Homi Bhabha Centre for Science Education

Olympiad and NIUS Publications

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1 Olympiad publications

Several of the following publications have emerged out of work done under both the Olympiad and NIUS programmes and contain acknowledgements to reflect both contributions.

1.1 Overview articles

1. *The Physics Olympiad*, Vijay A. Singh, Editorial, IAPT Bulletin, Vol. 15, No. 3, March 1998.

2. *The International Physics Olympiad 1999*, Vijay A. Singh and R. M. Dharkar, Physics News, Vol. 30, Nos. 3 and 4, pp. 60–64, 1999.

3. *Science Olympiads*, Vijay A. Singh and Arvind Kumar, in Science in India: Achievements and Aspirations, eds. H. Y. Mohan Ram and P. N. Tandon, INSA Publication, pp. 97–101, 2010.

1.2 Books

1.2.1 Physics

1. *Manual of a Course on Innovative Experimental Problems and Demonstrations in Physics*, Rajesh B. Khaparde, H. C. Pradhan, HBCSE, Mumbai, 2001.

2. *Indian National Physics Olympiad – Theory Problems (1998–2005)*, Vijay A. Singh and Shirish R. Pathare, HBCSE, Mumbai, 2008.

3. *Indian National Physics Olympiad – Theory Problems and Solutions (2006–2009)*, Vijay A. Singh and Praveen Pathak, HBCSE, Mumbai, 2010 (1st ed.), 2013 (2nd ed.).

1.2.2 Chemistry

1. *Indian National Chemistry Olympiad Theory Papers with Solutions (2002–2004)*, Savita Ladage & Swapna Narvekar, HBCSE, Mumbai, 2013.

2. *Indian National Chemistry Olympiad Theory Papers with Solutions (2005–2007)*, Savita Ladage & Swapna Narvekar, HBCSE, Mumbai, 2013.

3. *Experimental Problems in Chemistry*, Savita Ladage Swapna Narvekar & Indrani Sen, HBCSE, Mumbai, 2nd ed., 2013.

1.2.3 Biology

1. *Indian National Biology Olympiad – Theory Papers (2002-2004)*, Rekha Vartak and Anupama Ronad, HBCSE, Mumbai, 2011.

2. *Indian National Biology Olympiad – Theory Papers (2005-2007)*, Rekha Vartak and Anupama Ronad, HBCSE, Mumbai, 2011.

1.2.4 Mathematics

1. *Challenge and Thrill of Pre-College Mathematics*, V. Krishnamurthy, C. R. Pranesachar, K. N. Ranganathan, and B. J. Venkatachala, New Age International, 1996.

2. *Functional Equations*, B. J. Venkatachala, Prism Books Pvt Ltd, 2002.

3. *Inequalities: An Approach Through Problems*, B. J. Venkatachala, Hindustan Book Agency, 2009.

4. *Problem Primer for Olympiads*, C. R. Pranesachar, B. J. Venkatachala and C. S. Yogananda, Prism Books Pvt Ltd, 2011.

1.2.5 Astronomy

1. *Question Papers of Indian National Astronomy Olympiad (1999–2008)*, Aniket Sule, Anand Ghaisas and M. N. Vahia, Manovikas Prakashan, 2012.

2. *A Problem Book in Astronomy and Astrophysics*, ed. Aniket Sule, on behalf of IOAA board, Cygnus Publishing House, 2014.

1.3 Articles in journals

1.3.1 Physics

1. S. R. Pathare, S. S. Sawant, R. D. Lahane, S. H. Huli, *Low cost timer to measure the terminal velocity of the magnet falling through a conducting pipe*, The Physics Teacher, 52, 160, 2014.

2. B. C. Chakrabarti, S. R. Pathare, S. H. Huli, M. N. Nachane, *Experimental determination of unknown masses and their positions in a mechanical black box*, Physics Education (UK), 48, 477, 2013.

