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1. **Name (in Block Letters):** RAISHMA KRISHNAN
2. **Department:** Physics
3. **Current Designation:** Assistant Professor
4. **Date of Last Appointment:** 20 July 2017
5. **Email:** [raishma.krishnan@mirandahouse.ac.in](mailto:raishma.krishnan@mirandahouse.ac.in)
6. **Academic Qualifications:**
  - **PhD** – 1997-2003 from School of Physics, Hyderabad Central University, Hyderabad  
*Thesis Title:* Electron Localization in Low Dimensional Systems
  - **M. Phil** – 1996-1997 from School of Physics, Hyderabad Central University, Hyderabad  
*Dissertation Title:* Resistance of thin wires: Effect of Localization
  - **M. Sc** -1996 Calicut University, Kerala
  - **B. Sc** - Calicut University, Kerala
  - Qualified CSIR Research Fellowship **CSIR-JRF(NET)** in 1999
7. **Total Teaching Experience:** 7 years
8. **Field of Specialization under the Subject/Discipline:** Condensed Matter Physics (Theoretical)
9. **Areas of Research Interests:**
  - Kinetics of phase separation using molecular dynamics (MD) simulations
  - Noise induced transport, Brownian motors, Stochastic energetics
  - Low dimensional disordered systems, quasi-1D systems and Metal-insulator transitions
10. **Research Experience:**
  - Post Doctoral Fellow at IFCA, Spain under Spanish Ministry of Education and Science Fellowship
  - Guest Research Associate at Graduate School of Informatics, Kyoto University, Japan funded by Panasonic Co. Ltd
  - Post Doctoral Fellow at Institute of Physics, Bhubaneshwar, India



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## UNIVERSITY OF DELHI

### 11. Sponsored Research Projects Completed:

Completed two SERC Fast Track Scheme for Young Scientists at School of Physical Sciences, Jawaharlal Nehru University, New Delhi.

**Collaborator:** Prof. Sanjay Puri, School of Physical Sciences, Jawaharlal Nehru University, New Delhi

Sponsoring Agency	Title of Research Project	Position	Tenure	Total Grant sanctioned in Rs.
DST	Study of Phase transitions and Stochastic processes in non-equilibrium systems	PI	2013-2016	23.36 lakhs
DST	Study of Noise Induced Effects in non-equilibrium systems	PI	2009-2012	19.56 lakhs

12. **Membership of Professional bodies:** Indian Physics Association: Life membership

### 13. Publications:

**Total No of Publications: 21**

1. Annu Dahiya, **Raishma Krishnan** and P Senthil Kumar  
Position and Orientation Dependent Hybridization and Energy transfer of Dipole Emitter around Plasmonic Homodimers  
ChemistrySelect, **8**, e202204272 (2022).
2. **Raishma Krishnan** and Sanjay Puri,  
Molecular dynamics study of phase separation in fluids with chemical reactions,  
Phys. Rev. E **92**, 052316 (2015).
3. Awaneesh Singh, **Raishma Krishnan** and Sanjay Puri,  
Kinetics of microphase separation in block copolymers: A molecular dynamics study,  
Euro. Phys. Lett. **109**, 26006 (2015).
4. **Raishma Krishnan**, Prabhat K. Jaiswal and Sanjay Puri,  
Phase separation in antisymmetric films: A molecular dynamics study,  
J. Chem. Phys. **139**, 174705 (2013).
5. **Raishma Krishnan**, Sanjay Puri and A. M. Jayannavar,  
Reliability of fluctuation induced transport in a Maxwell demon type engine,  
Euro. Phys. J. B **78**, 193 - 199 (2010).
6. **Raishma Krishnan** and Horacio Wio,  
Brownian motors: Joint effect of non-Gaussian noise and time asymmetric forcing  
Physica A **389**, 5563-5572 (2010).
7. B. Seo, **Raishma Krishnan** and T. Munakata,



