

Sujeev Wickramasekara

Curriculum Vita

Department of Physics
Grinnell College
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812 Maggard St
Iowa City, IA 52240

Education

Ph.D., Physics, The University of Texas at Austin

B.S. (*Summa Cum Laude*), Physics, The University of Southern California

Research Interests and Expertise

Theoretical physics, quantum field theory, relativistic resonances, phenomenology of the Z-boson; Foundations of quantum physics; Functional and harmonic Analysis, Hp - spaces, representations of groups and semigroups, measure theory, distributions and test function spaces
(A research statement is available upon request.)

Professional Experience

- Assistant Professor
Department of Physics, Grinnell College Aug 2005-Present
- Research Scientist
Department of Physics and Astronomy, University of Iowa May 2008-Present
- Weiss Instructor of Physics and Astronomy,
Rice University Sep 2003-Aug 2005
- Postdoctoral Fellow and Lecturer
Department of Physics, The University of Texas at Austin 2000-Aug 2003
- Co-Director, Conference on Irreversible Quantum Dynamics
International Center for Theoretical Physics, Trieste, Italy July/ Aug 2002
- Visiting Scientist, Erwin Schroedinger Institute, Austria Aug 2000

Awards, Grants and Honors

- Cottrell College Science Award, Research Corporation (\$31,148.00) 2008-2010
- Harris Faculty Fellowship, Grinnell College 2008-2009
- Plenary Talk, 5th International Symposium of Quantum Theory and Symmetries
Valladolid, Spain 2007
- International Visitor Grant, University of Valladolid, Spain 2006
- Nominee, The Hermann Weyl Prize in Mathematical Physics 2002
- The Excellence in Teaching Award for a Teaching Assistant,
Honorary Recognition, The University of Texas at Austin 1999
- Tuition Fellowship, The University of Texas at Austin Summer 1997/99
- Member, Sigma Xi Scientific Research Society
- The Trustee Scholarship, The University of Southern California 1991-1994

Publications

List Attached

Selected Invited Lectures and Conference Presentations

List Attached

Service

- Technology Studies concentration committee and Scholarships Selection Committee, Grinnell College.
- Referee for several journals, including Physical Review Letters, Physical Review A, Physical Review D, Journal of Physics A: Mathematical and Theoretical; Journal of Mathematical Physics, and Nuclear Physics A.
- Referee for the International Center for Theoretical Physics, Trieste, Italy.

Publications

Peer-Reviewed Journals

1. *Interior Symmetries of Hadrons: $SO(3,2)$ as a Spectrum Generating Group*
Intern. J. of Theor. Phys. **36** (1997) 2409
2. *The Time Reversal Operator for Semigroup Evolution (with A. Bohm)*
Found. of Phys., **27** (1997) 969.
3. *Semigroup Representations of the Poincare Group and Relativistic Gamow Vectors*
(with A. Bohm, H. Kaldass and P. Kielanowski)
Phys. Lett. A **264** (2000) 425
4. *Time Asymmetric Quantum Theory and the Ambiguity of the Z-boson Mass and Width*
(with A. Bohm, N. L. Harshman and H. Kaldass)
Eur. Phys. J. C **18** (2001) 333
5. *A Note on the Topology of Space-time in Special Relativity*
Class. Quantum Grav., **18** (2001) 5353
6. *Symmetry Representations in the Rigged Hilbert Space Formulation of Quantum Mechanics*
(with A. Bohm)
J. Phys. A: Math. Gen., **35** (2002) 805
7. *Resonance States from Poles of the Relativistic S-Matrix (with A. Bohm and H. Kaldass)*
Intern. J. Mod. Phys. A **17** (2002) 3749
8. *On Einstein Causality and Time Asymmetry in Quantum Physics*
J. Phys. A: Math. Gen., **35** (2002) L715
9. *Representation of Semigroups in Rigged Hilbert Spaces: Subsemigroups of the Weyl-Heisenberg Group*
(with A. Bohm)
J. Math. Phys., **44** (2003) 930
10. *Relativistic Resonances from S-Matrix Poles (with A. Bohm and H. Kaldass)*
Fortschr. Phys., **51** (2003) 569
11. *Decaying States and the Causal Poincare Semigroup (with A. Bohm and H. Kaldass)*
Fortschr. Phys., **51** (2003) 604
12. *Complex Energies and Beginnings of Time Suggest a Theory of Scattering and Decay*
Annals of Physics, **321** (2006) 2299
13. *Galilean and Dynamical Invariance of Entanglement in Particle Scattering (with N.L. Harshman)*
Physical Review Letters, **98** (2007) 080406

