PRAMOD PADMANABHAN

CONTACT INFORMATION

Departamento de Física Matemática
Universidade de São Paulo
Instituto de Física - Universidade de São Paulo
Rua do Mato Travessa R Nr.187 CEP 05508-090
Cidade Universitária
São paulo- Brasil

Voice: 55-3091-6635

E-mail: pramod23phys@gmail.com

CITIZENSHIP

INDIA

RESEARCH INTERESTS

Exactly Soluble Quantum Many Body Systems via Lattice Theories
Topological Order and Classifying Phases at Low Temperatures
Mathematical Physics (Hopf Algebras and their Extensions, Category Theory, Topological Invariants).

EDUCATION

Instituto de Física-Universidade de São Paulo, São Paulo, SP, Brasil(Oct 2012 - Present)

- Post Doctoral Fellow of FAPESP
  - Advisor: Prof. Paulo Teotônio Sobrinho
  - Areas of Study:
    - Generalizing 3-Manifold Invariants á la Kuperberg to construct lattice models for describing low temperature phases.
    - Studying the relevance of Hopf algebras in the classification of phases of matter at low temperatures.
    - Topological order in systems with matter and gauge fields.
    - Topological Insulators and their Generalizations.

Syracuse University, Syracuse, NY, USA (Aug 2007 - May 2012).

Ph.D., High energy physics (theory)

- Advisor: Prof. A. P. Balachandran
- Areas of Study:
  - Fuzzy Physics: Spin systems on the fuzzy 2-sphere, Higgs algebras and associated topology changes.
  - Quantum fields on noncommutative spacetimes: Twisted field theories on the Moyal plane.
  - Pauli-forbidden transitions on noncommutative spacetimes.
  - Planck-scale physics and nonassociative noncommutative geometries.

Chennai Mathematical Insitute, Chennai, Tamil Nadu, India (August 2004 - May 2007).

B.Sc.(Hons.), Physics (Gold Medalist for highest GPA in class).

ACADEMIC ACHIEVEMENTS/AWARDS

- Awarded the Gold Medal of Excellence for obtaining the highest GPA in the graduating class of Chennai Mathematical Institute in the year 2007.

Academic Visits

- Summer 2008:
  - Student visitor of Prof.Sachin Vaidya, Indian Institute of Science, Bengaluru,
  - Student visitor at the University of Hyderabad, Hyderabad,
  - Student visitor of Prof.T.R.Govindarajan at The Institute of Mathematical Sciences, Chennai.
- Summer 2009:
  - Student visitor of Prof.Kumar S. Gupta at Saha Institute of Nuclear Physics, Kolkata,
  - Student visitor of Prof.T.R.Govindarajan at The Institute of Mathematical Sciences, Chennai.
- Winter 2009/Spring 2010/Summer 2010: Student visitor of Prof.T.R.Govindarajan and Prof.Sanatan Digal at The Institute of Mathematical Sciences, Chennai.
- Winter 2010: Student visitor of Prof.T.R.Govindarajan and Prof.Sanatan Digal at The Institute of Mathematical Sciences, Chennai.
- Spring 2011: Student visitor at the International Institute of Physics, Federal University of Rio Grande do Norte, Natal.
- Spring 2011: Student visitor of Prof.Amilcar R. De Queiroz at the Institute of Physics, University of Brasilia, Brasilia.
- Summer 2011: Student visitor of Prof.T.R.Govindarajan and Prof.Sanatan Digal at The Institute of Mathematical Sciences, Chennai.
- Spring 2012 : Student visitor of Prof. Sanatan Digal at The Institute of Mathematical Sciences, Chennai.
- Summer 2013 : Postdoc visitor of Prof. Sanatan Digal at The Institute of Mathematical Sciences, Chennai.
- Summer 2013 : Short term visitor of Prof. Krishnendu Sengupta at the Indian Association for the Cultivation of Science, Kolkata.

Teaching Experience

Syracuse University, Syracuse, NY, USA.

Teaching Assistant **August 2007 to December 2009, August 2010 to December 2010 and August 2011 to December 2011**

- Fall 2007: Teaching assistant to Prof.Joseph Schechter for General Physics II - *Electricity, Magnetism and Light* (PHY 212), Department of Physics.
- Spring 2008: Teaching assistant to Prof.Paul Souder for General Physics II - *Electricity, Magnetism and Light* (PHY 212), Department of Physics.
- Fall 2008: Teaching assistant to Prof.Gianfranco Vidali for General Physics II - *Electricity, Magnetism and Light* (PHY 212), Department of Physics.
- Spring 2009: Teaching assistant to Prof.Tomasz Skwarnicki for General Physics I - *Classical Mechanics* (PHY 211), Department of Physics.
- Fall 2009: Teaching assistant to Prof.Carl Rosenzweig for Major Concepts of Physics - (PHY 101), Department of Physics.
- Fall 2010: Teaching assistant to Prof.Carl Rosenzweig for Major Concepts of Physics - (PHY 101), Department of Physics.
- Fall 2011: Teaching assistant to Prof.Ken Foster for General Physics I Laboratory - (PHY 221), Department of Physics.

