lindefelt and A. Zunger, Phys. Rev. B 27, 4909-4923 (1983).

30. "Remarks on the Effects of Topology in the Aharonov-Bohm Effect", C.C. Gerry and Vijay A. Singh, Nuovo Cimento **73**, B, 161-170 (1983).

<sup>&</sup>lt;sup>2</sup>Only peer-reviewed scientific articles listed

#### Partial List of Publications (Continued)<sup>3</sup>

31. "Semi-Empirical Tight Binding Calculations for the Energy Bands of the Diamond and Zinc-Blende Type Semiconductors", S.N. Sahu, J.T. Borenstein, Vijay A. Singh and J.W. Corbett, Phys. Stat. Sol. (b) **122**. 661-667 (1984).

32. "On the Origin of E3-Like Defects in GaAs and  $GaAs_{1-x}Sb_x$  Alloys", P.A. Murawala, Vijay A. Singh, S. Subramanian, S.S. Chandvankar and B.M. Arora, Phys. Rev. B **29**, (RAPID COMM.) 4807-10 (1984).

33. "On Transition Metal Impurities in Semiconductors and the Haldane-Anderson Model", Vijay A. Singh and A.S. Vengurlekar, Phys. Rev. B **30**, 3527-3528 (1984).

34. "A Renormalization Group Study of Weak Disorder in the Anderson Hamiltonian", G.R. Bhat, Vijay A. Singh, and K. Subbarao, J. Phys. C **17**, 5569-5576 (1984).

35. "Theoretical Study of Transition Metal Impurities in III-V Semiconductors", Vijay A. Singh, Proceedings of the Nuclear Physics and Solid State Physics Symposium, Bhabha Atomic Research Center, Bombay, India, **27A**, pg. 75-85, Dec 23-25, (1984). (Also an INVITED TALK). [REVIEW ARTICLE].

36. "The Electronic Structure of Transition Atom Impurities in GaP", Vijay A. Singh and A. Zunger, Phys. Rev. B.**31**, 3729- 3759 (1985).

37. "Radiation Induced Electron Traps in  $GaAs_{1-x}Sb_x$  Alloys", P.A. Murawala, Vijay A. Singh, S. Subramaniun, S.S. Chandvankar, and B.M. Arora, J. Electron. Mat. **14A**, 1165-1170 (1985).

38. "Thermally Stimulated Current Studies of the Density of Gap States in Amorphous Silicon", D.S. Misra, Vijay A. Singh, S.C. Agarwal, Solid State Comm. **55**, 147-150 (1985).

39. "Analysis of Thermally Stimulated Currents in Amorphous Silicon", D.S. Misra, Vijay A. Singh and S.C. Agarwal, Phys. Rev. B **32**, 4052-4059 (1985).

40. "A Renormalization Group Study of Weak Disorder in the Hubbard Hamiltonian", G.R. Bhat and Vijay A. Singh, J. Phys. C **18**, 5731-5735 (1985).

41. "Theoretical Study of the Electronic States of Substitutional Transition Metal Impurities in InP", P.K. Khowash, D.C. Khan, Vijay A. Singh, J. Phys. C.18, 6177-6184 (1985).

42. "Phenomenological Approach to the Electronic Structure of Glassy Transition Metal Alloys", A.K. Bannerjee, Vijay A. Singh and A.K. Majumdar, Phys. Rev. B **32**, 8384-8386 (1985).

43. "Inversion of Chalcogen Defect Levels in Silicon: an MNDO Study", Raj K. Singh, S.N. Sahu, Vijay A. Singh, and J.W. Corbett, Physics Lett. **112A**, 175-177 (1985).

44. "Electronic Structure of Transition Metal Impurities in III-V Semiconductors", P.K. Khowash, Vijay A. Singh, and D.C. Khan, Indian J. Phys. **59A**, 451-453 (1985).

45. "Functional Integral Approach to Positionally Disordered Systems", D.C. Khandekar, Vijay A. Singh, K.V. Bhagwat, and S.V. Lawande, Phys. Rev. B **33**, 5482-5488 (1986).

46. "Paired Temperature Spectroscopy: A Novel Method to Characterise Traps in Semiconductors", Raj K. Singh, Vijay A. Singh, James W. Corbett, and Amita Das, J. Phys. C **19**, 2177-2187 (1986).

47. "Impurity Density of States of the Oxygen Thermal Donor in Silicon", K. Banerjee and Vijay A. Singh, Mat. Lett. **4** 447-450 (1986).

48. "A Theoretical Study of the Semi-Insulating Behaviour of Fe in InP", P.K. Khowash, Vijay A. Singh, and D.C. Khan, Phys. Stat. Sol. (b) **136**, 715-719 (1986).

<sup>&</sup>lt;sup>3</sup>Only peer-reviewed scientific articles listed

### Partial List of Publications (Continued)<sup>4</sup>

49. "Nature of the Eigen-States on a Fibonacci Chain", A. Mookerjee and Vijay A. Singh, Phys. Rev. B **34**, 7433-7435 (1986). (RAPID COMM.)

50. "Tight-Binding Studies of  $Ga_{1-x}Al_xAs$ ", J. Hasbun, Vijay A. Singh, and L.M. Roth, Phys. Rev. B **35**, 2988-2990 (1987).

51. "Fractal Characteristics of Classically Chaotic Quantum Systems", Vijay A. Singh and Jayanta K. Bhattacharjee, Phys. Rev. A **35** 3119-3121 (1987).

