URBASI SINHA

QUANTUM INFORMATION AND COMPUTING LAB,
LIGHT AND ATOMIC MATTER PHYSICS GROUP,
RAMAN RESEARCH INSTITUTE, BANGALORE, 560080, INDIA
EMAIL: USINHA@RRI.RES.IN

CurrentPosition: Associate Professor at the Raman Research Institute, Bangalore, India from March 2012. Affiliate faculty at the Institute for Quantum Computing, Waterloo, Canada.

Professional experience:

1. Postdoctoral Research Fellow in the Institute for Quantum Computing, Waterloo, Canada, September 2007 onwards. I was working on fundamental experimental tests of Quantum Mechanics using quantum optics tools as well as nanotechnology-based projects concentrating on fabricating solid-state quantum bit devices and their applications to Quantum Computing.
2. Postdoctoral Research Fellow in the Cavendish Laboratories, University of Cambridge, U.K., July 2006 - August 2007. I worked on an industry funded research project which dealt with investigation of soft condensed matter based techniques to develop a thinner, whiter version of paper than the conventionally available ones.

RESEARCH INTERESTS

Quantum Mechanics, Quantum Computing, Nanotechnology, Device fabrication, Quantum Optics, Superconductivity.

EDUCATION

1. Cambridge University, U.K. - PhD in Physics and Material Science, Supervisors - Prof. Mark Blamire and Dr. Edward Tarte -- 2002 - 2006.
2. Cambridge University, U.K. - B.A., M.A, 1st class in Part III Natural Sciences Tripos -- 2000-2002.
3. Jadavpur University, Kolkata, India - B.Sc., Physics honours - 1st class with distinction, placed among top few -- 1997 - 2000.
4. Ashok Hall Girls' Higher Secondary School, Kolkata, India - All India Senior School Certificate Examination (Class XII, equivalent to the A-Level) - 91% Physics, 97% Mathematics -- 1997.
5. Carmel Convent School, New Delhi, India - C.B.S.E (class X, equivalent to the O-Level)-95% science, 98% mathematics -- 1995.

RESEARCH PUBLICATIONS

1. *Violation of no signaling in higher order quantum measure theories,* K.S.Joshi, R.Srikanth and U.Sinha, arXiv: 1308.6065, 2013.

2. *Whirling waves in interference experiments,* R.Sawant, J.Samuel, A.Sinha, S.Sinha and U.Sinha, arXiv: 1308.2022, 2013.

3. *Effect of environmental coupling on tunneling of quasiparticles in Josephson junctions*, M.H.Ansari, F.K.Wilhelm, U.Sinha and A.Sinha, *Superconductor Science and Technology* **26**(12) 125013, 2013.

4. *Temperature-dependent electron mobility in InAs nanowires*, N.Gupta, Y.Song, G.W.Holloway, U.Sinha, C.Haapamaki, R. R.LaPierre and J.Baugh, arXiv: 1210.3665v1, *Nanotechnology* **24** 225202, 2013.

5. *Playing the AharonVaidman Quantum Game using a Young type photonic qutrit,* P.Kolenderski, U.Sinha,L.Youning, T.Zhao, M.Volpini, A.Cabello, R.Laflamme and T.Jennewein, *Phys.Rev.A* **86** 012321, 2012.

6. *Implementing the Aharon Vaidman Quantum Game with a Young type photonic qutrit,* P.Kolenderski, U.Sinha,L.Youning, T.Zhao, M.Volpini, A.Cabello, R.Laflamme and T.Jennewein, in *CLEO: QELS-Fundamental Science*, OSA Technical Digest (Optical Society of America, 2012), paper QM2H.7.

7. *Triple Photons and Triple Slits: A new frontier in Quantum mechanics tests,* T.Jennewein, H.Hubel, D.Hamel, A.Fedrizzi, S.Ramelov, K.Resch, U.Sinha, C.Couteau, R.Laflamme and G.Weihs in *Quantum Electronics and Laser Science Conference,* 2011.

8. *Born Rules*, U.Sinha, in *75 Years of Quantum Entanglement: Foundation and Information Theoretic Applications,* D.Home, G.Kar and A.S.Majumdar (Eds), American Institute of Physics Conference Proceedings, Vol.1384, pp 254-261, New York, 2011.

9. *Ruling out Multi-path interference in Quantum Mechanics*, U.Sinha, C.Couteau, T.Jennewein, R.Laflamme and G.Weihs, *Science* **329** 418-421, 2010.

