



A. R. USHA DEVI

EDUCATION

B. Sc.	Mysore University (Thunga College, Thirthahalli), 1985.
M.Sc	Mysore University, Mysore, 1990
Ph.D.	Mysore University, 1998

(All degrees in Physics)

AREAS OF INTEREST

Phase space description of quantum spin systems, Classical and quantum correlations, Quantum measurements and Quantum information theory.

EMPLOYMENT SUMMARY

Research Fellowships:

1991-93 UGC (India) Junior Research Fellow.
1993-95 UGC (India) Senior Research Fellow.
1995-96 CSIR (India) Senior Research Fellow.
at the Department of Studies in Physics, University of Mysore, Manasagangotri, Mysore.

Yuvaraja Science College, Mysore University, Mysore, India.

1996-1998 Lecturer.

Department of Physics, Bangalore University, Bangalore, India.

1998-2000 Lecturer.
2000-2005 Senior Lecturer.
2005-2008 Reader.
2008-2011 Associate Professor
2011- present Professor

Visiting Research Fellowships:

Associate of Institute of Mathematical Sciences (IMSc), Chennai, India, during the period 2001 to 2003.

Participated in the research programme of Professor Barry Sanders, Division of Information and Communication Sciences, Macquarie University, Sydney, Australia, as a Visiting Fellow in Physics, 2002.

Associate of Chennai Mathematical Institute (CMI), Chennai India, 2007-08

Commonwealth Fellow, H. H. Will's Physics Lab, Bristol University, Bristol, U.K.,
October 1, 2008 to March 31, 2009.

HONOURS/AWARDS/DISTINCTIONS

- M. Sc. Gold Medalist.
- Indian Physical Society (IPS) Young Physicist Award, 1997.
- Awarded Commonwealth Academic Staff Fellowship for the six month period 1 October 2008 to 31 March 2009 at the University of Bristol, Bristol, United Kingdom.

COURSES TAUGHT

Yuvaraja College Mysore University Mysore	Classical Mechanics, Quantum Mechanics and Nuclear Physics	B.Sc. Course, 1996-98.
Bangalore University Bangalore	Mathematical Physics: Green's functions and Integral Equations Nuclear Physics: Shell Model and Collective Models of Nuclei	M.Sc. Course, 1998-1999. M. Sc. Course, 1998-2003, 2010-15, 2018.
	Classical Mechanics: Analytical Mechanics Rigid Bodies and Small Oscillations	M. Sc. Course, 2000, 2006-07.
	Quantum Mechanics: Relativistic Dirac Theory	M. Sc. Course, 2000-08, 2010-14.
	Mathematical Physics: Complex variables Mathematical Physics: Group Theory	M. Sc. Course, 2000-01. M. Sc. Course, 2001-02, 2014-15.
	Quantum Theory of Angular Momentum Mathematical Physics: Vectors and Tensor Analysis	M. Sc. Course, 2002-05. M. Sc. Course, 2003-06.
	Quantum Mechanics: Perturbation theory Scattering Theory	M. Sc. Course, 2005-08, 2009-11.
	Particle Physics: Weak Interactions	M. Sc. Course, 2004-08, 2010-17.
	Gamma Decay	M. Sc. Course, 2001-04, 2012-15
	Ion Optics	M. Sc. Course, 2000-04, 2007, 2009-2014.
	Quantum Electrodynamics (Elective Course) Non-linear Dynamics (Elective Course)	M.Sc. Course, 2003-05. M. Sc. Course, 2009-10, 2015-17
	Application of Theoretical concepts (Elective Course)	M. Sc. Course, 2015-2017.

PROFESSIONAL SERVICE

- Member of the National Organizing Committee of the International School on Quantum Information (ISCQI) 2011, IOP, Bhubaneswar.
- Member of the Organizing Committee of 13th Asian Conference on Quantum Information Science (AQIS), 2013.
- Member of the Editorial Board of Resonance, journal of science education published monthly by Indian Academy of Sciences, Bangalore.
- Mentor, DST INSPIRE initiatives.

