

CURRICULUM VITAE

1. Name : Sumathi Rao

2. Designation : Professor H+

3. Date of Birth : December 5 1956

4. Nationality : Indian

5. Educational qualifications

1. B.Sc. (Physics), (First class with distinction), Maharaja Sayajirao University, Baroda (1977).
2. M.Sc. (Physics), (First class with distinction), Indian Institute of Technology, Bombay (1979).
3. Ph.D. (Theoretical High Energy Physics), State University of New York, Stonybrook (1983).

6. Awards/Special Recognitions

1. Ranked eighth in the state of Gujarat in the Senior School Certificate Examination, (1973).
2. National Science Talent Scholarship (1974-1979).
3. Ranked first in Pre-University Examination, Maharaja Sayajirao University, Gujarat, (1974).
4. Ranked first in B.Sc. (Physics), Maharaja Sayajirao University, Gujarat, (1977).
5. Associate of the International Centre for Theoretical Physics, Trieste, Italy, from 1990-1996.
6. Elected fellow of National Academy of Sciences, Allahabad, 2001.
7. Senior Associate, International Centre for Theoretical Studies, Tata Institute of Fundamental Research, Bangalore, August 2013

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7. Participation as Lecturer in Schools

1. Lectures on anyons, VIII SERC School in High Energy Physics, Jan, 1992, Physical Research Laboratory, Ahmedabad, India.
2. Lectures on anyons, I SERC School in Statistical Mechanics, Feb 1994, Puri, India.
3. Lectures on bosonisation and its applications, SERC school on 'Field Theories in Condensed Matter systems', Feb, 2001, Harish-Chandra Research Institute, Allahabad, India.
4. Tutor for course on Anomalies in field theory, SERC Theoretical High Energy School, Hyderabad, Jan 19-27, 2007.
5. Lecturer (Resource Person) for quantum mechanics, Science Academies' Refresher school on theoretical physics, Dept of Physics, Tezpur University, Assam, 6-20 Jan, 2015.

8. Participation as Organiser of Schools/Conferences

1. Organised the SERC school on 'Field Theories in Condensed Matter systems', Feb, 2001, Harish-Chandra Research Institute, Allahabad, India.
2. Organised the working group session on 'How to attract girls into physics', in the IUPAP international conference on women in physics, Paris, March 7-9, 2002.
3. Organised international school on 'Low dimensional nanoscopic physics' Jan 28-Feb 9, 2008, at Harish-chandra Research Institute, Allahabad
4. Will be organising an international school on "Topological quantum matter" at HRI - Feb 9-21, 2015.

9. Participation in National and International Committees

1. Member of the IUPAP Working group on Women in Physics (2000-2008)
2. Member of National Organising Committee, Statphys 22, July 2004.

3. Member, Board of Studies, School of Physics, Jawaharlal Nehru University, New Delhi (2008 - 2010).
4. Member, Academic council, MNNIIT (Allahabad), March 2013 -

10. Experience as thesis supervisor

1. P. K. Mohanty, 'Field theoretic approach to strongly correlated electron systems', (2000) (currently Professor at Saha Institute, Kolkata)
2. T. Gupta 'Aspects of correlated electron systems' (2003) (currently teaching in a college in Kolkata)
3. S. Das, 'Interaction effects in mesoscopic systems' (2004) (currently Asst. Professor at Delhi University)
4. Arijit Saha, 'Electron-electron interaction effects on transport through mesoscopic hybrid junctions'. (2009) (currently post-doctoral fellow at University of Basel, Basel, Switzerland)
5. Udit Khanna, current student working on topological insulators and Weyl semi-metals
6. Aditya Banerji, current student working on Majorana fermions
7. Ruchi Saxena, current student working on graphene and silicene
8. Dibyakanti Mukherjee, current student working on topological insulators and Weyl semi-metals
9. Krishna Mohan Tripathi, current student working on Chern-Simons theory and non-abelian statistics

Parts of the thesis of Dileep Jatkar (PhD 1991), D. M. Gaitonde (PhD 1992) and Arijit Kundu (PhD scholar in Germany) were also done with me.

11. Experience as referee for journals/theses

Regular referee for Phys. Rev. Lett., Phys. Rev. **B**, Phys. Rev. **D**, Phys. Rev. **E**, Nucl. Phys. **B**, EPL and Pramana. I have also examined more than half a dozen theses from places like Kolkata University, IIT Kanpur, Jadavpur University, etc.

12. Administrative experience

1. Acting director, August 2003 - December 2003.
2. Acting director (director-in-charge) May 15, 2011 - May 2012.

Besides this, I have also worked on many administrative committees of the institute including the local works committee, budget committee, purchase committee, Faculty Advisory committee, Women's grievance cell, etc, for many years.