3. S. R. Pathare, R. D. Lahane, S. S. Sawant, C. C. Patil, *Compound pendulum* Physics Education (India), 28(3), 5, 2012.

4. S. R. Pathare, R. D. Lahane , S. S. Sawant, J. P. Shetye, *Magnet solenoid interaction*, Physics Education (India), 28(4), 5, 2012.

5. Rahul Makhijani, Praveen Pathak & Vijay A. Singh, *A Pedagogical Study of Cooling of a Granular Gas*, Resonance, 16, 1044, 2011.

6. H. S. Mani, Praveen Pathak & Vijay A. Singh, *Energy and Angular Momentum Storage in Rotating Magnet*, Am. J. Phys., 79(8), 873, 2011.

7. S. R. Pathare, R. D. Lahane, S. S. Sawant, C. C. Patil, *Power loss from hot tungsten filament*, Physics Education (India), 27(2), 111, 2010.

8. V. Singh and P. Pathak, *Gender asymmetry in selection tests at the pre-college level*, Current Science, 98, 1432, 2010.

9. S. R. Pathare, R. D. Lahane, M. K. Upadhyay, *Coefficient of Linear Thermal Expansion*, Physics Education, 26, 135, 2009.

10. Rekha Raorane, Raghu Mahajan, Praveen Pathak, & Vijay A. Singh, *The Landau theory of phase transitions: a mechanical analog*, Resonance, 14, 704–713, 2009.

11. D. A. Desai, S. R. Pathare, A. K. Mishra, C. S. Dighe, *Study of Junction Diode Parameters of IRLED*, Physics Education, 25, 119, 2008.

12. Praveen Pathak, Vinay Uppal & Vijay A. Singh, *Exploring Black Hole Physics via Dimensional Analysis*, Resonance, 13, 475-486, 2008.

13. Praveen Pathak, Vijay A. Singh & Himanshu Asnani, *A Potpourri of Fermi Problems*, Resonance, 58–66, 2007.

14. S. R. Pathare, A. M. Shaker, A. K. Mishra, C. S. Dighe, *Coupled Torsion Pendulum*, Physics Education, 24, 213, 2007.

15. D. A. Desai, S. R. Pathare, *Rolling Motion*, Physics Education, 23(2), 127–134, 2006.

16. D. A. Desai, S. R. Pathare, M. S. Bapat, *Bifilar Pendulum*, Physics Education, 23(3), 195–202, 2006.

17. D. A. Desai, S. R. Pathare, S. C. Chopade, *Physical Pendulum*, Physics Education, 22(4), 267–282, 2006.

18. Vijay A. Singh, Praveen Pathak & K. K. Chaitanya, *The Quantum States of Neutron in the Earth's Gravitational Field: A Challenge from the 36th International Physics Olympiad*, Resonance, 90–100, 2006.

19. Vijay A. Singh, Rajesh B. Khaparde & Shirish R. Pathare, *The Mechanical Black Box — A Challenge from the 35th International Physics Olympiad*, Resonance, 75–82, 2005.

20. Dhruva Bhattacharjee, Rajesh B. Khaparde & H. C. Pradhan, *An Experiment-cum-Demonstration with a Magnetic Circuit*, Physics Education, 16(3), 251–262, 1999.

21. Rajesh B. Khaparde, B. N. Meera & H. C. Pradhan, *An Inexpensive Technique of Interfacing Photogates with Digital Stop-clocks and Its Applications*, Physics Education, 14(2), 131–138, 1997.

22. Rajesh B. Khaparde, B. N. Meera & H. C. Pradhan, *Study of Stationary Longitudinal Oscillations on a Soft Spring*, Physics Education, 14(1), 13–19, 1997.

1.3.2 Chemistry

1. S. Ladage, *Indian Chemistry Olympiad Programme: outcomes of the Decade*, in Chemistry in ICT age, book of proceedings, Springer (ISBN 978-1-4020-9732-4), 311–316, 2009.