   News reports about this work:

   1. http://www.newscientist.com/article/dn19215-tripleslit-experiment-confirms-reality-is-quantum.html
   2. http://www.wired.com/wiredscience/2010/07/two-is-the-magic-quantum-number/
   3. http://www.sciencenews.org/view/generic/id/61472/title/Two_is_the_magic_number
   4. http://physicsworld.com/cws/article/news/43275
   5. http://www.nature.com/news/2010/100722/full/news.2010.371.html
   6. http://www.telegraphindia.com/1100723/jsp/frontpage/story_12716779.jsp
   7. http://en.wikipedia.org/wiki/Born_rule
   8. http://godlessgeekblog.blogspot.com/2010/08/wave-particle-duality-and-double-and.html
   9. http://www.rr.com/news/topicdl/article/dlt/0gfr7Hr1X49jq/00tFe5Dg7v4Ef/Triple-slit_experiment
   10. http://www.sciencedaily.com/releases/2010/07/100722142640.htm
   11. http://www.physorg.com/news199009831.html
   12. http://photonics.com/Article.aspx?AID=43172
   13. http://arstechnica.com/science/news/2010/07/born-rules-quantum-mechanics-survives-triple-slit-test.ars?utm_source=rss&utm_medium=rss&utm_campaign=rss
   14. http://www.nsti.org/news/sciencenews.html
   15. http://scienceblogs.com/principles/2010/07/quantum_mechanics_is_square_ru.php
   16. http://www.perimeterinstitute.ca/News/In_The_Media/PI_and_IQC_Researchers_Perform_'Triple_Slit'_Test_of_Quantum_Mechanics/
   17. http://www.anandabazar.com/9pro6.htm
   18. http://newsrelease.uwaterloo.ca/news.php?id=5215
   19. http://bulletin.uwaterloo.ca/index.html
   20. http://topsy.com/www.newscientist.com/article/dn19215-tripleslit-experiment-confirms-reality-is-quantum.html?infonly=1&sort_method=influence
   21. http://www.youtube.com/watch?v=tDDFmy7n5FQ&feature=player_embedded
   22. http://www.telegraphindia.com/1110108/jsp/calcutta/story_13408505.jsp

10. *A Triple slit test for Quantum Mechanics,* U.Sinha, C.Couteau, F.Dowker, T.Jennewein, G.Weihs and R.Laflamme, *Physics in Canada,* **66** No.2, April-June 2010 (invited paper).
11. *Improving high Tc dc-SQUID performance by junction asymmetry,* U.Sinha, A.Sinhaand F.K.Wilhelm, *Superconductor Science and Technology* ***22,*** (2009), 055002.
12. *Testing Born's rule in Quantum mechanics with a triple slit experiment,* U.Sinha**,** C.Couteau, Z. Medendorp, I. Sollner, R. Laflamme, R. Sorkin, G. Weihs, arXiv: 0811.2068. in *Foundations of Probability and Physics-5,* L. Accardi, G. Adenier, C. Fuchs, G. Jaeger, A. Yu. Khrennikov, J.-Å. Larsson, S. Stenholm (Eds.), American, Institute of Physics Conference Proceedings, Vol. 1101, pp. 200-207, New-York (2009).
13. *On transmission line resonances in high Tc dc SQUIDS,* U.Sinha**,** A. Sinha and E.J. Tarte, *Superconductor Science and Technology* ***21,*** (2008), 085021.
14. *Dielectric characterization of strontium titanate thin films using Josephson junction based on-chip resonators*, U.Sinha, G.Burnell, M.G.Blamire and E.J.Tarte, *Superconductor Science and Technology* ***19,*** 427-432, 2006.
15. *Investigation of YBCO SQUIDS with gold damping resistors,* D.S.Pinker, L.K.Sahoo, D.A.Ansell, U.Sinha, S.H.Menema, G.Burnell and E.J.Tarte, *IEEE Transactions in Applied Superconductivity***15** (2), 789-792, Part 1, 2005.
16. *Device fabrication and Optimization for Josephson Broadband Spectroscopy of Ferroelectric thin films,* U.Sinha, P.F.McBrien, S.H.Menemma, D.Zhang, D.S.Pinker, G.Burnell, Z.H.Barber and E.J.Tarte, Ferroelectrics **329,** 1029-1034, 2005.
17. *Investigation of gold/YBCO contacts for use with resistively shunted SQUIDS*; D.S.Pinker, G.Burnell, U.Sinha, D.A.Ansell and E.J.Tarte; published in Conference Proceedings, European Conference in AppliedSuperconductivity (EUCAS), September 2003.
18. *Studies of transport properties of MgB_2 superconducto*r; A.Poddar, B.Bandyopadhyay, P.Mandal, D.Bhattacharya, P.Choudhury, U.Sinhaand B.Ghosh, Physica C **390,** 191-196, 2003.
19. *Emerging superconducting materials: Electrical resistivity,Thermoelectric power and thermal conductivity of Magnesium diboride,MgB_2*; A.Poddar, B.Bandyopadhyay, P.Mandal, D.Bhattacharya, P.Choudhury, U.Sinha and B.Ghosh, published in Conference proceedings DAE Symposium, India, 2002.