52. "Evaluation of Some Effective Medium theories for Liquid and Amorphous Metals", Liu Changfu, Vijay A. Singh and L.M. Roth, Phys. Rev. B **35** 7898-7901 (1987).

53. "Deep Defects in Semiconductor Alloys: Theoretical Aspects", Vijay A. Singh, in Electronic Structure and its Applications, Lecture Notes in Physics, Springer-Verlag (1987). [REVIEW ARTICLE]. **35** 7898-7901 (1987).

54. "Collision Cascades and Fractals", George O. Williams, Vijay A. Singh, and James W. Corbett, Phys. Stat. Sol. (b) **144** K1-K5 (1987). [Festschrift for Prof. A. Seeger.]

55. "Depletion of Interstitial Oxygen in Silicon and the Thermal Donor Model", J.T. Borenstein, Vijay A. Singh, and J.W. Corbett, J. Appl. Phys. **62**, 1287-1289 (1987).

56. "An Augmented Space Formalism for the Density of States of Cu-rich Disordered Cu-Ni Alloys", P.K. Thakur, A. Mookerjee and Vijay A. Singh, J. Phys. C **17** 1523-1532 (1987).

57. "Broadening in the Deep-Level Spectra of Defects in GaAsSb Alloys", A. Diwan, Vijay A. Singh, B.M. Arora, and P.M. Murawala, J. Phys. C. **20** 3603-3611 (1987).

58. "Paired Temperature Spectroscopy for Gap States in Ordered and Disordered Semiconductors I: Theoretical Analysis", Raj K. Singh, Vijay A. Singh, and J.W. Corbett, Semicond. Sci. & Tech. 2, 716-725 (1987).

59. "Paired Temperature Spectroscopy for Gap States in Ordered and Disordered Semiconductors II: Experimental Applications", Raj K. Singh, Vijay A. Singh, J.W. Corbett, and R. Magno Semicond. Sci. & Tech. 2, 726-731 (1987).

60. "Fractal Character of Impurity Eigen-States in a Solid", Vijay A. Singh and J.W. Corbett, J. Phys. C **21**, 133-139 (1988).

61. "A Metastable Model for Interstitial Oxygen Depletion in Silicon", Kajoli Banerjee, Vijay A. Singh, J.W. Corbett, Semicond. Sci. & Tech. **3**, 452-455 (1988).

62. "Deep Level Transient Spectroscopy (DLTS) Analysis of Defect Levels in Semiconductor Alloys", Amita Das, Vijay A. Singh, and David V. Lang, Semicond. Sci. & Tech. **3**, 1177-1183 (1988).

63. "Mean Field Approach to the Gap of a Model Interacting System", Kajoli Banerjee, Vijay A. Singh and G.R. Bhat, Int. J. Mod. Physics B **2** 87-101 (1988).

64. "X-alpha Approach to the atom in Jellium Model", S.J. Mali, Vijay A. Singh, and D.G. Kanhere, Sol. St. Commun. **66**, 1189-1990 (1988).

65. "Calculation of Electronic Properties of Some Solids using Non-Local Density Approximation", S.J. Mali, R.M. Singru, Vijay A. Singh, and D.G. Kanhere, J. Phys. F **18** L201-L205 (1988).

66. "Energy Theorems in Constrained Density Functional theory", Swapan K. Ghosh and Vijay A. Singh, J. Phys. Condens. Matter 1, 1971-1981 (1989).

<sup>&</sup>lt;sup>4</sup>Only peer-reviewed scientific articles listed

## Partial List of Publications (Continued)<sup>5</sup>

67. "Transient Spectroscopy and Disorder", Vijay A. Singh and Amita Das, Rad. Effects & Defects in Solids **111-112**, 385 -392 (1989).

68. "Scaling Models for Flight Patterns and Sexual Dimorphism in Raptors", Ramana M. Athreya and Vijay A. Singh, J. Bombay Natural History Society, **87**, 210 - 217 (1990).

69. "An Efficient Algorithm for Feynmann Path Integral Evaluation", Amita Das and Vijay A. Singh, Proceedings of National Seminar on "Path Integrals and their Applications", B.A.R.C., Bombay Jan 16-17, 1989, Indian Physics Association Publication, ed. D.C. Khandekar and S.V. Lawande pg. 158-176 (1990).

70. "Anisotropic Three - Dimensional t - J Model", R. Shankar and Vijay A. Singh, Phys. Rev. B **43**, 5616 - 5621 (1991).

71. "Electronic Structure of Point Defects in Semiconductor Alloys", A. Das, C. J. Barbero, Vijay A. Singh, J. W. Corbett, Phys. Stat. Sol. (b) **167**, 667 (1991).

72. "The Electronic Structure of Point Defects in Semiconductor Alloys: Simplified Approximations", Amita Das and Vijay A. Singh, J. Phys. Condens. Matter, 4, 2209 - 2216 (1992).

73. "Quantum Approximation to Regular and Chaotic Classical Motion: An Electron in Two Periodic Potentials", J.C. Kimball, Vijay A. Singh and Mark D'Souza, Phys. Rev. A **45**, 7065-7072 (1992).

74. "Optimizing Complex Systems with Ultra Large Degrees of Freedom", George C. John and Vijay A. Singh, Proc. Natl. Systems Conf., Dec.24-26 1993 pg. 94-97 ed. Prem Kalra , Allied Publishers (1993).