Grader **Fall 2009, Fall 2010, Fall 2011**

- Fall 2009: Grader for the graduate level course *Quantum Mechanics I* (PHY 567).
- Fall 2010: Grader for the graduate level course *Methods of Mathematical Physics* (PHY 581).
- Fall 2011: Grader for the graduate level course Methods of Mathematical Physics (PHY 581).

Publications

- Published Papers:

1. *Spin j Dirac Operators on the Fuzzy 2-Sphere,*
   A. P. Balachandran and **Pramod Padmanabhan**,
   JHEP **0909**, 120 (2009),
   E-print: arXiv:0907.2977 [hep-th].
2. *The Groenewold-Moyal Plane and its Quantum Physics,*
   A. P. Balachandran and **Pramod Padmanabhan**,
   AIP Conf. Proc. **1196**, pp 18-27 (2009),
   E-print: arXiv:0908.3888 [astro-ph].
3. *Causality and Statistics on the Groenewold-Moyal plane,*
   A. P. Balachandran, Anosh Joseph and **Pramod Padmanabhan**,
   Found. Phys. **40**, 692-702 (2010),
   E-print: arXiv:0905.0876 [hep-th].
4. *Beyond Fuzzy Spheres,*
   T. R. Govindarajan, **Pramod Padmanabhan** and T. Shreecharan,
   J Phys. A **43**, 205203 (2010),
   E-print: arXiv:0906.1660 [hep-ph].
5. *Non-Pauli Transitions from Spacetime Noncommutativity,*
   A. P. Balachandran, Anosh Joseph and **Pramod Padmanabhan**,
   Phys. Rev. Lett. **105**, 051601 (2010),
   E-print: arXiv:1003.2250 [hep-th].
6. *Unusual Thermodynamics on the Fuzzy 2-Sphere,*
   Sanatan Digal and **Pramod Padmanabhan**,
   JHEP **1010**, 091 (2010),
   E-print: arXiv:1006.4792 [hep-th].
7. *Spectrum of Higher Spin Dirac Operators on the Fuzzy 2-Sphere,*
   Sanatan Digal and **Pramod Padmanabhan**,
   E-print: arXiv:1004.3252 [hep-th].
8. *Non-Pauli Effects from Noncommutative Spacetimes,*
   A. P. Balachandran and **Pramod Padmanabhan**,
   JHEP **1012**, 001 (2010),
   E-print: arXiv:1006.1185 [hep-th].
9. *The LSZ Matrix Elements on the Moyal Plane,*
   A. P. Balachandran, **Pramod Padmanabhan** and Amilcar R. Queiroz.
   Phys. Rev. D 84, 065020 (2011),
   E-print: arXiv:1104.1629v2 [hep-th].
10. *2D Quantum Double Models From a 3D Perspective,*
    Miguel Jorge Bernab Ferreira, **Pramod Padmanabhan**, Paulo Teotônio-Sobrinho,
    J. Phys. A: Math. Theor. 47 (2014) 375204 (50pp),
    E-print: arXiv:1310.8483 [cond-mat.str-el].
11. *Non-Abelian Fusion Rules from an Abelian System,*
    Pramod Padmanabhan, Paulo Teotônio-Sobrinho,
    E-print: arXiv:1407.4064 [cond-mat.str-el].

12. *More Solvable 2D Quantum Models from Lattice Gauge Theories and Beyond,*
Pramod Padmanabhan, Juan Pablo Ibieta Jimenez, Miguel Jorge Bernabé Ferreira, Paulo Teotonio-Sobrinho,
arXiv:1408.2501 [cond-mat.str-el].
13. *A Recipe for Constructing Exactly Soluble Lattice Models with Gauge and Matter Fields in One and Two Dimensions,*
Pramod Padmanabhan, Juan Pablo Ibieta Jimenez, Miguel Jorge Bernabé Ferreira, Paulo Teotonio-Sobrinho,
arXiv:1503.07601 [cond-mat.str-el].

Work in Progress

1. *Deformed Quantum Double Models from Deformed Spacetime Invariants,*
Miguel Jorge Bernabé Ferreira, **Pramod Padmanabhan**, Paulo Teotônio-Sobrinho.
2. *Exactly Solvable 2D Lattice Models with Confined and Deconfined Excitations*
Pramod Padmanabhan, Paulo Teotônio-Sobrinho.
3. *Novel SPT Phases using Hopf Algebras and Drinfel'd Twists*
Pramod Padmanabhan, Paulo Teotônio-Sobrinho.