2. S. Ladage, & S. Narvekar, *Indian National Chemistry Olympiad Examinations: Implications for teaching and learning of chemistry*, in Chemistry in ICT age, book of proceedings, Springer (ISBN 978-1-4020-9732-4), 317–324, 2009.

1.3.3 Biology

1. R. R. Vartak, *Chromatography: An Educational Tool*, Resonance, 6, 83–91, 2001.

2. Rekha Vartak, *Photosynthesis in plants with nongreen leaves*, Journal of Biological Education, 40, 4, 2006.

3. Rekha Vartak, Anupama Ronad & Vikrant Ghanekar *Enzyme assay: an investigative approach to enhance science process skills*, Journal of Biological Education, 47, 4, 2013.

1.3.4 Mathematics

1. Prithwijit De, *A Golden Maximum*, Mathematical Spectrum (U. K.), pp. 132–133, May, 2014.

2. Prithwijit De, Sneha Titus, Swati Sircar, *A Fair Division*, At Right Angles (India),pp. 31–34,Vol. 3, No.1,March,2014

3. Prithwijit De, *Always a Cube*, Mathematical Spectrum (U. K.), pp. 29–33, September, 2012.

4. Prithwijit De, *A Sweetseller's Trick*, At Right Angles (India), pp. 17–19, Vol 1, No. 1, June, 2012.

5. Prithwijit De, *Height of Difficulty*, Mathematical Spectrum (U. K.), pp. 80–85, January, 2012.

6. Prithwijit De, *Message in a Bottle*, Mathematical Spectrum (U. K.), pp. 50–52, January, 2011.

7. Prithwijit De, *A Pouring Problem*, Mathematical Spectrum (U. K.), pp. 3–5, September, 2010.

8. Prithwijit De, *Caught up in a Box*, Mathematical Spectrum (U. K.), pp. 115–121, May, 2010.

9. Prithwijit De, *A Farmer and a Fence*, Mathematical Spectrum (U. K.), pp. 75–82, January, 2010.

1.3.5 Astronomy

1. C. Juvekar, M. Jain, A. Sule, *A few good orbits*, Physics Competitions, 14.1, 50, 2012.

2. A. Sule, W. S. M. Yong, R. Zapotinschi & G. Stachowski, *First International Olympiad in Astronomy and Astrophysics*, Physics Competitions, 10.1, 8, 2008.

1.3.6 Junior Science

1. Sarthak Chandra & P. K. Joshi, *Misconception on the phenomenon of dissolving*, IAPT Bulletin, 4(11), 286, 2012.

1.4 Short articles in bulletins and gazettes

1.4.1 Mathematics

1. Prithwijit De, in Mathematical Excalibur, Problem 415 (pp. 4, Vol. 17, No. 5, March-April, 2013)

2. Prithwijit De, in The Mathematical Gazette, July 2012: 95.I (pp. 352)

3. Prithwijit De, in American Mathematical Monthly:

   (i) 11630 (pp. 86-87, Jan, 2014) (Solution published)

   (ii) 11622 (pp. 946-947, Dec, 2013)

   (iii) 11596 (pp. 472-473, May, 2013)

   (iv) 11554 (pp. 703-704, Oct, 2012)

   (v) 11552 (pp. 702-703, Oct, 2012) (Solution published)

   (vi) 11550 (pp. 614-615, Aug-Sep, 2012)

   (vii) 11509 (pp. 429-430, May 2012)

   (viii) 11511 (pp. 69-70, January, 2012)

   (ix) 11492 (pp. 850, November, 2011)

   (x) 11486 (pp. 849-850, November, 2011)

   (xi) 11457 (pp. 378,April, 2011)

(xii) 11443 (pp. 278,March, 2011)

(xiii) 11386 (pp. 463-444,May, 2010)

(xiv) 11385 (pp. 285,March, 2010)

4. Prithwijit De, in CRUX Mathematicorum:

   (i) Jun 2014: 3753 (pp. 279-280), 3755 (pp. 281-282)