75. "Theory of the Photoluminescence Spectra of Porous Silicon", George C. John and Vijay A. Singh, Phys. Rev. B **50**, 5329-5334 (1994).

76. "Monte-Carlo Evaluation of the Aharonov -Bohm Effect", George C.John and Vijay A. Singh, Intnl. J. Mod. Phys. C 6, 67-76 (1995)

77. "Temperature-Time Duality and Deep Level Spectroscopy", Sandeep Agarwal, Y.N.Mohapatra, and Vijay A. Singh, J. Appl. Phys. **77**, 3155-3161 (1995).

78. "Time Analyzed Transient Spectroscopy and Multiple DX Related Emission Centers in Silicon Doped  $Al_xGa_{1-x}As$ ", Sandeep Agarwal, Y.N.Mohapatra, Vijay A. Singh, and R.Sharan, J. Appl. Phys. **77**, 5725-5729 (1995).

79. "Diffusion Induced Nucleation Model for the Formation of Porous Silicon", George C. John and Vijay A. Singh, Phys. Rev. B **52**, 11125-11131 (1995).

80. "Optical Properties of Porous Silicon", George C. John and Vijay A. Singh, Proceedings of the Workshop on Advanced Laser Spectroscopy and Applications Feb. 25-28 1995, I.I.T.-Kanpur, India, ed. H.D. Bist et al., pages 351-359, Allied Publishers (1995) [REVIEW ARTICLE].

81. "Porous Silicon : Theoretical Studies", George C. John and Vijay A. Singh, Physics Reports **263**, 93-151 (1995). [REVIEW ARTICLE]

82 "A Two Scale Model for Aggregation and Etching", George C. John and Vijay A. Singh, Phys. Rev. E 53, 3920-3924 (1996).

83. "Vibrational Spectra of Defects in Silicon: An Orbital Radii Approach", H.C. Verma, George C. John and Vijay A. Singh, Phys. Rev B **53**, 9831-9837 (1996).

84. "Model for the Photoluminescence Behaviour of Porous Silicon", George C. John and Vijay A. Singh, Phys. Rev. B **54**, 4416-4419 (1996)

<sup>&</sup>lt;sup>5</sup>Only peer-reviewed scientific articles listed

## Partial List of Publications (Continued)<sup>6</sup>

85. "Monte Carlo Computation for Complex Systems", George C. John and Vijay A. Singh, in Modelling of Complex Systems ed. J.K.Bhattacharya and A.K. Mullick, Chapter IX, page 405-433, Narosa Publications, London (1997) [REVIEW ARTICLE].

86. "A Simple Scheme for the Numerical Evaluation of Nearly Singular Integrals", G.C. John, J.E. Hasbun, and Vijay A. Singh, Computers in Physics, **11**, 293-298 (1997).

87. "Self Organisation in Porous Silicon Formation", G.C. John and Vijay A. Singh, Phys. Rev. B 56, 4638-4641 (1997)

88. "Radiative Processes in Nanocrystalline Silicon", Vijay A. Singh and G.C. John, in Physics of Semiconductor Nanostructures, ed. K.P. Jain pg. 186-201, Narosa Publishing House, London (1997) [REVIEW ARTICLE].

89. "The Phenomenology of Luminescence in Nanocrystalline Silicon", Vijay A. Singh and George C. John, in Semiconductor Materials and Technology, ed. R.M. Mehra and P.C. Mathur, Solid State Phenomena, **55**, ed. R.M. Mehra and P.C. Mathur, Scitech Publication, Switzerland, 62-67 (1997) [REVIEW ARTICLE].

90. "Light Emission from Porous Silicon", G.C. John and Vijay A. Singh, Comments in Cond. Matt. Phys. 18, 163-177 (1997).

91. "Electronic and Optical Properties of Semiconductor Nanostructures", Vijay A. Singh and V. Ranjan in Physics of Semicondutor Devices, eds. V. Kumar and S.K. Agarwal, pg. 69 - 76, Narosa Publishing House, London [1998] [REVIEW ARTICLE].

92. "Size Dependence of Photoluminescence in Semiconductor Nanocrystallites", V. Ranjan and Vijay A. Singh in Physics of Semicondutor Devices, eds. V. Kumar and S.K. Agarwal, pg. 98 - 101, Narosa Publishing House, London [1998].

93. "Carrier Dynamics in Porous and Nanocrystalline Silicon", Vijay A. Singh and George C. John, in Frontiers in Materials Modelling and Design, eds. Vijay Kumar, S.Sengupta, and B.Raj, pg. 250-256, Springer-Verlag, Berlin (1998) [REVIEW ARTICLE].

94. "Unified Model for the Luminescence and Transport Data in Self Supporting Porous Silicon", R.M. Mehra, V. Agarwal, Vijay A. Singh, and P.C. Mathur, J. Appl. Phys. **183**, 2235-2240 (1998).

95. "An effective exponent for the size dependence of luminescence in semiconductor nanocrystallites ", V. Ranjan, Vijay A. Singh and George C. John , Phys. Rev. B. ,58 , 1158-1161 (1998).

96. "Trends in the Physics of Semiconducting Materials", Vijay A. Singh and V. Ranjan, Metals, Materials and Processes, **10**, 237-246 (1998) [REVIEW ARTICLE].