Invited Talks at Conferences

1. 'Topological field theories in 2+1 dimensions', Workshop on Anomalies, Bangalore, 1989.
2. 'Anyons in Chern-Simons theories', International Colloquium on Modern Quantum Field Theory, TIFR, Bombay, 1990.
3. 'Correlation functions on a torus for the SU(3) WZW model' Workshop on Quantum Field Theory, Indian Institute of Science, Bangalore, 1990.
4. 'Do Hard-core Bosons exhibit Quantum Hall Effect?', International Colloquium on Modern Quantum Field Theory II, TIFR, Bombay, 1994.
5. 'Exactly Solvable Fermionic N -band Models', Symposium on Exactly Solvable Models, Indian Institute of Science, Bangalore, September, 1998.
6. 'Women Scientists : A Contradiction in Terms?' Symposium on Science and Technology : Concerns and Perspectives, National Academy of Sciences, Allahabad, at Lucknow, 23-25 Oct 1998.
7. 'Fractional Quantum Hall effect', Prof. K. S. Krishnan Birth Centenary Conference on Condensed Matter Physics, Allahabad University, Allahabad, Dec 5-8 1998.
8. 'Transport in Luttinger liquids', Symposium on Quantum Many-Body Physics, Jawaharlal Nehru University, New Delhi, March 5-7, 1999.
9. 'Transport in Luttinger liquids', Conference on Field Theories in Condensed Matter, S. N. Bose National Centre for Basic Sciences, Calcutta, March 15-16, 2000.
10. 'Renormalisation group ideas in different contexts', 'Physics and Astronomy at the Millenium, State University of New York at Stonybrook, New York, U.S.A., June 16-18, 2000.
11. 'Transport in Quantum wires' 'International Conference on Mesoscopic and Disordered Systems', Indian Institute of Science, Bangalore, Dec. 2000.

12. 'How to attract girls into physics', IUPAP international meeting on Women in Physics, March 7-9, 2002, Paris, France.
13. 'Transport in Quantum wires' , specialised lecture in thematic session, International Conference on Theoretical Physics, TH2002, July 21-27, 2002, UNESCO, Paris, France.
14. 'Theoretical Physics in the Third World : An Indian perspective' International Conference on Theoretical Physics, TH2002, July 21-27, 2002, UNESCO, Paris.
15. 'Transport through quantum dots' , National Seminar on 'Recent Advances in Physics', 19-20 September 2003, Gopalpur-on-sea, organised by Berhampur University and Institute of Physics, Bhubaneswar.
16. , 'Transport through quantum wires', One day conference at School of Physics, Jawaharlal Nehru University, New Delhi, March 9, 2004.
17. 'Non-linear sigma model approach to quantum spin chains' , CM-DAYS05, Gopalpur-on-sea, 2005.
18. 'Novel phenomena in low dimensional systems', Conference-cum-seminar on Emerging trends in physics, S.G.T.B Khalsa college, New Delhi, India, Sept 20-23, 2006.
19. 'Science: A journey into new frontiers', National Conference on Convergence with physics, Jamshedpur, India, 10-11 October, 2006
20. 'Novel phenomena in low dimensional physics', K S Krishnan Discussion Meeting on Frontiers in Quantum Science, Chennai, India, 13-14 December 2006
21. 'Novel phenomena in low dimensional physics', Workshop on correlated systems and novel materials, Kharagpur, India, Jan 16-18, 2007
22. 'Progress report of women in physics in India,' Working group meeting of women in physics, Physikszentrum, Bad Honnef, Germany, April 19-21, 2007.
23. 'Women in physics in India', 10th Asia Pacific Physics Conference, Pohang, Korea, August 21-24, 2007.

24. 'Junctions of quantum wires', Correlated electrons and frustrated magnetism, International Centre, Dona Paula, Goa, India, Dec 4-6, 2007.
25. 'Spintronics with NSN junction of quantum wires', Quantum Correlations and quantum computing, Indian Institute of Technology, Kharagpur, India, Dec 11-13 2007.
26. 'Inter-edge interactions and novel fixed points at a junction of quantum Hall line junctions', Quantum Phases and excitations in quantum Hall systems, June 16-21, 2008, Max Planck Institute, Dresden, Germany
27. 'Personal and professional development', Third IUPAP conference on women in physics, Seoul, Korea, Oct10-12, 2008.
28. 'Transport through junctions of quantum wires : Application of quantum field theory methods in low dimensional condensed matter systems', in 'New Trends in Field theory', Physics Department, Banaras Hindu University, Varanasi, Nov 1-2, 2008.
29. 'Transport through superconducting junctions', K.S. Krishnan Discussion meeting on 'Quantum matter and quantum information, IMSc, Chennai, Dec 1-2, 2008.
30. 'Transport through superconducting junctions', 'Indian condensed matter workshop', Centre for Theoretical Sciences, Tata Institute of Fundamental Research, held at Mahabaleshwar, Dec 9-23, 2008.
31. 'Report on the International conferences on women in physics', Women in Science and Technology programme at PAN-IIT 2008, Indian Institute of Technology, Chennai, Dec 19-21, 2008.
32. 'Novel phenomena in mesoscopic physics or there's room at the bottom', One -day conference at IIT Chennai, Dec 21st, (2009).
33. 'Novel phenomena in mesoscopic physics or there's room at the bottom', Recent trends in condensed matter physics, Saha institute of Nuclear Physics, Kolkata, March 27-29 (2009).
34. Transport through quantum wires, Recent trends in condensed matter physics, Saha Institute, Kolkata, March 27-29 (2009).
35. 'Spin polarised scanning tunneling microscopy of helical Luttinger liquids', poster presented at Quantum matter in low dimensions :