   (ii) May 2014: 3749 (pp. 242-243)

   (iii) April 2014: 3731 (pp. 189)

   (iv) March 2014: 3727 (pp. 151-152) (solution published), 3728 (pp. 153)

   (v) June 2013: 3660 (pp. 256)

   (vi) May 2013: 3643 (pp. 203), 3647 (pp. 208 - 209) (solution published)

   (vii) April 2013: 3632 (pp. 154-155), 3635 (pp. 158-159)

   (viii) March 2012: 3627 (pp. 116-117)

   (ix) February 2012: 3611 (pp. 71)(solution published), 3613 (pp. 73)

   (x) January 2012: 3609 (pp. 39-40)

   (xi) December 2011: 3598 (pp. 556-557)

   (xii) November 2011: 3576 (pp. 463-464), 3577 (pp. 464-465)

   (xiii) October 2011: 3556 (pp. 395-396)

   (xiv) April 2011: 3528 (pp. 178-179), 3532 (pp. 184-185)

   (xv) Mar 2011: 3514 (pp. 117), 3525 (pp. 127)

   (xvi) Feb 2011: 3505 (pp. 57)

5. Prithwijit De, in The College Mathematics Journal:

   (i) March 2014: 998 (pp. 148-149)

   (ii) January 2014: 995 (pp. 63-64)

   (iii) November 2013: 989 (pp. 442-444)

   (iv) March 2013: 971 (pp. 143), 972 (pp. 144), 973 (pp. 144-146), 974 (pp. 146-147)(solution published), 975 (pp. 147-148)

6. Prithwijit De, in Mathematics Magazine:

   (i) February 2014: 1911 (pp. 63)

   (ii) December 2013: 1906 (pp. 383)

   (iii) April 2013: 1891 (pp. 148-149)

   (iv) June 2012: 1873 (pp. 231-232)

7. Prithwijit De, in Irish Mathematical Society Bulletin:

(i) Winter 2012: 68.2 (pp. 70-71) (solution published)

(ii) Winter 2013: 70.1 (pp. 102-103) (solution published)

8. Prithwijit De, in Mathematical Reflections:

(i) Mathematical Reflections 2 (2014): J295 (pp. 1).

(ii) Mathematical Reflections 3 (2013): J265 (pp. 1).

(iii) Mathematical Reflections 1 (2013): J256 (pp. 4), S253 (pp. 7).

(iv) Mathematical Reflections 6 (2012): J249 (pp. 3), S247 (pp. 7), S248 (pp. 8).

(v) Mathematical Reflections 5 (2012): J243 (pp. 3), S241 (pp. 7), S245 (pp. 11), O241 (pp. 21).

(vi) Mathematical Reflections 4 (2012): J235 (pp. 1), J237 (pp. 3), S235 (pp. 7).

(vii) Mathematical Reflections 2 (2012): J223 (pp. 1), J225 (pp. 3), S224 (pp. 8), S228 (pp. 12).

(viii) Mathematical Reflections 6 (2011): S211 (pp. 7).

(ix) Mathematical Reflections 5 (2011): J199 (pp. 1), J200 (pp. 2), S201 (pp. 9).

(x) Mathematical Reflections 3 (2011): J188 (pp. 2), J191 (pp. 5), J192 (pp. 6-7), S187 (pp. 8), S190 (pp. 11).

(xi) Mathematical Reflections 2 (2011): S181 (pp. 8).

(xii) Mathematical Reflections 1 (2011): J175 (pp. 1).

(xiii) Mathematical Reflections 4 (2010): J163 (pp. 1), J167 (pp. 6), S164 (pp. 11), S168 (pp. 17-18).

9. Pranesachar, C. R., in American Mathematical Monthly:

(i) Equally Many Repetitions of Each Type (2012).

(ii) An Arccos Integral (2012).

(iii) Diagonal Intersections not Collinear (2011).