97. "The Origin of the Anomalous Temperature Dependence of Luminescence in Semiconductor Nanocrystallites", Manish Kapoor, V. Ranjan, and Vijay A. Singh, Solid State Phy. eds. R. Mukhopadhyay, A. M. Shaikh, and B. M. Godwal, **41**, 481-482, Universities Press (1998).

98. "Semiconductor Quantum Dots: Theory and Phenomenology ", Vijay A. Singh ,V. Ranjan and Manish Kapoor , Bull. Materials Sci., **22**, 563 - 569 (1999) [REVIEW ARTICLE].

99. "A Phenomenological Study of the Si-H Infrared Spectra in Porous and Amorphous Silicon", Manish Kapoor and Vijay A. Singh, Mod. Phys. Lett. B **20**, 703-708 (1999).

100. "The International Physics Olympiad - 1999", Vijay A. Singh and R. M. Dharkar, Physics News **30**, 60-64 (1999).

<sup>&</sup>lt;sup>6</sup>Only peer-reviewed scientific articles listed

## Partial List of Publications (Continued)<sup>7</sup>

101. "Origin of the Anomalous Temperature Dependence of Luminescence in Semiconductor Nanocrystallites", Manish Kapoor, Vijay A. Singh, and G. K. Johri, Phys. Rev. B **61**, 1941-1945 (2000).

102. "Electronic Structure of Defects in Semiconductor Quantum Dots", V. Ranjan and Vijay A. Singh, and Manish Kapoor, in Physics of Semicondutor Devices, eds. V. Kumar and S.K. Agarwal, 1012 - 1018, Allied Publishers Ltd., N. Delhi (2000).

103. "Ampere versus Biot-Savart", Vijay A. Singh, Resonance 5, 84-91 Aug. (2000).

104. "The Role of the Carrier Mass in Semiconductor Quantum Dots", M. Singh, V. Ranjan, and Vijay A. Singh, Intnl. J. Mod. Phys. B 14, 1755 - 1765 (2000).

105. "Shallow – Deep Transitons of Impurities in Semiconductor Nanostructures", V. Ranjan and Vijay A. Singh, J. Appl. Phys. **89** 6415 - 6421 (2001).

106. "Shallow Impurities and  $\delta$ - Doping in Quantum Dot - Quantum Well", V. Ranjan and Vijay A. Singh, J. Phys. Condens. Matter **13** 8105 - 8119 (2001).

107. "Self Capacitance of a Quantum Dot: Dependence on the Shape of the Confining Potential", V. Ranjan, R. K. Pandey, Manoj K. Harbola, and Vijay A. Singh, Phys. Rev. B **65** 045311-1 – 045311-8 (2002).

108. "The Band Gap in Silicon Nanocrystallite", V. Ranjan, M. Kapoor, and Vijay A. Singh, J. Phys. Condens. Matter **14** 6647 - 6655 (2002).

109. "The Magnetohydrodynamic Generator: A Physics Olympiad Problem (2001)", Vijay A. Singh and Manish Kapoor, Resonance **7** 68 - 75 (July 2002)

110. "Many Electron Effects in Semiconductor Quantum Dots", R. K. Pandey, Manoj K. Harbola, and Vijay A. Singh, Bull. Materials Sci., **26**, 63 - 67 (2003).

111 "Scaling of Coulomb and Exchange-Correlation with Quantum Dot Size", R. K. Pandey, Manoj K. Harbola, and Vijay A. Singh, Phys. Rev. B 67, 075315-1 – 075315-2 (2003).

112. "Evidence for an Optimum Size for Luminescence in Quantum Dots", Vijay A. Singh, Manish Kapoor, and R. K. Pandey, Proceedings of the International Conference on Photonics-2002, TIFR, Dec. 16-18, 2002, Mumbai, INDIA.

113. "Ferromagnetism in Diluted Magnetic Semiconductor – Generalized RKKY Interaction and Spin - Wave Excitations", Avinash Singh, Animesh Datta, Subrat Das, and Vijay A. Singh, Phys. Rev. B 68 235208-1 – 235208-9 (2003).

114. "Helium - like Donors in Semiconductor Quantum Dots", R. K. Pandey, Manoj K. Harbola, and Vijay A. Singh, J. Phys. Condens. Matter **16** 1769 -1776 (2004).

115. "To Scale or not to Scale: Self - Capacitance, "Hubbard U", and Quantum Dot Size?", Vijay A. Singh, R. K. Pandey, and Manoj K. Harbola, Indian J. Phys. **78A**, 61 -65 (2004).

116. "Shallow - Deep Transitions of Neutral and Charged Donor States in Semiconductor Quantum Dots", R. K. Pandey, Manoj K. Harbola, and Vijay A. Singh, Phys. Rev. B **70**, 193308 (2004).

117. "Size Dependence of the Mossbauer Effect in One Dimension", Tarun Grover, Kedar Singh, and Vijay A. Singh, Solid State Commun., **133**, 403 - 406 (2005)

118. "The Mechanical Black Box: A Challenge from the 35<sup>th</sup> International Physics Olympiad (2004)", Vijay A. Singh, Rajesh B. Khaparde, and S. R. Pathare, Resonance **10**, 75 - 82 April (2005).

<sup>&</sup>lt;sup>7</sup>Only peer-reviewed scientific articles listed

### Partial List of Publications (Continued)<sup>8</sup>

119. "Aur Ab Silicon Yug (And Now the Silicon Age)", Vigyan Prakash [*Hindi*], **3**, 27 - 28, April - June (2005).