- Assisted Professor K. N. Srinivasa Rao, Retired Professor of Theoretical Physics, Mysore University, Mysore, in writing a book **Classical Mechanics** during the period 1999-2001. The book has been published by the Universities Press during 2003. Subsequently, along with Professors M. V. Nagaraja Murthy (Institute of Mathematical Sciences, Chennai), V. Ravishankar (IIT, Kanpur), assisted Professor K. N. Srinivasa Rao in bringing out the book **Linear Algebra and Group Theory for Physicists** during the period 2004-2005; the book is now published by Hindustan Book Agency, New Delhi (2006).
- Referee for the journals
 - Physical Review Letters
 - Physical Review A
 - Journal of Physics
 - New Journal of Physics
 - Physica A
 - Optics Letters
 - J. Opt. Soc. Am. A,B
 - Physics Letters A
 - Quantum Information Processing,
 - Pramana - J. Physics
 - European Journal of Physics D,
 - Int. J. Quant. Information
 - Resonance-Journal of Science Education, Indian Academy of Sciences.

COLLABORATORS

1. G. Ramachandran, University of Mysore, Mysore 570005, India.
2. A. K. Rajagopal, Inspire Institute Inc., Alexandria, Virginia 22303.
3. K. R. Parthasarathy, Indian Statistical Institute, New Delhi 110 016, India.
4. R. Rendell, Inspire Institute Inc., Alexandria, Virginia 22303.
5. T. S. Mahesh, IISER, Pune 411008, India.
6. A. K. Pati, Harischandra Research Institute (HRI), Alahabad 211019, India.
7. K. S. Mallesh, University of Mysore, Mysore 570005, India.
8. Sumiyoshi Abe, Mie University, Mie, 5148507, Japan.
9. Mark Wilde, Louisiana State University, Baton Rouge, Louisiana 70803, USA.
10. A. Thilagam, University of South Australia, Adelaide 5095, South Australia.
11. B. C. Sanders, University of Calgary, Alberta, Canada T2N 1N4.
12. Sudha, Kuvempu University, Shankaraghatta 577451, India.
13. Swarnamala Sirsi, Mysore Unviersity, Mysore 570006, India.
14. K. N. Srinivasa Rao, Mysore University, Mysore 570005, India.
15. A. V. Gopal Rao, Mysore University, Mysore 570005, India.
16. Andal Narayanan, Raman Research Institute, Bengaluru, India.

Ph.D supervision

- FOUR students have been awarded Ph.D degree under the supervision of Usha Devi so far and currently, FIVE students are working for their Ph.D.

LIST OF PUBLICATIONS

Journals:

1. Asymptotic spectral stability of the Gisin-Percival state diffusion, K. R. Parthasarathy and A. R. Usha Devi, arXiv:1707.08157[quant-ph]; submitted for publication.
2. One Parameter family of N-qudit Werner-Popescu states: Bipartite separability using conditional quantum relative Tsallis entropy, Anantha S. Nayak, Sudha, A. R. Usha Devi, A. K. Rajagopal, Accepted for publication in Int. J. Quant. Info.; arXiv:1712.00746 [quant-ph]
3. From quantum stochastic differential equations to Gisin-Percival state diffusion, K. R. Parthasarathy and A. R. Usha Devi, Journal of Mathematical Physics **58**, 082204 (2017); arXiv:1705.00520 .
4. N term pairwise correlation inequalities, steering and joint measurability, H. S. Karthik, A. R. Usha Devi, J. Prabhu Tej, A. K. Rajagopal, Sudha, A. Narayanan, Phys. Rev. A **95**, 052105 (2017); arXiv:1610.04540.
5. One parameter families of noisy N-qubit states: Biseparability using conditional quantum relative Tsallis entropy, Anantha S Nayak, Sudha, A.R. Usha Devi, A.K. Rajagopal, Quantum Information Processing, <https://doi.org/10.1007/s11128-016-1491-9>, arXiv:1610.04540 [quant-ph]
6. Unsharp measurements and joint measurability, H. S. Karthik, A. R. Usha Devi, A. K. Rajagopal, Current Science, (SPECIAL SECTION: QUANTUM MEASUREMENTS), **109**, NO. 11, 10 December 2015; arXiv: arXiv:1505.04246
7. Joint measurability and temporal steering, H. S. Karthik, J. Prabhu Tej, A. R. Usha Devi and A. K. Rajagopal, J. Opt. Soc. Am. B, **32**, A34-A38 (2015); arXiv:1412.0871
8. Joint measurability, steering and entropic uncertainty, H. S. Karthik, A. R. Usha Devi and A. K. Rajagopal, Phys. Rev. A **91**, 012115 (2015); arXiv:1410.1148
9. What does monogamy in higher powers of a correlation measure mean?, P. J. Geetha, Sudha, A. R. Usha Devi, Journal of Modern Physics, **5**, 1294 (2014); arXiv:1409.1521
10. Quantum which-way information and fringe visibility when the detector is entangled with an ancilla, J. Prabhu Tej, A. R. Usha Devi, H. S. Karthik, Sudha, A. K. Rajagopal, Phys. Rev. A, **89**, 062116 (2014); arXiv:1404.6065
11. From the sandwiched quantum relative Tsallis entropy to its conditional form: Separability criterion beyond local and global spectra, A.K. Rajagopal, Sudha, Anantha S Nayak, A.R. Usha Devi, Phys. Rev. A, **89**, 012331 (2014); arXiv:1309.6944
12. Equivalence of classicality and separability based on P phase-space representation of symmetric multiqubit states, A R Usha Devi, A K Rajagopal, Sudha, H S Karthik, J Prabhu Tej, Quantum Inf Process, **12**, 3717 (2013); arXiv:1306.2825