(iv) A Triangle Inequality (2011).

(v) 11435 (2011).

(vi) 11426 (2011).

(vii) 11419 (2011).

(viii) 11414 (2011).

(ix) 11408 (2011).

(x) 11393 (2010).

(xi) 11392 (2010).

(xii) 11384 (2010).

(xiii) 11383 (2010).

(xiv) 11377 (2010).

(xv) 11374 (2010).

(xvi) 11361 (2010).

(xvii) 11357 (2010).

(xviii) 11356 (2010).

(xix) 11355 (2010).

(xx) *Can you see the Telescope?*, March 2010, Volume 117-3, pg. 284–285.

(xxi) *A reciprocal Diophantine*, March 2010, Volume 117-3, pg. 279–280.

(xxii) *A new lower bound for the sum of the Altitudes*, October 2009, Volume 116-8, pg. 748–749.

(xxiii) *A bisector Inequality*, October 2009, Volume 116-8, pg. 749–50.

(xxiv) *An application of Popoviu's Inequality*, October 2009, Volume 116-8, pg. 752–753.

(xxv) *Soving a Recurrence by Binary Expansion*, August-September 2009, Volume 116-7, pg. 649.

(xxvi) *An Exponential condition for Commutativity*, June-July 2009, Volume 116-6, pg. 551–552.

(xxvii) *From Quadrilateral to Trapezoid*, June-July 2009, Volume 116-6, pg. 553–554.

2 NIUS Publications

Several of the following publications have emerged out of work done under both the Olympiad and NIUS programmes and contain acknowledgements to reflect both contributions.

2.1 Overview articles

1. NIUS proposal by Arvind Kumar, 2004.
2. NIUS Overview by Vijay Singh, 2004–2010.

2.2 Books

2.2.1 Physics

1. Rajesh B. Khaparde, H. C. Pradhan, *Training in Experimental Physics Through Demonstrations and Problems*, Penram International Publishing (India) Pvt Ltd, ISBN: 81-87972-34-3, 1st ed., 2009.

2.2.2 Chemistry

1. Savita Ladage, *Interesting Experiments for Undergraduate Chemistry*, HBCSE Publications, April 2009.
2. Savita Ladage, Swapna Narvekar, Indrani Sen, *Challenging Experiment in Chemistry*, HBCSE Publications, April 2009.

2.3 Technical reports

2.3.1 Physics

1. Rajesh B. Khaparde, *Collection of Experimental Problems in Physics, SCEP-2013 and NIUS 10.1*, HBCSE, Mumbai, 2013.
2. Rajesh B. Khaparde, *Physics Laboratory Course (PL 101) Manual, (Prepared for NISER, Bhubaneswar / UM-DAE-CBS, Mumbai)*, HBCSE, Mumbai, 2007.

2.4 Articles in journals

2.4.1 Physics

1. A. Mazumdar et al., *Measurement of acoustic glitches in solar-type stars from oscillation frequencies observed by Kepler*, The Astrophysical Journal, 782, 18, 2014.

2. T. S. Metcalfe & 41 co-authors, including A. Mazumdar, *Properties of 42 solartype Kepler targets from the Asteroseismic Modeling Portal*, accepted in The Astrophysical Journal Supplement Series, arXiv:1402.3614, 2014.

3. S. M. Roy, A. Deshpande & N. Sakharwade, *Remote tomography and entanglement swapping via von Neumann-Arthurs-Kelly interaction*, Phys. Rev. A, 89, 052107-1 – 052107-5, 2014.

4. S. Sen, & A. K. Ray, *Implications of nonlinearity for spherically symmetric accretion*, Phys. Rev. D, 89, 063004, 2014.

5. A. Sengupta, S. Bose, & A. K. Ray, *Nonlinear variations in axissymmetric accretion*, Phys. Rev. D, 89, 103011, 2014.

6. V. Silva Aguirre et al. including A. Datta & A. Mazumdar, *Old Puzzle, New Insights: A Lithium-rich Giant Quietly Burning Helium in Its Core*, The Astrophysical Journal Letters, 784, L16, 2014.