PROFESSIONAL RECOGNITION/AWARDS/SCHOLARSHIPS

1. Queens' College Bursary, University of Cambridge, November 2005.
2. Lundgren Research Award, University of Cambridge, October 2005.
3. Cambridge Philosophical Society studentship, October 2005.
4. Gates Cambridge Scholarship for PhD in the Dept. of Material Science and Metallurgy, July 2002. (Typically around 100 scholars are chosen every year from around 10,000 applicants worldwide.)
5. Overseas Research Students awards scheme 2002-2005 (Typically one or two students are chosen every year in a particular department).
6. 1st class in Part III Natural Sciences Tripos, Cambridge, June 2002.
7. Tutorial prize, St.Edmund's College, Cambridge, June 2002.
8. Tutorial travel awards, St.Edmund's College, Cambridge, March 2001 and March 2002.
9. Chevening-Nehru Cambridge Scholarship to pursue a Masters degree in Physics-2000 (the only physics recipient of the award that year).

REFEREES

1. Prof. Raymond Laflamme
   Canada Research Chair in Quantum Information
   Director, Institute for Quantum Computing
   Director, CIFAR QIP program
   Perimeter Institute and University of Waterloo

2. Sir Anthony James Leggett
   John D. and Catherine T. MacArthur Professor and
   Center for Advanced Study Professor of Physics
   University of Illinois, Urbana Champaign

3. Prof. Gregor Weihs
   University of Innsbruck

4. Prof. Frank K. Wilhelm
   Institute for Quantum Computing
   University of Waterloo

5. Prof. Rafael D Sorkin
   Perimeter Institute for Theoretical Physics

CONFERENCES

1. *American Physical Society March Meeting 2014,* Denver, Colorado, USA, 3rd – 7th March 2014 (talk in a focus session).
2. *International Program on Quantum Information (IPQI 2014),* IOP, Bhubaneswar, India, 17th – 28th February 2014 (invited talk).
3. *Quantum Information Processing and Applications (QIPA 2013),* HRI, Allahabad, India, 2nd – 8th December 2013 (invited talk).
4. *International Conference on Quantum Information and Quantum Computing (ICQIQC 2013),* Benagluru, India, 7th -11th January 2013 (invited talk).
5. *International Conference on Quantum Communication, Measurement and Computing (QCMC 2012*), Vienna, Austria, 30th July – 3rd August 2012 (poster presentation).
6. *75 years of Quantum Entanglement 2011,* Kolkata, India, 6th-10th January 2011 (invited talk).
7. *Quantum Works Annual General Meeting 2010*, Ottawa, Canada, 10th -11th June 2010 (poster presentation).
8. *Cross Border Workshop on Laser Science 2010*, IQC, Waterloo, Canada, 3rd -5th June 2010 (poster presentation).
9. *QISS* (*Quantum Information with Spins and Superconductors*), IQC, Waterloo, Canada, 16th – 18th May 2010 (poster presentation).
10. *CIFAR (Canadian Institute for Advanced Research) QIP meeting,*held at Caledon, Canada, 24th – 27th May 2009 (invited talk).
11. *The American Physical Society March meeting,* held in Pittsburgh, Pennsylvania, U.S.A 15th-20th March 2009 (oral presentation).
12. *The clock and the quantum,* held at Perimeter Institute, Canada, 27th September-2nd October, 2008 (oral presentation).
13. *International Superconductive Electronics Conference (ISEC 2005),* held in Holland, 5th– 9th September 2005 (poster presentation).
14. *Applied Superconductivity Conference (ASC 2004)*, held in Jacksonville, Florida, U.S.A. 4th-8th October 2004 (oral and poster presentation).
15. *Condensed Matter and Materials Physics Conference (CMMP 2004)*, Warwick, U.K. 4th -7th April 2004. (Poster presented).
16. *International Conference on Nanoscience and Technology (ICONSAT)*, Kolkata, India, 17th-20th December 2003. (Poster presented).
17. *Asian Meeting on Ferroelectricity (AMF4),* Bangalore, India, 12th-15th December 2003.(oral presentation).
18. *European Conference on Applied Superconductivity (EUCAS),* Sorrento, Italy, 14th-17th September 2003.(co-author in a poster presentation).
19. *European Meeting on Ferroelectricity (EMF4),* Cambridge, U.K., 3rd-7th August 2003.