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- Self-tuning of threshold for a two state system,  
Phys. Rev. E **75**, 056106 (2007).
8. **Raishma Krishnan**, Jim Chacko, Mamata Sahoo and A. M. Jayannavar,  
Stokes Efficiency of temporally rocked ratchets,  
J. Stat. Mech. P06017 (2006).
  9. **Raishma Krishnan**, Soumen Roy and A. M. Jayannavar,  
Enhanced thermodynamic efficiency in time asymmetric ratchets,  
J. Stat. Mech. P04012 (2005).
  10. **Raishma Krishnan**, Debasis Dan and A. M. Jayannavar,  
Noise induced currents and reliability of transport in frictional ratchets,  
Physica A **354**, 171-181 (2005).
  11. **Raishma Krishnan** and A. M. Jayannavar,  
Entropy production, energy loss and currents in adiabatically rocked frictional ratchets,  
Physica A **345**, 61 (2005).
  12. **Raishma Krishnan**, Mangal C. Mahato, A. M. Jayannavar,  
Brownian rectifiers in the presence of temporally asymmetric unbiased forces,  
Phys. Rev. E **70**, 021102 (2004).
  13. **Raishma Krishnan**, Debasis Dan and A. M. Jayannavar,  
Coherence in transport in a special class of inhomogeneous ratchet,  
Mod. Phys. Lett. B **18**, 213 (2004).
  14. **Raishma Krishnan** and A. M. Jayannavar,  
Engines at molecular scale,  
National Academy Science Letters **27**, 301 (2004).  
Web: [xxx.lanl.gov/physics/0408058](http://xxx.lanl.gov/physics/0408058).
  15. **Raishma Krishnan**, Debasis Dan and A. M. Jayannavar,  
Transport coherence in frictional ratchets,  
Ind. J. of Physics **78**, 747 (2004).  
Web: [xxx.lanl.gov/cond-mat/0309617](http://xxx.lanl.gov/cond-mat/0309617).
  16. Swarnali Bandopadhyay, **Raishma Krishnan** and A.M. Jayannavar,  
Hartman effect in presence of Aharanov-Bohm flux,  
Solid State Communications **131**, 447 (2004).
  17. Vipin Srivastava and **Raishma Krishnan**,  
Two dimensional localization: synthesis of old and new results,  
Int. J. Mod. Phys. B **17**, 4491-4507 (2003).
  18. Vipin Srivastava and **Raishma Krishnan**,  
Intrinsic phase-decoherence of electrons by two level systems,  
Mod. Physics Letters B **16**, 511-517 (2002).
  19. **Raishma Krishnan** and Vipin Srivastava,



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Low temperature resistance of quasi-one dimensional wires,  
Ind. J. Phys. 75A, 449-451 (2001).

20. **Raishma Krishnan** and Vipin Srivastava,  
Localization and interactions in q uasi-one dimension,  
Microelectronic Engg. 51-52, 317-326 (2000).
21. **Raishma Krishnan** and Vipin Srivastava,  
Resistance of quasi-one dimensional wires,  
Phys. Rev. B 59, R12747-12750 (1999).

### PAPERS IN PROCEEDINGS

1. **Raishma Krishnan** and A. M. Jayannavar,  
Energy loss and entropy production in adiabatically rocked thermal ratchets,  
Proceedings of DAE SSP Symposium, 46, 657-658 (2003).
2. **Raishma Krishnan** and Vipin Srivastava,  
Source of intrinsic decoherence in mesoscopic systems,  
Proceedings of DAE SSP Symposium, 42, 603-604 (1999).

### 14. Selected Presentations:

#### (A) INTERNATIONAL CONFERENCES

1. **Raishma Krishnan** and A. M. Jayannavar, *Energetic efficiency and transport coherence in Brownian motors* - **Poster** at the International Summer School on Fundamental Problems in Statistical Physics XI held at Leuven, Belgium from September 4-17, 2005.
2. **Raishma Krishnan** and A. M. Jayannavar, *Generalized efficiency, coherency in transport and thermodynamics of Brownian motors* - **Poster** at the third Indo-Israel meeting in Condensed Matter Physics held at Toshali Sands Resorts, Puri, India, from 17-21 April 2005.
3. **Raishma Krishnan** and A. M. Jayannavar, *Thermodynamic efficiency in adiabatically rocked time asymmetric ratchets* - **Oral** at the seminar and workshop on "Non-Equilibrium Phenomena and Phase Transitions in Complex Systems" and "From the Boltzmann Equation to Brownian Ratchets" held at University of Bayreuth, Germany, from 28 September to 2 October, 2004.
4. **Raishma Krishnan** and A. M. Jayannavar, *Energetics in temporally asymmetric rocked ratchets* - **Poster** at the seminar and workshop on "Non-Equilibrium Phenomena and Phase Transitions in Complex Systems" and "From the Boltzmann Equation to Brownian Ratchets" held at University of Bayreuth, Germany, from 28 September to 2 October, 2004.
5. **Raishma Krishnan** and A. M. Jayannavar, *Study of stochastic energetics in Brownian motors* - **Poster** presented at STATPHYS 22 held at Bangalore, India during 4-9 July 2004.
6. Vipin Srivastava and **Raishma Krishnan**, *Novel metal-insulator transitions in 2D glassy systems* - **Oral** presented at the 19th International Congress on Glass, University of Edinburgh, UK, during 2-6 July 2001.