7. K. Verma, H. M. Antia, S. Basu, A. Mazumdar, *A theoretical study of acoustic glitches in low-mass main-sequence stars*, accepted in The Astrophysical Journal, arXiv:1408.428, 2014.

8. K. Verma, J. P. Faria, H. M. Antia, S. Basu, A. Mazumdar, M. J. P. F. G. Monteiro, T. Appourchaux, W. J. Chaplin, R. A. Garcia, T. S. Metcalfe, *Asteroseismic estimate of helium abundance of a solar analog binary system*, The Astrophysical Journal, 790, 138, 2014.

9. Subhananda Chakrabarti, Rahul M. Makhijani, Vijay A. Singh, *Photoluminescence Spectra of InAs Quantum Dots Embedded in GaAs Heterostructure*, Journal of Lumin, 4.1–4.6, 2013.

10. S. Hekker, Y. Elsworth, S. Basu, A. Mazumdar, V. Silva Aguirre & W. J. Chaplin, *Tests of the asymptotic large frequency separation of acoustic oscillations in solartype and red-giant stars*, Monthly Notices of the Royal Astronomical Society, 434, 1668, 2013.

11. K. K. Mashood and Vijay A. Singh, *Large Scale Studies on the Transferability of Problem Solving Skills and the Pedagogic Potentials of Physics*, Physics Education (British), 48, 629–635, 2013.

12. D. P. Roy, *Determination of the Third Neutrino-mixing angle theta-13 and its implications*, Journal of Physics G, Vol 40, 053001, 2013.

13. O. L. Creevey & 32 co-authors including J. Bhattacharya, A. Mazumdar, T. Shrotriya and A. Subramaniam, *Fundamental Properties of Five Kepler Stars Using Global Asteroseismic Quantities and Ground-Based Observations*, Astronomy & Astrophysics, 537, A111, 2012.

14. Priyanka DeSouza & Vijay Singh, *Simple models for the 100 meter dash*, Resonance, 17, 592–603, 2012.

15. G. Handler and 17 co-authors, including A. Mazumdar, *A multisite photometric study of two unusual beta Cep stars: the magnetic V2052 Oph and the massive rapid rotator V986 Oph*, Monthly Notices of the Royal Astronomical Society, 424, 2380, 2012.

16. Ninad R. Jetty, Akash Suman, and Rajesh B. Khaparde, *Novel cases of diffraction of light from a grating: Theory and experiment*, Am. J. Phys., 80, 972, 2012.

17. K. K. Mashood & Vijay Singh, *Variation in Angular Velocity and Angular Acceleration of Particle in Rectilinear Motion*, Eur. J. Phys., 33, 473–478, 2012.

18. K. K. Mashood & Vijay Singh, *An inventory on rotational kinematics of a particle: unravelling misconceptions and pitfalls in reasoning*, Eur. J. Phys., 33, 1301–1312, 2012.

19. K. K. Mashood & Vijay Singh, *Rotational kinematics of a particle in rectilinear motion: Perceptions and pitfalls*, Am. J. Phys., 80 (8), 720–723, 2012.

20. A. Mazumdar, E. Michel, H. M. Antia, S. Deheuvels, *Seismic detection of acoustic sharp features in the CoRoT target HD 49933*, Astronomy & Astrophysics, 540, A31, 2012.

21. A. Mazumdar et al., *Acoustic glitches in solar-type stars from Kepler*, Astronomische Nachrichten, 333, 1040, 2012.

22. Subhendra Mohanty, Soumya Rao & D. P. Roy, *Relic density and pamela events in a heavy wino dark matter model with sommerfeld effect*, International Journal of Modern Physics A, Vol. 27, No. 6, 1250025-1-1250025-20, 2012.

