

Curriculum Vita

Analabha Roy

Contact Information: Theoretical Condensed Matter Physics
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Previous Addresses: 1. S.N. Bose National Centre for Basic Sciences,
Sector-III, Block - JD
Salt Lake, Calcutta - 700 098, India
2. Center for Complex Quantum Systems,
University of Texas,
1 University Station C1609,
Austin, TX, 78712, United States

Languages: **Bengali** (Native), **Hindi** (National)
English (Fluent. Certified as a second language by the Texas Intensive English Program)

Research Interests: **Theoretical condensed matter physics/Complex Quantum Systems:** Nonequilibrium dynamics in systems of ultracold atoms, BCS-BEC Crossover, Quantum information and control, Strongly Correlated Systems, Chaos in Complex Quantum Systems

Education: **University of Texas**, Austin, Texas, USA
Doctor of Philosophy (Ph.D), Physics, August 2002 - May 2009
Advisor: Linda E. Reichl
Indian Institute of Technology, Kanpur, Uttar Pradesh INDIA
Master of Science, Physics , July 2000 to May 2002
Jadavpur University, Calcutta, West Bengal INDIA
Bachelor of Science, First Class in Physics with Honors (Distinction in subsidiaries), July 1997 to July 2000

Current Research: My current research interests range from theoretical condensed matter physics and statistical physics to complex quantum systems. As an undergraduate at Jadavpur University, I worked on the problem of deterministic chaos in the Ehrenfest dynamics in quantum double well oscillators. During my masters at IITK, I had worked on the phenomenon of quintessence and the cosmological constant as a visiting student at IUCAA. My graduate dissertation (PhD Thesis) was on the dynamics of quantum control in cold atom systems, focusing on the quantum dynamics of coherent Raman excitations for attractive Bosons in a double well, and the influence of chaos therein. I graduated with a Doctor of Philosophy in Physics from the University of Texas at Austin in 2009. My graduate research continued on to my first postdoctoral position at UT Austin, where I worked on the dynamics of quantum control in optical lattices. My ongoing research work at SNBNCBS is on the dynamics of Fermi-Bose mixtures as the system is quantum quenched across the BCS-BEC crossover. In addition, I am also working on the problem

of Landau-Zener-Stuckelberg interferometry in quenched BCS-BEC systems, as well as Bose gases in optical lattices as the system is quenched past the Superfluid-Mott Insulator phase transitions. A detailed timeline of my research work is presented below in the section titled 'Academic Experience'.

Publications:

1. A.Roy, A.Das, K. Sengupta, R. Dasgupta and S. Modak, '*Periodically driven quenching in BCS systems*', in progress.
2. A. Roy, '*Dynamics of quantum quenching for BCS-BEC systems in the shallow BEC regime*', sent to Physica B, available as arXiv:1009.2125:
<http://arxiv.org/abs/1009.2125>
3. A. Roy and L.E. Reichl, '*Quantum Control of Interacting Bosons in Periodic Optical Lattice*', Physica **E**, 42, 1627-1632 (2010)
DOI:<http://dx.doi.org/10.1016/j.physe.2010.01.010>
4. A. Roy and L.E.Reichl, '*Coherent Control of Trapped Bosons*', Phys Rev **A** 77, 033418 (2008) DOI: <http://link.aps.org/doi/10.1103/PhysRevA.77.033418>
5. A. Roy and J.K. Bhattacharjee, '*Chaos in the Quantum Double Well Oscillator: The Ehrenfest View Revisited*' Phys. Lett. **A**, 288/1-3 (2001)
DOI: [http://dx.doi.org/10.1016/S0375-9601\(01\)00351-6](http://dx.doi.org/10.1016/S0375-9601(01)00351-6)

Conference Presentations and Workshops:

- 2011** Int'l School on Topology in Quantum Matter: Indian Institute of Science, Bangalore
Summer workshop on the Quantum Hall Effect, Topological Insulators, and Topological Quantum Computing
- 2010** STATPHYS-Kolkata VII: Saha Institute of Nuclear Physics, Kolkata, WB, India
Quantum quenching in BCS-BEC systems: A dynamical approach: Poster
- 2009** A.P.S March Meeting, David L. Lawrence Convention Center, Pittsburgh, PA
Dynamics of Quantum Control for Bosons in Optical Lattices Session P17: Semiconducting Qbits I, Lec P17, 15
- 2008** A.P.S March Meeting, Morial Convention Center, New Orleans, LA
Coherent Control of Trapped Bosons Session D14: Quantum Information Science in AMO, Lec D14 2
- Fall 2007** Joint Meeting, Tx Sect. A.P.S et al Dept of Physics, Texas A & M University
Coherent Control of Trapped Bosons Session B2 AMO1: Atomic, Molecular and Optical Physics, Lec B2.1

Computational Skills:

Subject	Background
Programming Paradigms	Procedural, Object-Oriented, and Parallel (distributed grid w OpenMP, MPI).
Symbolic/Numerical Computing Environments	Mathematica, GNU Octave.
Languages	C/C++, Python, Unix shell scripts.
Markup/typesetting languages	HTML/CSS , \LaTeX .
Data Storage and I/O	HDF5, netCDF, XML, Parallel I/O.
Numerics	O.D.Es, P.D.Es, Eigensystems, Monte Carlo, Optimization, Matrices, Data analysis, FEM.
Operating Systems	Linux, IBM AIX and SUN-OS.
Data Viewing	GNUPlot, GNU Plot utils, Mathematica, Paraview, SciDavis.
Networking and Security	LAN setup and administration, FOSS client-server setup and maintenance, firewall.

- Honors and Awards:
- Awarded the Senior Research Associateship (Scientists' Pool Scheme) from the Council of Scientific and Industrial Research (Government of India), 2011.
 - Awarded the 'Dr. D.S. Kothari Postdoctoral Fellowship in Sciences, Medical & Engineering Sciences' from the University Grants Commission (India) , 2011.
 - Scored 99.2162 percentile nationwide (Rank:17) in the Joint Entrance Screening Test (J.E.S.T-2002) in Physics, 2002 and scored 99.0000 percentile nationwide (Rank:9) in J.E.S.T-2000.
 - Awarded Certificate of Merit by the Indian Association of Physics Teachers for being placed in the Nationwide Top 1 percent in the National Graduates Physics Examination, 1997

Academic Experience:

• **Research Experience:**

S. No.	Specifying Period	Designation	Affiliation
1	November 2011 - Present	C.S.I.R. Senior Research Associate	T.C.M.P, Saha Institute of Nuclear Physics, Kolkata, India
1	November 2009 - November 2011	Postdoctoral Research Fellow	S.N. Bose National Centre for Basic Sciences, Kolkata, India
2	June 2009 - August 2009	Postdoctoral Research Associate	Center for Complex Quantum Systems, University of Texas, Austin, TX, USA
3	June 2005 - January 2006 June 2006 - August 2007	Graduate Research Assistant	Center for Complex Quantum Systems, University of Texas, Austin, TX, USA
4	January 2002 - April 2002	M.Sc Research Project	Indian Institute of Technology, Kanpur India
5	May 2001 - August 2001	Vacation Students Program	Inter-University Centre for Astronomy and Astrophysics, Pune, India
6	1998 - 2000	Undergraduate Research Project	Jadavpur University Kolkata, India

• **Teaching Experience:**

S. No.	Specifying Period	Designation	Affiliation
1	September 2008 - January 2009	Graduate Teaching Assistant	Department of Physics University of Texas, Austin, TX, USA
2	August 2007 - May 2008	Grader	Department of Astronomy University of Texas, Austin, TX, USA
3	January 2006 - May 2006	Graduate Teaching Assistant	Department of Physics University of Texas, Austin, TX, USA
4	September 2002 - May 2005	Graduate Teaching Assistant	Department of Physics University of Texas, Austin, TX, USA