SEMINARS

1. **Physics Colloquium** titled "Precision Tests of Quantum Mechanics" at **Harish Chandra Research Institute, Allahabad, India** 4th April 2014.
2. **Public lecture** titled "Quantifying the Quantum" on the occasion of *Women's Day* at **SRN Adarsh College , Bangalore, India** 11th March 2014.
3. **Public lecture** titled 'Quantifying the Quantum" on the occasion of *National Science Day* at **BNM Institute of Technology, Bangalore, India** 28th February 2014.
4. **Invited seminar** titled `Quantifying the Quantum' at the **Centre for Nanoscience and Engineering (CeNSE), Indian Institute of Science, Bangalore, India** 28th November 2013.
5. **Public lecture** under the KSTA-BUB lecture series at Bangalore University titled `Quantifying the Quantum' at **Venkatagiri auditorium, Jnanabharathi campus, Bangalore university, Bangalore, India** 27th September 2013.
6. **Invited seminar** tiltled `Quantifying the Quantum' at the **Institute for Quantum Science and Technology, University of Calgary, Calgary, Canada** 17th July 2013.
7. **Institute Colloquium** titled `Quantifying the Quantum' at **Tata Institute for Fundamental Research (TIFR), Mumbai, India** 17th April 2013.
8. **Invited talk** titled `Triple slits, Born Rule and Beyond..' at **Indian Association for Cultivation of Sciences, Kolkata, India** 7th May 2012.
9. Seminar titled `Triple slits, Born Rule and Beyond..' at th**e University of Toronto, Toronto, Canada** 8th December 2011**.**
10. Seminar titled `Triple slits, Born Rule and Beyond..' at **Institute for Quantum Information Science, Calgary, Canada** 29th November 2011.
11. **Invited talk** titled `Born Rule(s)' at the 75 Years of Quantum Entanglement conference, **Kolkata, India** 7th January 2011.
12. **Invited talk** titled `Born Rule(s)' at the IQC Board meeting, **Institute for Quantum Computing, Waterloo, Canada** 22nd October 2010.
13. **Invited talk** titled `Born Rule(s)' at **Princeton University, Princeton, NJ, USA** 27th September, 2010.
14. **Invited talk** titled `Born Rule(s)' at **University of Kentucky, Lexington, KY, USA** 31st August, 2010.
15. **Invited talk** titled `Testing quantum mechanics using a three slit experiment' at **Indian Association for Cultivation of Sciences, Kolkata, India** 10th February 2010.
16. **Invited talk** titled `Testing quantum mechanics using a three slit experiment' at **University of Illinois Urbana Champaign, IL, USA** 9th December 2009.
17. **Invited talk** titled `Testing quantum mechanics using a three slit experiment' at **Indian Institute for Sciences, Bangalore, India** 14th August 2009.
18. **Invited talk** titled `Testing quantum mechanics using a three slit experiment' at **Raman Research Institute, Bangalore, India** 13th August 2009.
19. **Invited talk** titled ` Testing quantum mechanics using a three slit experiment' at the **CIFAR QIP meeting, Caledon, ON, Canada** 25th May 2009.
20. **Oral presentation** titled ` Testing quantum mechanics using a three slit experiment' at The **American Physical Society March meeting**, **Pittsburgh, Pennsylvania, USA** 16th March 2009.
21. Seminar titled 'Testing quantum mechanics using a triple slit experiment', **Saha Institute for Nuclear Physics (SINP), Kolkata, India**, 9th January, 2009.
22. Seminar titled 'Dielectric characterization using resonances in high T_CJospehson junction circuits', **S.N Bose National Centre for Basic Science, Kolakta, India**, 9th January, 2009.
23. Seminar titled 'Resonances, asymmetry, SQUIDs, noise and all that jazz', **Tata Institute for Fundamental Research (TIFR), Mumbai, India**, 6th January, 2009.
24. Seminar titled 'Resonances, asymmetry, SQUIDs, noise and all that jazz', **Indian Institute for Sciences (IISc), Bangalore, India**, 17th December, 2008.
25. Seminar titled 'Testing quantum mechanics using a triple slit experiment', **Institute for Mathematical Sciences, Chennai, India**, 15th December, 2008.