120. "Einstein, Photoelectric Effect and the Genesis of the Photon Concept", B. M. Arora and Vijay A. Singh, Phys. Educ. **22**, 17 - 28, (2005)

121. "A Simple Approach to Coulomb Blockade for a Gaussian Distribution in sizes of Quantum Dots", Akashdeep Kamra, Praveen Pathak, and Vijay A. Singh, Prayas, **2**, 173 - 177 (2005).

122. "Revisitng Elementary Quantum Mechanics with the BenDaniel - Duke Boundary Condition", Vijay A. Singh and Luv Kumar, Amer. J. Phys. **74**, 412 - 418 (2006).

123. 'Spin Blockade Effects in Spherical Quantum Dots", R. K. Pandey, Manoj K. Harbola, and Vijay A. Singh, Phys. Rev. B, **73**, 165307-1 - 165307-5, (2006).

124. "The Quantum States of Neutron in Earth's Gravitational Field: A Challenge from the 36th International Physics Olympiad", Vijay A. Singh, P. Pathak, and K. K. Chaitanya, Resonance, **11**, 90 - 100 Aug. (2006).

125. "Einstein thatha Prakash Vidyut Prabhav (Einstein and the Photoelectric Effect", Vijay A. Singh, Vigyan Prakash [*Hindi*], 4, 35 - 40, July - December (2006).

126. "A Potpourri of Fermi Problems", P. Pathak, H. Asnani, and Vijay A. Singh, Resonance, 12, 58 - 66 June (2007).

127. "Defects in Semiconductor Nanostructures", Vijay A. Singh, Manoj K. Harbola and P. Pathak, Pramana, **70**, 255 - 261 (2008).

128. "A Mean Field Approach to Coulomb Blockade for a Disordered Assembly of Quantum Dots", A. Kamra, P. Pathak, and Vijay A. Singh, Pramana, **70**, 279 - 284 (2008); also Proc. of the International Workshop on the Physics of Semiconductors 2007, Mumbai – appeared pg 950 - 952 Mar. 2008 [IEEE Explore Publication]

129. "Exploring Black Hole Physics via Dimensional Analysis", P. Pathak, V. Uppal, and Vijay A. Singh, Resonance, **13**, 475 - 486 May (2008).

130. "Mean-field Theory of Coulomb Blockade Disribution for a Disordered Ensemble of Quantum Dots", A. Kamra, P. Pathak, and Vijay A. Singh, Physical Review B, **77**, 115302-1 -115302-7 (2008).

131. "Nanovighyan – Prarambhik Parichay", Vijay A. Singh, Gyan Vigyan: Samkalin Saikshik Nibandh (Scientific Essays) page 13 - 21 HBCSE Publications (2009).

132. "The Landau Theory of Phase Transitions: A Mechanical Analog", R. Raorane, R. Mahajan, P. Pathak and Vijay A. Singh, Resonance, 14, 704-713, July (2009).

133. "Effective Mass Theory of Two - Dimensional Quantum Dot in the Presence of a Magnetic Field", H. Asnani, R. Mahajan, P. Pathak and Vijay A. Singh, Pramana, **73**, 573-580 (2009).

134. "An Entropic Measure for the Teaching - Learning Process", Vijay A. Singh, P. Pathak and P. Pandey, Physica A: **388**, 4453-4458 (2009).

135. "Science Olympiads" Vijay A. Singh and Arvind Kumar Science in India: Achievements and Aspirations, 75 years of the Academy (Indian National Science Academy). Eds.: H. Y. Mohan Ram and P. N. Tandon, 97-101, Feb. (2010).

136. "Gender Asymmetry in Selection Test at the Pre-College Level", Vijay A. Singh and Praveen Pathak, Current Science, **98**, 1432-1433 (2010).

<sup>&</sup>lt;sup>8</sup>Only peer-reviewed scientific articles listed

# Partial List of Publications (Continued)<sup>9</sup>

137. "Nano Vigyan-Prarambhik Parichay" (In Hindi) Vigyaan Parishad Prasar, Prayag and HBCSE Publications HBCSE publication, Vijay A. Singh 13-21, (2009).

138. "Monitoring the Teaching-Learning Process via an Entropy Based Index", Vijay A. Singh, Praveen Pathak and Pratyush Pandey, in "Econophysics and Economics of Games, Social Choices and Quantitative Techniques" Eds. B.Basu, B.K. Chakrabarti, S. R. Chakravarty, and K. Gangopadhyay, Springer-verlog, Heidelberg, 139-146, (2010).

139. "Understanding a Rotational Motion": A Survey of Indian Students", Praveen Pathak, Vijay A. Singh and Chandralekha Singh, Perdelm, 15-22 (2010).

140. "A Pedagogical Study of Cooling of a Granular Gas", R. Makhijani, Praveen Pathak and Vijay A. Singh, Resonance, **16**, 1044-1052, (2011).

141. "Energy and Angular Momentum Storage in a Rotating Magnet", H. S. Mani, Praveen Pathak and Vijay A. Singh, Am. J. Phys., **79**, 873-876, (2011).

142. "Electronic Structure Calculations in Quantum Chemistry and Condensed Matter Physics", Vijay A.Singh and Swapan K. Ghosh, Proceedings of the International Conference on Chemistry Education 2010, Submitted (2010).