Also selected to be republished in two other journals:

- Virtual Journal of Nanoscale Science & Technology (March, 2007)
- Virtual Journal of Quantum Information (March, 2007)

14. *Comment on the applications of Hardy class functions in scattering theory*
(with M. Gadella)
J. Phys. A: Math. Theor., **40** (2007) 4665
15. *Tensor Product Structures, Entanglement, and Particle Scattering* (with N.L. Harshman)
Open Sys. & Information Dyn. **14** (2007) 3
16. *Gamow Vectors in the Bakamjian-Thomas Construction*
Journal of Geometry and Symmetry in Physics, **11** (2008) 67
17. *Rigged Hilbert Spaces, Eigenfunction Expansions and Commutative Harmonic Analysis*
(with M. Gadella and F. Gómez-Cubillo)
Journal of Geometry and Symmetry in Physics, **11** (2008) 23
18. *Hardy Class Functions for Potential Scattering and Decay*
(with M. Gadella and F. Gómez-Cubillo)
Reports on Mathematical Physics, **62** (2008) 129
19. *Bakamjian-Thomas Construction for Quasistable States*
J. Phys. A.: Math. Theor., **41** (2008) 304025
20. *The Galilean and U(1)-Gauge Symmetry of the Schrödinger's Field* (with V. Colussi)
Ann. Phys., **323** (2008) 3020
21. *Relativistic Dynamics of Quasistable States I: Perturbation Theory for the Poincaré Group*
J. Math. Phys., **50** (2009) 042305
22. *Relativistic Dynamics of Quasistable States II: Differentiable Representations of the Causal Poincaré Semigroup*, J. Math. Phys. (In press: July 2009).
23. *Semigroup Integrability of Point-form Dynamics* (with N.L. Harshman)
Reports on Mathematical Physics (In press: 2009)

Work in Progress

24. *Perturbations of unitary representations of finite dimensional Lie groups*, Preprint, University of Iowa
25. *Perturbation of unitary representations of the Galilei group: mass operators with continuous spectra*
(with V. Colussi and H. Reich) Preprint, Grinnell College
26. *Spatial contractions of the Poincaré group and the Galilean transformations of Maxwell's equations in the electric limit*
(with H. Reich) Preprint, Grinnell College

Invited, Peer-Reviewed/Refereed Papers

27. *Some Little Things about Rigged Hilbert Spaces and Quantum Mechanics* (with A. Bohm and M. Gadella)
In *Generalized functions, operator theory and dynamical systems*, Chapman and Hall/CRC
Research Notes in Mathematics, 399, I. Antoniou and G. Lumer (Eds.).
28. *A New Topology for an Axiom of Quantum Mechanics* (with A. Bohm)
In *Irreversible Quantum Dynamics*, Lecture Notes in Physics, Springer (2003),
F. Bennati and R. Florianini (Eds.)