13. Inversion of moments to retrieve joint probabilities in quantum sequential measurements, H. S. Karthik, Hemant Katiyar, Abhishek Shukla, T. S. Mahesh, A. R. Usha Devi, A. K. Rajagopal, *Phys. Rev. A*, **87**, 052118 (2013); arXiv:1304.0058
14. Non-Markovianity and Clauser-Horne-Shimony-Holt (CHSH)-Bell inequality violation in quantum dissipative systems, A. Thilagam, A. R. Usha Devi, *J. Chem. Phys.*, **137**, 215103 (2012); arXiv:1210.5291
15. Quantum reading of digital memory with non-Gaussian entangled light, J. Prabhu Tej, A. R. Usha Devi, A. K. Rajagopal, *Phys. Rev. A* **87**, 052308 (2013); arXiv:1210.0791
16. Macrorealism from entropic Leggett-Garg inequalities, A. R. Usha Devi, H. S. Karthik, Sudha and A. K. Rajagopal, *Phys. Rev. A* **87**, 052103 (2013); arXiv:1208.4491
17. Quantum discord and classical correlation can tighten the uncertainty principle in the presence of quantum memory, Arun Kumar Pati, Mark M. Wilde, A. R. Usha Devi, A. K. Rajagopal, Sudha, *Physical Review A* **86**, 042105 (2012) ; arXiv:1204.3803
18. Interplay of quantum stochastic and dynamical maps to discern Markovian and non-Markovian transitions, A. R. Usha Devi, A. K. Rajagopal, Sudha, R. W. Rendell, *J. Quant. Inf. Sci. Vol 2*, 47-54 (2012); arXiv:1201.0477
19. Monogamy of quantum correlations in three qubit pure states using Rajagopal-Rendell (RR) quantum deficit, Sudha, A. R. Usha Devi, A. K. Rajagopal, *Phys. Rev. A* **85**, 012103 (2012); . arXiv:1110.3026
20. Uncertainty relations in the realm of classical dynamics, A. R. Usha Devi, H. S. Karthik, *Am. J. Phys.* **80**, 708 (2012) ; arXiv:1108.2682
21. Quantumness of correlations and entanglement, A. R. Usha Devi, A. K. Rajagopal, Sudha, *Int. J. Quant. Inf.* **9** 1757 (2011); arXiv:1105.4115
22. Majorana representation of symmetric multiqubit states, A.R. Usha Devi, Sudha, A.K.Rajagopal, *Quant. Inf. Proc.* DOI 10.1007/s11128-011-0280-8, 2011; arXiv:1103.3640.
23. Spin Squeezing and Quantum Correlations, A. R. Usha Devi and Sudha, *Asian J. Phys* **20**,131 (2011); arXiv:1101.0308
24. Open system quantum dynamics with correlated initial states, not completely positive maps and non-Markovianity, A. R. Usha Devi, A. K. Rajagopal and Sudha, *Phys. Rev. A* **83**, 022109 (2011); arXiv:1011.0621.
25. Loss of exchange symmetry in multiqubit states under Ising chain evolution, Sudha, B. G. Divyamani and A. R. Usha Devi, *Chinese Physics Letters*, **28**, 020305 (2011); arXiv:0907.3644
26. Kraus representation of quantum evolution and fidelity as manifestations of Markovian and non-Markovian forms, A. K. Rajagopal, A. R. Usha Devi and R. Rendell, *Phys. Rev. A* **82**, 042107 (2010); arXiv:1007.4498
27. The thermostistical aspect of Werner-type states and quantum entanglement, S. Abe, A. R. Usha Devi, A. K. Rajagopal, *J. Phys. A: Math. Theor.* **43** (2010) 045303.
28. Entropic characterization of separability in Gaussian states, Sudha, A. R. Usha Devi and A. K. Rajagopal, *Phys. Rev. A* **81**, 024303 (2010); arXiv:0909.1087
29. Quantum target detection using entangled photons, A. R. Usha Devi and A. K. Rajagopal, *Phys. Rev. A*, **79**, (2009) 062320; arXiv:0901.1453