143. "Simple Models for the 100 meter Dash", Priyanka deSouza and Vijay A. Singh, Resonance, **20**, 592-602, (2010).

144. "Approximate approches to the One-Dimensional Finite Potential Well", Shilpi Singh, Praveen Pathak, Vijay A. Singh, Eur. J. Phys., **32**, 1701-1710, (2011).

145. "Dorothy Hodgkin: Ek Anukarniya Vyaktitva (In Hindi) Vigyaan Parishad Prasar, Prayag and HBCSE Publications,(2011).

146. "Sifting the Grain from the Chaff: The Concept Inventory as a Probe of Physics Understanding" Vijay A. Singh, Physics News, **41**, 20-31, (2011).

147. "An inventory on rotational kinematics of a particle", K.K. Mashood and Vijay A. Singh, World Conference on Physics Education, (2012).

148. "Number Crunching" Book Review, Vijay A. Singh, Current Science 102, 505, (2012)

149. "Variation in Angular Velocity and Angular Acceleration of a Particle in Rectilinear Motion" K.K. Mashood and Vijay A. Singh, Eur. J. Phys., **33**, 475-478,(2012).

150. "Rotational Kinematics of a particle in rectilinear motion: Perceptions and Pitfalls", K.K. Mashood and Vijay A. Singh, Amer. J. Phys., 720-723 (2012).

151. "An Inventory on Rotational Kinematics of a Particle: Unravelling Misconceptions and Pitfalls in Reasoning", K.K. Mashood and Vijay A. Singh, Eur. J. Phys., **33**, 1301 - 1312, (2012).

152. "Photoluminescence Spectra of InAs Quantum dots Embedded in Gaas Heterostructure", Subhananda Chakrabarti, Rahul M Makhijani, Vijay A. Singh, Journal of Luminescence, 401-406, (2012). Also in AIP Conference Proceedings **1512**, 202 (2013).

153. "Development of a concept inventory in rotational kinematics: initial phases and methodological concerns" K.K. Mashood and Vijay A. Singh, HBCSE, epiSTEME V Proceedings, (2013)

<sup>&</sup>lt;sup>9</sup>Only peer-reviewed scientific articles listed

## BOOKS

1. **PHYSICS** [Textbook for Class XI], National Centre for Educational Research and Technlogy, Government of India (2002). [Note: This book, at the Senior Secondary School Level (India) or equivalently at the College Freshman Level (USA), has a circulation of over two hundred thousand (2,00,000) per year across the nation.]

2. **PHYSICS** [Textbook for Class XII], National Centre for Educational Research and Technlogy, Government of India (2003). [Note: This book, at the Senior Secondary School Level (India) or equivalently at the College Freshman Level (USA), has a circulation of over two hundred thousand (2,00,000) per year across the nation.]

3. Indian National Physics Olympiad Theory Problems (1998 - 2005) [Vijay A. Singh and Shirish R. Pathare], HBCSE Publications Section, Mumbai - 88 (2008).

4. Indian National Physics Olympiad Theory Problems and Solutions (2006 - 2009) [Vijay A. Singh and Praveen Pathak], HBCSE Publications Section, Mumbai - 88 (2009)

5. Challenging Problems of the Physics Olympiad, [Vijay A. Singh and Praveen Pathak] Under preparation (2011)

#### International Conferences (Partial List)

1. NATO Advanced Study Institute on "Physics and Applications of Ion Beam Interactions in Solids", State Univ. of New York at Albany, July 21-August 5, 1978.

2. NATO Advanced Study Institute on "Electrons in Disordered Metals and at Metallic Surfaces", Rijksuniversiteit, Gent, Belgium (Europe), August 24-September 9, 1978.

3. The Gordon Research Conference on "Point and Line Defects in Semiconductors", New Hampshire, July 23-27, 1979.

4. "Liquid and Amorphous Metals", 4th International Conference in Grenoble, France (July 1980).

5. Quantum Chemistry Program Exchange (QCPE) Workshop on the Practical Applications of Quantum-Chemical Methods, June 21-26 (1980), Indiana University, Bloomington, Indiana.

6. Third "Lund" Conference on "Deep Defect Levels in Semiconductors", May (1981).

7. NATO Advanced Study Institute on "Excitations in Disordered Systems", Michigan State University, Aug. 23-Sept 4 (1981).

8. Invited Talk on "The Effective Medium Approach to Disordered Systems" at the South-West Theoretical Physics Conference in Salt Lake City, Utah, U.S.A. (March 1982).

9. I have regularly attended the March Meeting of the American Physical Society from 1976 to 1982 to present short talks.

10. Invited Talk on "Theoretical Study of Transition Metal Impurities in III-V Semiconductors", at the DAE Symposium on Solid State Physics, Dec 23-25, 1984, BARC, Trombay, Bombay-400085.

11. Chairperson of the Theory Sessions at the Gordon Research Conference on "Point Defects, Line Defects, and Interfaces in Semiconductors", July 8-12, 1985, Plymouth, New Hampshire, USA.

12. The Gordon Research Conference on "Point Defects, Line Defects, and Interface in Semiconductors", July 20-24, 1987, Plymouth, New Hampshire, USA.

13. III SERC School in Condensed Matter Physics, B.A.R.C., Trombay, Bombay Dec 7-Dec 24, 1987. Delivered a series of eight lectures on "Methods of Electronic Structure Calculations of Defects/Interfaces in Semiconductors".