23. Subhendra Mohanty, Soumya Rao & D. P. Roy, *Predictions of a Natural SUSY Dark Matter Model for Direct and Indirect Detection Experiments*, Journal of High Energy Physics, 1211, 175, 2012.

24. Debashis Saha & Prasanta K. Panigrahi, *N-qubit quantum teleportation information splitting and superdence coding through the composite GHZ-Bell channel*, Quantum Information Processing, 11, 615–628, 2012.

25. Vijay A. Singh, *Number Crunching: Taming Unruly Problems, (Review of Paul Nashin's Book)*, Curr. Sci. 102, 505, 2012.

26. W. J. C. Chaplin & 58 co-authors including A. Mazumdar, *Ensemble Asteroseismology of Solar-Type Stars with the NASA Kepler Mission*, Science, 332, 213, 2011.

27. Shilpi Singh, Praveen Pathak & Vijay A. Singh, *Approximate Approaches to the One-dimensional Finite Potential Well*, Eur. J. Phys., 32, 1–10, 2011.

28. Vijay A. Singh, *Sifting the Grain from the Chaff: The Concept Inventory as a Probe of Physics Understanding*, Physics News, 41, 20–31, 2011.

29. S. Ghosh & S. M. Roy, *Chain of Hardy-type local reality constraints for n qubits*, Journal of Mathematical Physics, 51, 122204, 2010.

30. Rajesh B. Khaparde & H. C. Pradhan, *An Experiment on Equipotential Curves*, Physics Education, 27(1), 27–38, 2010.

31. Rajesh B. Khaparde & H. C. Pradhan, *Fourier Analysis Using an Op-Amp Filter*, Physics Education, 27(3), 191–206, 2010.

32. A. Mazumdar and E. Michel, *Model independent determination of sharp features inside a star from it oscillation frequency*, Astronomisches Nachrichten, 331, P25, 2010.

33. A. Mazumdar, L. Singhal & S. Prabhu, *Can asteroseismology solve the solar abundance problem?*, Astromisches Nachrichten, 331, 961, 2010.

34. Praveen Pathak, Vijay A. Singh & Chandralakha Singh, *Understanding a Rotational Motion: A Survey of Indian Students*, Perdelm, 15–22, 2010.

35. Saket Patkar & Sudhir Jain, *A non-Hermitian circular billiard*, Physics Letters A, 374, 3396–3399, 2010.

36. Harish Ravi & Rajesh Khaparde, *Understanding DC motors through experiments*, Resonance, 15, 561–572, 2010.

37. P. Shruthi, *Physics of Neutrino mass, Mixing and Oscillation*, Prayas, 4, 2010.

38. H. Asnani, R. Mahajan, Praveen Pathak & Vijay Singh, *Effective mass theory of a two-dimensional quantum dot in the presence of Magnetic Field*, Pramana, 73, 573–580, 2009.

39. Sayan Choudhury, Sreraman Muralidharan & Prasanta K. Panigrahi, *Quantum teleportation and state sharing using a genuinely entangled six-qubit state*, J. Phys. A: Math. Theor., 42, 11, 115303, 2009.

40. Sakshi Jain, Sreraman Muralidharan and Prasanta K. Panigrahi, *Secure quantum conversation through non-destructive discrimination of highly entangled multipartite states*, Europhys. Lett., 87, 60008, 2009.

41. Rajesh B. Khaparde & H. C. Pradhan, *An Experiment on the Formation of Rainbows*, Physics Education, 26(1), 65–76, 2009.

42. A. Mazumdar et al., *Asteroseismology and interferometry of the red giant star epsilon Ophiuchi*, Astronomy & Astrophysics, 503, 521, 2009.

43. Vijay Singh, Praveen Pathak, Pratyush Pandey, *An entropic measure for the teaching learning process*, Physica A: Statistical Mechanics and its Applications, 388, 4453–4458, 2009.