29. *Gamow Vectors and Time Asymmetric Quantum Mechanics* (with M. Gadella)
Published in *New Research in Quantum Physics*, V. Krasnoholovets and F. Columbus, Eds,
(Nova Science, New York, 2004), pp. 45-69. ISBN: 1-59454-001-2.
30. *Rigged Hilbert Spaces in Quantum Physics*
(with J-P. Antoine, R. Bishop and A. Bohm)
in F. Weinert, K. Hentschel, D. Greenberger (eds.): *Compendium of Quantum Physics* (Springer,
Heidelberg/Berlin/New York 2009)
31. *Rigged Hilbert Spaces for the Dirac formalism and time-symmetric quantum mechanics*
(with J-P. Antoine and A. Bohm)
in F. Weinert, K. Hentschel, D. Greenberger (eds.): *Compendium of Quantum Physics* (Springer,
Heidelberg/Berlin/New York 2009)

Conference Proceedings

32. *Group Theory and the Hadron Spectrum* (with A. Bohm)
A. O. Barut Memorial Lectures, Published in Turkish Journal of Physics 21 (1997) 289.
33. *SO(3,2) as a Spectrum Generating Group for a Collective Model of Hadron Structure*
Group 21, Physical Applications and Mathematical Aspects of Geometry, Groups, and Algebras,
V. II; H. D. Doebner, W. Scherer, and C. Schulte (Eds.)
34. *Resonances, Gamow Vectors and Time Asymmetric Quantum Theory* (with A. Bohm and R. Scurek)
Rev. Mexi. de Fisica, 45 (1999) 16.

Selected Invited Lectures and Conference Presentations

- *SO(3,2) as a Spectrum Generating Group*
XXI International Colloquium on Group Theoretical Methods in Physics,
Goslar, Germany, July 1996
- *Relativistic Spectrum Generating Groups and Collective Models of Hadrons*
IX International Symposium on Symmetries in Science, Bregenz, Austria, August 1996
- *The Formalism of Spectrum Generating Groups*
Summer School on "Present Problems in Quantum Mechanics," Peyresq, France, July 1996
- *Lie Group Representations in Rigged Hilbert Spaces*
Guest Lecture at Dept. de Matematicas, Centro de Investigacion del IPN Mexico City,
Mexico, November 1999
- *Relativistic Gamow Vectors from Poincare Semigroups*
Guest Lecture at Dept. de Fisica, Centro de Investigacion del IPN, Mexico City,
Mexico, November 1999
- *Representation of Groups and Semigroups in Rigged Hilbert Spaces I and II*
Guest Lectures at Erwin Schroedinger Institute, Vienna, Austria, August 2000
- *Integrability of Operator Lie Algebras in Rigged Hilbert Spaces*
Fourth annual Workshop on Time Asymmetric Quantum Theory, Clausthal, Germany, July 2001
- *A Group Theoretical Characterization of Unstable Particles*
Guest Lecture at Dept. of Physics, University of Peradeniya, Sri Lanka, August 2001
- *Algebraic Structure of the Generators of a Class of Semigroup Representations,*
III International Workshop on Pseudo-Hermitian Hamiltonians in Quantum Physics,
Istanbul, Turkey, June 2005
- *A Unified Theory of Relativistic Resonances and Decaying States*
Colloquium, Department of Computer Science, Audio Technology and Physics,
American University, Washington DC, February, 2006
- *Differentiable Representations of Causal Poincare Semigroup*
XXV Workshop on Geometric Methods in Physics, Bialowieza, Poland, July 2006
- *Extending the Bakamjian-Thomas Construction for Resonances*
Mathematical Physics Colloquium, Department of Physics, University of Iowa, April 2007
- *Poincaré Invariant Dynamics of Quasistable States (Plenary Talk)*
5th International Symposium on Quantum Theory and Symmetries, Valladolid, Spain, 2007
- *Relativistic Dynamics of Quasistable States*
Colloquium, Max Planck Institute for Complex Systems, Dresden, Germany, July 2008

- *Point-form quantum dynamics: relativistic and non-relativistic mass operators with continuous spectra*, Seminar, Faculty of Science, University of Valladolid, Spain, March 20, 2009
 - *Group representations in rigged Hilbert spaces I*
Mathematical Physics Seminar, University of Iowa, April 14, 2009
 - *Group representations in rigged Hilbert spaces II*
Mathematical Physics Seminar, University of Iowa, April 21, 2009
 - *Time asymmetry in quantum physics: boundary conditions and physical applications*, Complex Quantum Systems Seminar, University of Texas at Austin, April 30, 2009
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