30. Dynamical evolution of quantum oscillators towards equilibrium, A. R. Usha Devi and A. K. Rajagopal, Phys. Rev. E **80**, 011136 (2009); arXiv:0901.1453
31. Separability bounds on multiqubit moments due to positivity under partial transpose, A. R. Usha Devi and A. K. Rajagopal, Phys. Rev. A, **78**, (2008) 062334; arXiv:0807.1672
32. A scheme for amplification and discrimination of photons, A. R. Usha Devi, R. Prabhu and A. K. Rajagopal, J. Phys. B: At. Mol. Opt. Phys. **41**, 235501 (2008); arXiv:0802.2315
33. Positive-operator-valued-measure view of ensemble approach to polarization optics, Sudha, A. R. Usha Devi and A. K. Rajagopal, J. Opt. Soc. Am. A **25**, 874 (2008); arXiv:0704.0147
34. Generalized information theoretic measure to discern the quantumness of correlations, A. R. Usha Devi and A. K. Rajagopal, Phys. Rev. Lett. **100**, 140502 (2007); arXiv:0707.2195
35. Separability of a family of one parameter W and GHZ multiqubit states using Abe-Rajagopal q conditional entropy approach, R. Prabhu, A. R. Usha Devi and G. Padmanabha, Phys. Rev. A **76**, 042337 (2007); arXiv: 0706.3038
36. Collective multipole-like signatures of entanglement in symmetric N-qubit systems, A. R. Usha Devi, R. Prabhu and A. K. Rajagopal, Phys. Rev. A **76**, 012322 (2007); quant-ph/0612210
37. Characterizing multiparticle entanglement in symmetric N-qubit states via negativity of covariance matrices, A. R. Usha Devi, R. Prabhu and A. K. Rajagopal, Phys. Rev. Lett. **98**, 060501 (2007); quant-ph/0609055.
38. Constraints on the uncertainties of entangled symmetric qubits, A. R. Usha Devi, M. S. Uma, R. Prabhu and A. K. Rajagopal, Physics Letters A **364**, 203 (2007); quant-ph/0601035.
39. Non-classicality of photon added coherent and thermal radiation fields, A. R. Usha Devi, R. Prabhu and M. S. Uma, Eur. Phys. J. D **40**, 133 (2006).
40. Local invariants and pairwise entanglement in symmetric multi-qubit system, A. R. Usha Devi, M. S. Uma, R. Prabhu and Sudha, Int. J. Mod. Phys. B. **20**, 1917 (2006); quant-ph/0509056.
41. Non-local properties of a symmetric two-qubit system, A. R. Usha Devi, M. S. Uma, R. Prabhu and Sudha, J. Opt. B: Quantum Semiclass. Opt. **7**, 5740 (2005).
42. Bivalued 'click'-'no-click' probabilities for EPRB spin correlations, A. R. Usha Devi and Swarnamala Sirsi, J. Phys. A: Math. Gen. **38**, 2525 (2005).
43. Spin squeezing criterion with local unitary invariance, A. R. Usha Devi, Xiaoguang Wang and B. C. Sanders, Quantum Information Processing **2**, 207 (2003); quant-ph/0304051.
44. Squeezing of a coupled state of two spinors, A. R. Usha Devi, K. S. Mallesh, Mahamoud A. A. Sbaiah, K. B. Nalini and G. Ramachandran, J. Phys. A: Math. Gen. **36**, 5333 (2003).
45. Geometry of Larmor Nutation, K. N. Srinivasa Rao, A. V. Gopala Rao and A. R. Usha Devi, Pramana- J. Phys. **59**, 621 (2002).
46. Spin Distributions for Bipartite Quantum Systems, A. R. Usha Devi Int. J. Mod. Phys. A **17**, 2267 (2002)
47. Normalized Braunstein-Caves Inequalities, A.R.Usha Devi, J. Phys. A: Math. Gen. **33**, 227 (2000).