Opportunities and challenges, Nordita, Stockholm, 6-10 September (2010).

36. 'Spin polarised scanning tunneling microscopy of helical Luttinger liquids', ICTS conference on condensed matter physics, Infosys campus, Mysore, 12-23 December, (2010).
37. 'Topological insulators and helical edge states', Conference on new trends in field theories, BHU, Varanasi, 7-12 Feb (2011).
38. 'Introduction to topological insulators', School on quantum computation, HRI, Allahabad, 14-20 Feb (2011).
39. 'Topological insulators and helical edge states' , Workshop on low dimensional quantum systems, HRI, Allahabad, October 10-13, (2011).
40. 'Topological insulators and helical edge states' , International conference on physics of novel and emerging materials, IACS, Kolkata, Nov 15-17, (2011).
41. 'Spin-polarized multi-terminal transport in helical edge states', March meeting, Boston, U.S.A, 27 Feb - March 3, (2012).
42. 'Topological insulators and effect of magnetic field on surface states',,, Conference on Emerging Trends in Physics, Dept of Physics, Banaras Hindu University, India, Nov 23-26, 2012.
43. 'Gender and science', seminar at Allahabad University, 2nd March 2013.
44. 'Colloquium on Topological insulators', Dept of Physics, University of Chandigarh, Chandigarh, 11 March 2013.
45. 'Gender and science', seminar at Allahabad University, 2nd March 2013.
46. 'Charge and spin fractionalisation in helical edge states' ICTP conference, April 7-11, 2013.
47. 'Transport through 2D surface states of 3D topological insulators', Frontiers in Condensed Matter physics, Delhi University, April 12-14, 2013.
48. 'Topological insulators', Macquarie University, Sydney, Australia, May 2, 2013.

49. ‘Exotic excitations in topological insulators’, Workshop on topological insulators, HRI, Allahabad, July 10, 2013.
50. Poster on ‘Transport and STM studies of surface states of topological insulators’, Dresden conference, September, 2014.
51. ‘Surface states in two and three dimensional topological insulators’, Dept. of Physics, University of Basel, Basel, Switzerland, September, 2013.
52. ‘Majorana modes and non-abelian statistics, Conference on ‘Quantum information processing and applications’, HRI, December 2013.
53. ‘From topological insulators to Weyl semi-metals’, India-UK conference on ‘From graphene to topological insulators’, GATI 2014, Jan 27-29, 2014.
54. ‘Attracting girls to science’, International conference on research and curriculum development for gifted minds, New delhi, Feb 6, 2014.
55. ‘Introduction to Weyl semi-metals’, IIT Kharagpur conference, Feb 8, 2014.
56. *Majorana modes and non-abelian statistics*, Conference on Quantum information processing and applications, HRI, Feb 14-20, 2014

Science and Society

My interest in the issue of women in physics started with a Symposium on Science and Technology : Concerns and Perspectives, organised by the National Academy of Sciences, Allahabad, at Lucknow, 23-25 Oct 1998, where I gave a talk on ‘Women Scientists : A Contradiction in Terms?’. I later published this in Current Science Vol. **76**, 24 (1999).

I was a member of the working group of the International Union of Pure and Applied Physics (IUPAP) on the status of women in physics from its inception in 2000 until 2008. I had organised a session on ‘How to attract girls into physics at the First IUPAP International Conference on Women in Physics, March 7-9, in Paris, in 2002. A report on the Conference was also published in Current Science, Vol. **83**, 359 (2002). I was also on the National Organising Committee of the IUPAP conference on ‘Physics Education’ to be held in August 2005 in New Delhi. I was also a member of the Indian delegation that attended the Second IUPAP conference on women in physics in Brazil in May 2005 and also the Third IUPAP conference on women in physics in Korea in October 2008. Reports from both these conferences have also been published. In Korea, I organized a session on Personal and Professional Development. I have also given several talks now in various places about attracting girls to science and the problems faced by women in science.

I also gave a talk about the problems of doing physics in the third world at the TH2002 meeting in Paris, at a special session focussing on theoretical physics in the third world.