26. **Oral presentation** titled ` Testing quantum mechanics using a three slit experiment' at **The Clock and the Quantum conference**, **Perimeter Institute, Waterloo, Canada**, 30th September 2008.
27. Seminar titled 'Three slit experiment',**National Physical Laboratories, London, UK,** 5th September, 2008.
28. Seminar titled 'Three slit experiment', **Cavendish Laboratories, University of Cambridge, U.K.,** 3rd September, 2008.
29. Seminar titled 'Dielectric characterization using resonances in high T_CJosephson junction circuits', **MIT, Cambridge, USA** 22nd July 2008.
30. Seminar titled 'Three slit experiment', **Indian Association for Cultivation of Sciences, Kolkata, India,** 18th February 2008.
31. Seminar titled ' Development of microporous paper coatings', **Cavendish Laboratories, University of Cambridge, U.K.,** 19th June 2007.
32. **Nanoscale Science and Engineering Science (NSEC) seminar at Harvard University, USA**, 13th October 2006.
33. Seminar titled 'Dielectric characterization using resonances in high T_CJospehson junction circuits', **Clarke Group seminar, University of California Berkeley (UCB), USA**, 10th October 2006.
34. Seminar titled 'Dielectric characterization using resonances in high T_CJospehson junction circuits', **Martinis Group seminar, University of California Santa Barbara (UCSB), USA**, 4th October 2006.
35. Seminar titled 'Dielectric characterization using resonances in high T_CJospehson junction circuits', **Thin films and Interfaces Group seminar, Cavendish laboratories**, **University of Cambridge**, U.K., 25th September 2006.
36. Seminar titled 'JOBS and SQUIDs' as a part of the Device Materials Group termly seminar series, **University of Cambridge**, U.K., 9th June 2005.
37. **Oral presentation** titled `Characterization of Ferroelectric thin films by a Josephson-junction based On-chip spectrometer' at The **Applied SuperconductivityConference (ASC)**, **Jacksonville, Florida**, 7th October 2004.
38. **Invitedtalk** titled `Josephson broadband Spectroscopy' at the **Speclab, SanJuan, Puerto Rico,USA** on 11th October 2004.
39. Seminar titled 'Josephson Broadband Spectroscopy of nearly ferroelectric thin films' as a part of the Device Materials Group termly seminar series, **University of Cambridge**, U.K., 3rd June 2004.
40. **Invited talk** titled 'Device fabrication and Optimization for Josephson Broadband Spectroscopy of Ferroelectric thin films' **at Saha Institute of Nuclear Physics (SINP)**, **Kolkata, India**, 8th January 2004.
41. **Oral presentation** titled 'Device fabrication and Optimization for Josephson Broadband Spectroscopy of Ferroelectric thin films' at **The Asian Meeting on Ferrolectricity (AMF4)**, **Indian Institute of Sciences (IISC), Bangalore, India**, 14th December 2003.
42. Seminar titled 'Josephson Broadband Spectroscopy of thin films' at the departmental Postgraduate Seminar day, **University of Cambridge**, U.K., June 2003.
43. **Invited talk** titled 'Pulsed Laser Deposition, Lithography techniques and An Introduction to Josephson Broadband Spectroscopy of Ferroelectric thin films' at **Indian Association forCultivation of Sciences (IACS), Kolkata**, April 2003.
44. **Invited talk** titled 'High T_c Axial gradiometers using Superconducting imaging surface' at **Saha Institute of Nuclear Physics (SINP), Kolkata**, 6th September 2002.
45. **Invited talk** titled 'High T_c Axial gradiometers using Superconducting imaging surface' at **Indian Association for Cultivation of Sciences (IACS), Kolkata**, 10th September 2002.