44. P. Demarque, D. Guenther, L. H. Li, A. Mazumdar, C. W. Straka, *YREC: The Yale Rotating Stellar Evolution Code*, Astrophysics & Space Science, 316, 31, 2008.

45. Akashdeep Kamra, Praveen Pathak & Vijay A. Singh, *A Mean Field Approach to Coulomb Blockade for a Disordered Assembly of Quantum Dots*, Pramana, 70, 279–284, 2008.

46. Akashdeep Kamra, Praveen Pathak & Vijay A. Singh, *Mean Field Theory of Coulomb Blockade Distribution for a Disordered Ensemble of Quantum Dots*, Phys. Rev. B, 77, 115302, 2008.

47. Rajesh B. Khaparde & H. C. Pradhan, *Electromagnetic Damping of a Rotating Disc*, Physics Education, 25(3), 193–204, 2008.

48. Sreraman Muralidharan & Prasanta K. Panigrahi, *Quantum-information splitting using multipartite cluster states*, Phys. Rev. A, 78, 062333, 2008.

49. Sreraman Muralidharan & Prasanta K. Panigrahi, *Perfect teleportation, quantumstate sharing, and superdense coding through a genuinely entangled five-qubit state*, Phys. Rev. A, 77, 032321, 2008.

50. Vijay A. Singh, Manoj K. Harbola & Praveen Pathak, *Defects in Semiconductor Nanostructures*, Pramana, 70, 255–261, 2008.

51. Rajesh B. Khaparde & Smitha Puthiyadan, *Efficiency of a Light Emitting Diode*, Physics Education, 23, 291, 2007.

52. Rajesh Khaparde, Smitha Puthiyadan & H. C. Pradhan, *Reflection of Polarized Light*, Physics Education, 24, 289, 2007.

53. S. R. Pathare, S. C. Chopade, P. Jindal, *Magnetic Black Box*, Prayas, 2, 195–202, 2007.

54. Luv Kumar & Vijay A. Singh, *Revisiting Elementary Quantum Mechanics with the Ben-Daniel-Duke Boundary Condition*, Am. J. Phys., 74, 412–418, 2006.

55. R. K. Pandey, Manoj K. Harbola & Vijay A. Singh, *Spin-Blockade Effects in Spherical Quantum Dots*, Phys. Rev. B, 73, 165307, 2006.

56. Angik Sarkar, T. K. Bhattacharya & Ajay Patwardhan, *On Quantum Logic Processor: Implementation with Electronic Mach-Zehnder Interferometer*, Applied Physics Letters, 88, 213113, 2006.

57. Vijay A. Singh, *Einstein thatha Prakash Vidyut Prabhav (Einstein and the Photoelectric Effect)*, Vigyan Prakash (Hindi), 4, 35–40, 2006.

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2.6 Presentations in conferences

2.6.1 Physics

1. Anwesh Mazumdar, Abhisek Datta, Umang Gupta, Amit Seta, Jayant Thatte, Tamaghna Hazra, Saskia Hekker, *Asteroseismology of Red Giants*, at the 32nd Meeting of the Astronomical Society of India, IISER Mohali, March 2014.

2. Anwesh Mazumdar, *Red Giant diagnostics from an observational perspective*, Invited talk at Workshop on Asteroseismology of Red Giant Stars, Amsterdam, The Netherlands, June, 2013.

3. Anwesh Mazumdar, *Internal seismic diagnostics in stars*, Invited talk at Special Session 13: High-precision tests of stellar physics from high-precision photometry, XXVIII General Assembly of the International Astronomical Union, Beijing, China, August, 2012.

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2.6.2 Chemistry

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2.6.3 Biology

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3 Summary

Table 1: Summary of Olympiad publications

Overview articles	Books	Articles in journals	Short articles in bulletins
3	14	39	82

Table 2: Summary of NIUS publications

Overview articles	Books and technical reports	Articles in journals	Articles in conference proceedings	Presentations in conferences
2	5	81	31	23