48. Non-locality in Einstein-Podolsky-Rosen-Bohm spin correlations, Swarnamala Sirsi and G.Ramachandran Physics Teacher, **39** 68 (1997).
49. Non-locality in Einstein-Podolsky-Rosen spin correlations, A. R. Usha Devi, Swarnamala Sirsi and G.Ramachandran Int. J. Mod. Phys. A, **12**, 5279 (1997).
50. Trivariate quasi-probability distributions for polarized spin-1 nuclei, A. R. Usha Devi, Swarnamala Sirsi, G. Ramachandran and P. Devi Int. J. Mod. Phys. A, **12**, 2779 (1997).
51. Quasi-probability distributions for arbitrary spin- j particles, G.Ramachandran, A. R. Usha Devi, P.Devi and Swarnamala Sirsi Found. Phys. **26**, 401 (1996).
52. Polarized light, G.Ramachandran, A. R. Usha Devi and N. S. S. K. Vardhana, Pramana-J. Phys. **45**, 319 (1995).
53. A complement to Goldstein-Moravcsik theorem, A. R. Usha Devi, A.Sudha Rao and G.Ramachandran, Mod. Phys. Lett. A **20**, 1449 (1995).
54. Joint probabilities for an aligned spin-1 system, A. R. Usha Devi, Swarnamala Sirsi, G.Devi and G.Ramachandran, J. Phys. G: Nucl. Part. Phys. **20**, 1859 (1994).
55. Photon polarization asymmetries in $(p,p'\gamma)$ reactions, A. R. Usha Devi, A. Sudha Rao and G. Ramachandran, Pramana-J. Phys. **42**, 97 (1994).
56. Determination of inelastic scattering amplitudes from $(p,p'\gamma)$ reactions, G. Ramachandran, A. R. Usha Devi and A.Sudha Rao Phys. Rev. C **49**, R623 (1994).
57. Multiaxial decomposition of a Cartesian tensor, A. R. Usha Devi, Swarnamala Sirsi, and G.Ramachandran, Journal of Mysore University(Platinum Jubilee Special Issue):Sec.B, **32**, 541 (1992).

Conferences/Symposia/Workshop

1. Pairwise correlation inequalities and joint measurability, **A. R. Usha Devi**, Invited talk presented at the International Conference on Quantum & Non-linear Optics (QNO2018), 2-5 February, 2018, Kuala Lumpur, Malaysia.
<https://sites.google.com/view/qno18/home>
2. Pairwise correlation inequalities and joint measurability, **A. R. Usha Devi**, Invited talk presented at the International Symposium on New Frontiers in Quantum Correlations (ISNFQC18); A tribute to Professor Satyendra Nath Bose on his 125th birth anniversary, held during January 29th to February 2nd, 2018 at S. N. Bose National Centre for Basic Sciences, Kolkata, India. <http://newweb.bose.res.in/Conferences/ISNFQC18/>
3. Asymptotic limit of diffusive quantum trajectories, **A. R. Usha Devi**, Invited talk presented at the 3rd International Conference on Quantum Foundations (ICQF) 2017, held at Panache Hotel, Patna, India, during 4-9 December, 2017.
4. Quantum leaps in precision measurements, **A. R. Usha Devi**, Invited talk presented at the International Conference on Mathematics and Applications (ICMA) 2017, Department of Mathematics, Ramjas College, University of Delhi, Delhi, April, 26-28, 2017.
5. Participated in the **2nd Quantum Information School** held at Institute of Mathematical Sciences, Chennai, during the period Dec 5 - 17, 2016.