PUBLIC OUTREACH AND REPORTS ON MY RESEARCH

1. http://www.telegraphindia.com/1100723/jsp/frontpage/story_12716779.jsp
2. http://news.therecord.com/article/757952
3. http://www.anandabazar.com/9pro6.htm

4. http://www.youtube.com/watch?v=tDDFmy7n5FQ&feature=player_embedded
5. An article in the Indian monthly magazine "Desh", September issue.
6. An article in the August 13th 2010 issue of India Abroad news magazine.
7. http://www.telegraphindia.com/1110108/jsp/calcutta/story_13408505.jsp

TEACHING AND OUTREACH ACTIVITIES

1. Teaching a graduate level course on Quantum Information and Computing at RRI Bangalore, India in the January – May 2014 term.
2. Member of RRI PhD admissions committee, colloquium organizing committee.
3. Taught a graduate level course on Quantum Information and Computing at RRI Bangalore, India in the January – May 2013 term.
4. Co-organized the "ICTS Mini Winter school for Quantum Information and Computing" held at IISc Bangalore, India from 3rd – 5th January 2013.
5. Was a part of the Local Organizing Committee for the "International Conference on Quantum Information and Quantum Computing (ICQIQC 2013)" held at IISc Bangalore, India from 7th – 11th January 2013.
6. Delivered a set of 4 lectures titled "Quantum Information and Computation using Quantum Optics"at the Quantum Information and Computation summer school organized by IISc Bangalore, May 2012.
7. Participated in the IQC annual Open house, September 2010.
8. Lectured on Introduction to Quantum Mechanics in the Quantum Cryptography School for Young Students 2010 held at IQC from 26th – 30th July 2010.
9. Lectured on Introduction to Quantum Mechanics in the Quantum Cryptography School for Young Students 2009 held at IQC from 27th – 31st July 2009.
10. Participated in the Perimeter Institute – IQC outreach workshops for high school children and teachers, Fall 2008.
11. Demonstrated the usefulness of Material Science and science in general to school children as a part of the Physics at Work workshop held in the Cavendish laboratories, Cambridge, September 20-22nd 2005.
12. Supervised students from St.Edmund's College, Cambridge doing Part IA Mathematics Course of the Natural Sciences Tripos, Fall 2003-04. Supervisions in Cambridge are like tutorial sessions or problem classes.
13. Supervised students from Queens' College, doing Part IA Physics Course of the Natural Sciences Tripos, Easter term 2003.

STUDENTS

CURRENT

Project assistant (equivalent to JRF):

1. Debadrita Ghosh

Project students:

1. Anjali P.S.
2. Rengaraj Aparajithan
3. Animesh Aaryan
4. Pradeep N
5. Sudhi Oberoi

PAST

Project students:

1. Aravind HV (Co-supervised Masters' thesis with Prof. Aninda Sinha, IISc)
2. Shreya Ray (Masters' thesis)
3. Nidhin Prasnnan
4. Reena Sayani (Masters' thesis)
5. Sunny Saurabh (Masters' thesis)
6. Karthik. S. Joshi
7. Arun V.S. (co-supervised with Prof.VasantNatarajan, IISc)
8. Matthew Volpini and Tong Zhao (co-supervised with Prof. Thomas Jennewein)
9. Nikesh Dattani (co-supervised with Prof. Raymond Laflamme)
10. Zachari Medendorp (co-supervised with Dr.Christophe Couteau and Prof. GregorWeihs).

UNDERGRADUATE PROJECT WORK

1. DC magnetization study of $La_{1-x}Ba_xCoO_3$ which was credited as an acknowledgment in *" Transport and magnetic properties of* $La_{1-x}Ba_xCoO_3$ *"; P.Mandal, P.Choudhury, S.K.Biswas and B.Ghosh; submitted for publication, August 2004.*
2. Analyzing properties of high T_c gradiometers using superconducting imaging surface. Part III project supervised by Dr. Edward Tarte, Cambridge, 2002.
3. Measurement of transport properties of MgB_2 under the guidance of Professor B.Ghosh. Saha Institute of Nuclear Physics, Calcutta, 2001.
4. Simulation studies using ROOT for particle physics measurements related to the ALICE detector in the LHC scheduled to operational in 2006. Muon-Arm-Project, Saha Institute of Nuclear Physics, Calcutta, 2001.
5. Computational study of the doping of semiconductors using FORTRAN 90. Cambridge, 2001.
6. Analysis of particle tracks and measurement of mass, lifetime and branching ratios of elementary particles (K mesons and hyperons), Cambridge, 2001.
7. Data encryption using synchronized chaos---Jadavpur University, 1999. The project won the second prize in the Inter-University Scientific model competition.