Workshops and Presentations

1. Participant in the 3rd Central New York Cosmology Workshop, Department of Physics, Syracuse University, Syracuse, New York, (21, September 2007).
2. Participant in Workshop on Noncommutative Geometry and Quantum Field Theory, The Institute of Mathematical Sciences, Chennai, (18 - 24, December 2008).
3. Participant in the national meeting on 'Noncommutative Quantum Field Theory' held at the Indian Institute of Technology Kanpur, Kanpur, (July-August, 2009).
4. Presentation on *Higher Spin Dirac Operators on the Fuzzy 2-Sphere* at the national meeting on 'Noncommutative Quantum Field Theory' held at the Indian Institute of Technology Kanpur, Kanpur, (July-August, 2009).
5. Participant in Simons Center for Geometry and Physics Building Inauguration Conference, SUNY Stony Brook, New York, (Novermber 3, 2010).
6. Participant in the Conference on Chandrayana, The Institute of Mathematical Sciences, Chennai, (3-7, January 2011).
7. Participant in the Jorge André Swieca Summer School in Particles and Fields, Campos do Jordão, São Paulo, (January 31- February 11, 2011).
8. Participant in the 2nd Joint Dutch-IFT School on Theoretical Physics, IFT-UNESP, São Paulo, (February 14-18, 2011).
9. Presentation on *Novel Phenomena on the Fuzzy 2-Sphere* at the International Institute of Physics, Federal University of Rio Grande do Norte, Natal.
10. Participant in the 1st National Workshop on Field Theory, Goiânia, (April 6-9, 2011).
11. Participant in *Trails in a Noncommutative Land*, SISSA(Scuola Internazionale Superiore Di Studi Avanzati), Trieste, (May 18-20, 2011).
12. Thesis Defense on *Physics on Noncommutative Spacetimes* at the Physics Department, Syracuse University, New York, (October 12, 2011).
13. Participant in BAL FEST, at the Physics Department, Syracuse University, New York, (December 3, 2011).
14. Participant in WECIQ 2012 (Workshop-School in Quantum Computation and Information) Oásis Atlântico Imperial Hotel - Fortaleza, Ceará, Brasil, (October 8 -12, 2012).
15. Participant in Quantum Optics VI, Piriápolis, Uruguay, (November 12 - 16, 2012).
16. Participant in Topological States of Matter, Aspen Center for Physics, Aspen, Colorado, USA, (January 13 - 18, 2013).
17. Participant in Topological Phases of Matter, Simons Center for Geometry and Physics, Stony Brook, New York, USA, (June 10 - 14, 2013).

18. Presentation on *The Tensors in Tensor Network States: Toric Code Models* at the Indian Association for the Cultivation of Science, Kolkata, India, (June 26, 2013).
19. Participant in The 31st Jerusalem Winter School in Theoretical Physics - Frontiers of Quantum Information Science, Jerusalem, Israel, (Dec 30 - Jan 9, 2014).
20. Posters presented in The 31st Jerusalem Winter School in Theoretical Physics - Frontiers of Quantum Information Science, Jerusalem, Israel on *2D Quantum Double Models from a 3D perspective* and *Deformed Quantum Double Models from Deformed Three Manifold Invariants*.
21. Presentations on *Topological Order from Lattice Gauge Theory* in IMSc, Chennai, India, (October 24th and October 31st, 2014).
22. Presentation on *Topological Order from Lattice Gauge Theory* in IISc, Bengaluru, India,(November 17th, 2014).
23. Participant at the Chandrasekhar Memorial Lectures and Discussion Meeting on *Quantum Entanglement in Macroscopic Matter* in ICTS, Bengaluru, India, (January 12th, 2015).
24. Presentation on *Topologically Ordered Models from Lattice Theories with Gauge and Matter Fields* in CMI, Chennai, India, (January 22nd, 2015).
25. Participant in *Symmetry and Topology in Quantum Matter* in IPAM-UCLA, Los Angeles, USA, (January 26th, 2015).
26. Poster presented in *Symmetry and Topology in Quantum Matter* in IPAM-UCLA, Los Angeles, USA, (January 26th, 2015).
27. Presentation on *Topological Order from Lattice Gauge Theories* in Stellenbosch, South Africa, (February 10th, 2015).
28. Presentation on *Topological Order from Lattice Theories with Gauge and Matter Fields and More*, Stellenbosch, South Africa, (February 11th, 2015).

USEFUL LINKS Link to Google Scholar MyCitations Page.