6. Thermodynamic state-to-state transformation and work extraction, **A. R. Usha Devi**, A. K. Rajagopal and H. S. Karthik, Invited talk presented at the International Conference on Quantum Foundations (ICQF) 2016, held at Panache Hotel, Patna, India, during 17-21 October, 2016
7. Trade-off relation between generalized which-way information and fringe visibility, J. Prabhu Tej, **A. R. Usha Devi**, H. S. Karthik, Sudha and A. K. Rajagopal, Invited talk presented at the International School and Conference on Quantum Information, held during 9-18 February, 2016 at Institute of Physics, Bhubaneswar, India.
8. Compatible measurements and steering, H. S. Karthik, **A. R. Usha Devi**, J. Prabhu Tej, A. K. Rajagopal and Sudha, Invited talk presented at the International Conference on Light Quanta: Modern Perspectives and Applications, held during 14-16, December 2015, Allahabad University, Allahabad, India.
9. Non-local and temporal steering with joint measurability, H. S. Karthik, **A. R. Usha Devi** J. Prabhu Tej, Sudha, Andal Narayanan and A. K. Rajagopal, Invited talk presented at the International Conference on Quantum Information Processing and Applications, held during 7-13, December 2015, HRI, Allahabad, India.
10. Moment matrix positivity, joint measurability and temporal correlation inequalities, H. S. Karthik, J. Prabhu Tej, **A. R. Usha Devi**, Sudha, A. Narayanan, and A. K. Rajagopal, Invited talk presented at the International Conference on Quantum Foundations (ICQF) 2015, held at National Institute of Technology, Patna, India during 30th November - 4th December, 2015.
11. Quantum leaps in precision, A. R. Usha Devi, Invited talk presented at the one day workshop on **Quantum Computation and Quantum Communication (QCQC2015)**, held on 8 January, 2015 at Indian Institute of Science, Bangalore
12. Beating entropic uncertainty bound using unsharp measurements, A. R. Usha Devi, Invited talk presented at the **Discussion Meeting on Quantum Measurements (DMQM2014)**, held during 22-24 October, 2014, Indian Institute of Science, Bangalore, Bangalore
13. Local realism, macrorealism and non-contextuality: Unified approach, A. R. Usha Devi, Invited talk presented at the **International Program on Quantum Information (IPQI2014)**, held during 17-28 February, 2014, Institute of Physics, Bhubaneswar
14. Non-classicality and entanglement of symmetric multiqubit states, A. R. Usha Devi, A. K. Rajagopal, Sudha, H. S. Karthik and J. Prabhu Tej, **13th Asian Quantum Information Science Conference (AQIS13)**, held during 25-30 August, 2013, Institute of Mathematical Sciences, Chennai
15. Quantifying non-classical correlations via moment matrix positivity, H. S. Karthik, A. R. Usha Devi, A. K. Rajagopal, Sudha, J. Prabhu Tej and Andal Narayanan, **13th Asian Quantum Information Science Conference (AQIS13)**, held during 25-30 August, 2013, Institute of Mathematical Sciences, Chennai
16. Classical correlations and separability perceived via generalized measurements, A. R. Usha Devi, A. K. Rajagopal and Sudha, **International Conference on Quantum Information - IWQI 2012**, held during 20-26 February, 2012, Harish-Chandra Research Institute (HRI), Allahabad
17. Initial correlations in open system dynamics, A. R. Usha Devi and A. K. Rajagopal, **Quantum Discord Workshop 2012**, held during 9-13 January 2012, Singapore.