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---

### (B) NATIONAL CONFERENCES

1. **Raishma Krishnan**, Mangal. C. Mahato and A. M. Jayannavar, *Noise induced transport and efficiency in adiabatically rocked time asymmetric ratchets* - **Oral** at Symposium on Condensed Matter Physics, CMDAYS '04 held at NEHU University, Shillong during 25-27 August 2004.
2. Swarnali Bandopadhyay, **Raishma Krishnan** and A. M. Jayannavar, *Delay time, superluminal propagation and Hartman effect in barrier tunneling* - **Oral** at Symposium on Condensed Matter Physics, CMDAYS '04 held at NEHU University, Shillong during 25-27 August 2004.
3. **Raishma Krishnan** and A. M. Jayannavar, *Energy loss and entropy production in adiabatically rocked thermal ratchets* - **Oral** at the DAE Solid State Physics Symposium held at Jiwaji University, Gwalior during 26-30 Dec 2003.
4. **Raishma Krishnan**, Debasis Dan and A. M. Jayannavar, *Transport coherence in frictional ratchets* - **Poster** in the Symposium on Condensed Matter Physics, CMDAYS '03 held at Jadavpur University during 27-29 August 2003.
5. **Raishma Krishnan** and Vipin Srivastava, *Localization in low dimensional disordered systems: New Challenges* - **Poster** presented in the National conference on 'Recent Developments in Disordered Materials', Panjab University, Chandigarh during 15-16 March 2001.
6. **Raishma Krishnan** and Vipin Srivastava, *Source of intrinsic decoherence in mesoscopic systems* - **Poster** presented in the DAE Solid State Physics Symposium, IGCAR Kalpakkam, Tamil Nadu from 20-24 December 1999.
7. **Raishma Krishnan** and Vipin Srivastava, *Low temperature resistance of quasi-one dimensional wires* - **Poster** presented in the Symposium on Condensed Matter Physics (SCMP 99), IACS, Jadavpur, Calcutta during 4-6 December 1999.

### COLLOQUIUM DELIVERED:

1. **Raishma Krishnan**, *Study of phase transitions and stochastic processes in nonequilibrium systems* – Presented a talk at the **DST group monitoring workshop** held at Indian Institute of Information Technology (IIIT), Hyderabad on 10 March 2016.
2. **Raishma Krishnan**, *Study of noise induced effects in nonequilibrium systems* – Presented a talk at the **DST group monitoring workshop** held at Sri Mata Vaishno Devi University (SMVDU), Jammu on 19 August 2011.
3. **Raishma Krishnan**, *Energy transduction in Brownian Ratchets* - **Colloquium** at IFCA, University of Cantabria, Spain on 23 November 2007.
4. **Raishma Krishnan**, *Energy Localization effects in low dimensional systems* - **Colloquium** at Institute of Physics, Bhubaneswar, INDIA, on 28 October 2002.

### 15. SCHOOLS/WORKSHOPS ATTENDED:

1. Participated in the International Summer School on 'Fundamental Problems in Statistical Physics XI' held at Leuven, Belgium from September 4-17, 2005.



# Miranda House

## UNIVERSITY OF DELHI

---

2. Participated in the Seminar and Workshop on "Non-Equilibrium Phenomena and Phase Transitions in Complex Systems" and "From the Boltzmann Equation to Brownian Ratchets" held at University of Bayreuth, Germany, from 28 September to 2 October, 2004.
3. Participated in the Scientific and Engineering Research Council (SERC) School on Statistical Physics, held at Tata Institute of Fundamental Research (TIFR), Mumbai, during 16 February - 28 February 2004.
4. Participated in the International Conference on 'Strongly Correlated Electron Systems', Saha Institute of Nuclear Physics, Calcutta from 23-28 October 2000.
5. Participated in the SERC School on Field Theory Techniques in Condensed Matter Physics, Harish Chandra Research Institute (HRI) for Mathematics and Mathematical Physics, Allahabad, during 13 February - 4 March 2000.