14 American Physical Society Meeting. March 15 to 20 1991. Presented three papers.(See Bulletin of the American Physical Society, 36, No.3, 1991; pages 372, 919, and 925.)

15 International Workshop on Advanced Laser Spectroscopy Feb. 25-28 1995, I.I.T.-Kanpur, INDIA, and delivered an invited talk on "Optical Properties of Porous Silicon".

16. International Workshop on Frontiers in Materials Modelling and Design, Kalpakkam, IN-DIA, Aug. 20-23 1996, with an invited talk on "Carrier Dynamics in Porous and Nanocrystalline Silicon".

17. International Conference in Semiconductor Materials and Technology, Delhi, INDIA, Dec. 16-21 1996, with an invited talk "The Phenomenology of Luminescence in Nanocrystalline Silicon".

18. International Symposium on Physics of Semiconductor Nanostructures, Delhi, INDIA, Jan. 23-25 1997, with an invited talk on "Radiative Processes in Nanocrystalline Silicon".

19. Ninth International Workshop on the Physics of Semiconductor Devices, Delhi, INDIA, Dec. 16-20 1997, with an invited talk on "Electronic and Optical Properties of Semiconductor Devices".

20. International Physics Olympiad, Padua, Italy: July 18 – July 27 1999. **Delegation Leader** of the Indian team in which all five team members won medals : 4 **Silver** and 1 **Bronze**.

#### International Conferences (Partial List: Continued)

21. International Physics Olympiad, Leicester, England: July 8 – July 16 1999. **Delegation** Leader of the Indian team. Won 2 Gold and 2 Bronze Medals. India achieved the distinction of being placed third among 64 participating nations.

22. International Conference on Science and Technology of Nanomaterials and Clusters, Barkatullah University, Bhopal, India Nov. 23 -25 2000. Delivered an invited talk: "Can You Hope to Dope a Quantum Dot?"

23. Eleventh International Workshop on the Physics of Semiconductor Devices, Delhi, INDIA, Dec. 18-21 2001, with an invited talk on "Coulomb Blocakde in Semiconductor Quantum Dots".

24. International Physics Olympiad, Antalaya, Turkey: June 28 – July 6 2001. **Delegation** Leader of the Indian team. Won 3 Gold and 2 Silver Medals. India achieved the distinction of being placed second among 65 participating nations.

25. Proceedings of the International Conference on Photonics-2002, TIFR, Dec. 16-18, 2002, Mumbai, INDIA. Oral presentation on "Evidence for an Optimum Size for Luminescence in Quantum Dots".

### International Conference:- 2004 onwards<sup>10</sup>

26. Prateek Gupta and Vijay A. Singh, "Computational Study of Nanosturcutres", International Workshop on Physics of Semiconductor Devices, Delhi 2005 (Oral Presentation).

27. Luv Kumar and Vijay A. Singh, "Ben-Daniel Duke Condition", International Workshop on Physics of Semiconductor Devices, Delhi 2005 (Oral Presentation).

28. Oscar Castellino and Vijay A. Singh, "Scalling Laws for Track Events: A Useful Pedagogical Approach to Complex Biological Phenomena", International Conference on Physics Education, Delhi, Aug. 21-25, 2005 (Poster Presentation).

29. Praveen Pathak, **K. K. Chaitanya** and Vijay A. Singh, "Quantum States of Fullerenes and Atoms in the Earth's Gravitational Field", Annual Convention of Indian Association of Physics Teachers and **National** Symposium on Impact of Nanoscience and Nanotechnology on Physics Education, Nov. 2-4, 2006 (Invited Presentation).

30. Akashdeep Kamra, Praveen Pathak and Vijay A. Singh, "A Mean Field Approach to Coulomb Blockade for a Disordered Assembly of Quantum Dots", International Conference on Mesoscopic and Disordered Systems, IIT Kanpur, Dec. 2006 (Poster Presentation).

31. K. K. Chaitanya, Praveen Pathak and Vijay A. Singh, "Quantum States of Fullerenes and Atoms in the Earth's Gravitational Field", **International** Conference on Mesoscopic and Disordered Systems, IIT Kanpur, Dec. 2006 (Poster Presentation).

32. Vijay A. Singh, Manoj Harbola and Praveen Pathak, "Defects in Semiconductor Nanostructures", **International** Conference on Mesoscopic and Disordered Systems, IIT Kanpur, Dec. 2006 (Invited Presentation).

33. Sudeep Kamath and Vijay A. Singh, "Size Dependence of the Mossbauer Effect on Nanostructures", Advanced Nano Material Conference International, Jan. 8-10, 2007 (Poster Presentation).

34. Sudeep Kamath and Vijay A. Singh, "Recoilless Emission in Nanostructres", International Conference on the Applications of the Mossbauer Effect, IIT Kanpur, October 14-19, 2007 (Oral Presentation).

<sup>&</sup>lt;sup>10</sup>The highlighted name(s) is of the undergraduate student(s) associated with National Initiative on Undergraduate Science (NIUS)

### International Conferences:- 2004 onwards (Continued)<sup>11</sup>

35. Akashdeep Kamra, Praveen Pathak and Vijay A. Singh, "Coulomb Blockade Distribution for a Disordered Ensemble of Quantum Dots" International Workshop on Physics of Semiconductor Devices, Mumbai Dec. 16-20, 2007 (Poster Presentation).