18. Global vs local disorder and separability in terms of generalized conditional entropies, A. R. Usha Devi, A. K. Rajagopal, **International School and Conference on Quantum Information - ISCQI 2011** held during 13-22 December, 2011, Institute of Physics, Bhubaneswar.
19. Quantum target detection using entangled photons, A. R. Usha Devi and A. K. Rajagopal, **Quantum Information Processing Applications - QIPA 2011** held during 14-20 February, 2011, Harish-Chandra Research Institute (HRI), Allahabad.
20. Asymptotic efficiency of quantum hypothesis testing: The quantum Chernoff bound, A. R. Usha Devi and A. K. Rajagopal, **International Conference on Quantum Probability and Related Topics** held during 14-17 August, 2010, JNCASR, Bangalore.
21. Determining the whole pure symmetric N-qubit state from its parts, A. R. Usha Devi, Sudha and A. K. Rajagopal, **International Program on Quantum Information (IPQI-2010)** held during 4-30 January, 2010, at Institute of Physics, Bhubaneswar.
22. Thermal relaxation of two oscillators - Variance matrix approach, R. Prabhu and A. R. Usha Devi, Workshop on **'Entanglement in Quantum Condensed Matter Systems'** held during 17-29 November, 2008 at IMSc., Chennai.
23. Distinctive subdynamic features of bipartite systems, A. K. Rajagopal, A. R. Usha Devi, R. W. Rendell and M. Steiner, **International School and Conference on Quantum Information (ISCQI-2008)** , 4-12 March, 2008, Bhubaneswar, Orissa, India.
24. Role of covariance matrix in symmetric multiqubit states, A. R. Usha Devi, R. Prabhu and A. K. Rajagopal, **International School and Conference on Quantum Information (ISCQI-2008)**, 4-12 March, 2008, Bhubaneswar, Orissa, India.
25. Generalized measurements and quantumness of correlations, A. R. Usha Devi and A. K. Rajagopal, **International School and Conference on Quantum Information (ISCQI-2008)** , 4-12 March, 2008, Bhubaneswar, Orissa, India.
26. Higher order spin squeezing, R. Prabhu and A. R. Usha Devi and Sudha **International School and Conference on Quantum Information (ISCQI-2008)** , 4-12 March, 2008, Bhubaneswar, Orissa, India.
27. Quantum Mechanical Basis of Vision, Ramakrishna Chakravarthi, A. K. Rajagopal and A. R. Usha Devi, **India-US Workshop on Science and Technology at the Nabo-Bio Interface**, held during 19-22 February, 2008 at Bhubaneswar, India.
28. Entanglement and generalized entropies, R. Prabhu and A. R. Usha Devi **Second Indo-French Workshop for Young Scientists**, October 29 - November 3, 2007, Gif-Sur Yvette, France.
29. Non-classicality of photon added Gaussian light fields, A. R. Usha Devi, R. Prabhu and M. S. Uma, Second International Conference on **Current Developments in Atomic, Molecular and Optical Physics (CDAMOP-2006)**, held at University of Delhi, New Delhi, during 21-23 March, 2006.
30. Separability, negativity, concurrence and local invariants of symmetric two qubit states, A. R. Usha Devi, M. S. Uma, R. Prabhu and Sudha, **International Conference on Squeezed States and Uncertainty Relations (ICSSUR'05)** held at Besancon, France, during 2-6 May, 2005.
31. Pairwise entanglement properties of a symmetric multi-qubit system, A. R. Usha Devi, M. S. Uma, R. Prabhu and Sudha, XVI-DAE-BRNS High Energy Physics Symposium held at Saha Institute of Nuclear Physics, Kolkata, India, during 29th November to 3rd December, 2004.

32. Non-local properties of a symmetric two-qubit system, A. R. Usha Devi, M. S. Uma, R. Prabhu and Sudha, Seventh International Conference on Photoelectronics, Fiber Optics and Photonics held at International School of Photonics, Cochin University of Science and Technology, Kochi, India, during 9-11 December, 2004.
33. Thermodynamics and Statistical Mechanics as fundamental theories, A. R. Usha Devi, Workshop on **Foundations of Sciences** held at National Institute of Advanced Studies (NIAS), Bangalore during 23-25 February, 2004; appeared in the Project of History of Indian Science, Philosophy and Culture (PHISPC) volume entitled Foundations of Sciences, edited by Professor B. V. Sreekantan.
34. Phase space formulation of Quantum Mechanics, **International Workshop on Nuclear Physics** held at Mandalay University, Mandalay, Myanmar during 10-12 December, 2003.
35. Physical reality: Static or dynamic?, International Conference on **The Concept of Matter in Indian Philosophical Schools and the New Physics: Understanding Knowledge Systems** held during 6-7 January, 2003 at Bangalore University, Bangalore.
36. Squeezing in N two level systems, Proceedings of XIV DAE Symposium on High Energy Physics, University of Hyderabad, 18-22 December, 2000, Hyderabad.
37. Correlations between spin components in an aligned spin-1 nuclei, A. R. Usha Devi, Swarnamala Sirsi and G.Ramachandran, Proceedings of DAE symposium on Nuclear Physics, **40B**, 156 (1997); symposium held at Bangalore University, Bangalore, 1997.
38. Preparation of classical and non-classical polarisation states of spin-1 nuclei, Swarnamala Sirsi and A. R. Usha Devi, Proceedings of DAE symposium on Nuclear Physics, **40B**, 244 (1997)
39. Two body disintegration of nuclei and EPR type spin correlations, A. R. Usha Devi, G.Ramachandran and P.Devi, Proceedings of the International Nuclear Physics Symposium(INPS-95), Bombay, 1995.
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