36. International Physics Olympiad, Isfahan, Iran: July 13 - 22 2007. Delegation Leader of the Indian team. Won 2 Gold and 2 Silver Medals. India achieved the distinction of being placed sixth among 78 participating nations.

37. Himanshu Asnani and Vijay A. Singh, "Nurturing of Scientific Talent and Creativity in Students" National Seminar on Science and Schoo l Educations, University of Delhi, Feb. 15-16, 2008 (Plenary Presentation).

38. Vijay A. Singh, "Photoluminescence in Nanostructures", **National** Workshop on Optoelectronics, TIFR, Mumbai, July 28-August 5, 2008 (Invited Presentation).

39. Vijay A. Singh, "Landau and Modern Physics", **National** Workshop on Contribution and Relevance of Lev. D. Landau (Centenary year), J. P. University, Chapra, Bihar, Nov. 20-21, 2008 (Keynote Presentation).

40. Vijay A. Singh, "Classroom Experiments and Demonstrations in School Science" **National** Workshop on the XVI State Level Children Science Congress, D. A. V. College, Siwan, Bihar, Nov. 22, 2008 (Keynote Presentation).

41. Himanshu Asnani, Raghu Mahajan, Praveen Pathak and Vijay A. Singh, "Low Dimensional Semiconductors and the BenDaniel Duke Boundary Condition", International Conference on Non Hermitian Hamiltinians in Quantum Physics, BARC, Mumbai, Jan. 13-16, 2009 (Invited Presentation).

42. **Raghu Mahajan**, Praveen Pathak and Vijay A. Singh, "Effective Mass Theory of a Two Dimensional Quantum Dot", **National** Symposium on Advances in Laser Physics-2009, H. S. Gour University, Sagar, MP, February 27-28, 2009 (Invited Presentation).

43. Vijay A. Singh, Praveen Pathak and **Pratyush Pandey** "Monitoring the Teaching Learning Process via an Entropy Based Index", **International** Workshop on Econophysics of Games and Social Choices, Indian Statistical Institute-Kolkata, March 9-13, 2009 (Invited Presentation).

44. Vijay A. Singh, "The Science Olympiads: National and International", Bihar Science Conference 2009, College of Commerce, Patna 800020 (Invited Presentation).

45. Vijay A. Singh, Praveen Pathak and **Raghu Mahajan**, "Electronic Structure of a Two Dimensional Quantum Dot", **International** Conference on Frontiers of Physics, Kathmandu, Nepal, June 2-5, 2009 (Invited Presentation).

46. Abhinav Sinha and Vijay A. Singh, "Excited States Calculation in Quantum Dots", International Conference on Frontiers of Physics, Kathmandu, Nepal, June 2-5, 2009 (Invited Presentation).

47. Vijay A. Singh, "The Scientific Legacy of Homi Jahangir Bhabha" (Bhabha ka Vaigyanik Yogdan), **National** Symposium on the Contributions and Relevance of Bhabha, Bose, and Darwin, Jagdam College, J. P. University, Chapra, Oct. 13, 2009 (Keynote Presentation).

48. "Electronic Structure of a Two-Dimensional Quantum Dot" International Conference on Frontiers of Physics Kathmandu, Nepal, June 2-5, 2009.[Plenary Address].

49. "Reflections on Undergraduate Education", Young Indian Scientist Colloquium, TIFR, September 7-9, 2009.[Invited Talk]

 $<sup>^{11}</sup>$ The highlighted name(s) is of the undergraduate student(s) associated with National Initiative on Undergraduate Science (NIUS)

50. "The Physics Olympiad: Perspectives and Progress", IAPT Silver Jubilee Convention, Kanpur, October 10-12, 2009 [Plenary Speaker].

51. "Pan Indian Survey of Students' Understanding of Rotational Motion", International Conference on Physics Education, Bangkok, October 18-24, 2009. Praveen Pathak, Vijay A. Singh and Chandralekha Singh. [Praveen Pathak Presented the talk]

52. "The Scientific Legacy of Homi Jahangir Bhabha" National Symposium on the Contributions and Relevance of Bhabha, Bose and Darwin, Jagdam College. Jai Prakash University, Chapra, October 30, 2009. [Keynote Address]

53. "Indian Initiative on Undergraduate Research" Indian Conference for Academic Research by Undergraduate Students (ICARUS), Conference on Undergraduates, IIT Kanpur, March 26-28, 2010[Invited Speaker].

54. "Confinement Effect in Quantum Dots: The Role of Dimensionality", Current Trends in Condensed Matter Physics 2010 (CTCMP), NISER-Bhubaneshwer, 15-19, December, 2010.[Invited Talk].

55. "Identifying and Nurturing Scientific Talent in India", Bihar Science Conference, B.R. Ambedkar University, Muzzaffarpur, February 11-13, 2011.

56. The talk "Marie Curie and her Scientific Achievements" [Marie Curie ki Vaigyanik Uplabhdhiyan] was presented by Vijay A. Singh in Hindi at:

(i) World Hindi Divas, TIFR. January 25, 2012.

(ii) The Workshop on Contribution of Madame Curie, Jagdam College, Jai Prakash University, November 4-5, 2011.

57. "Scientific Careers: Promises and Possibilties", Vijay A. Singh, Bihar School Examination Board, Patna, December 2, 2011.

58. "Selection and Nurturing of Talented Students", Vijay A. Singh, Intel Conference, The Taj, New Delhi, February 29, 2012.