RUCKENSTEIN, Andrei E.

Curriculum Vitae

Born: February 11, 1955

Education:

Executive Education Program in Nonprofit Management and Leadership, BU.....2013-2014
Ph.D., Cornell University, Physics 1984
Supervisor: Professor E. D. Siggia.
Title: Bose condensation, hydrodynamics and magnetic relaxation in spin-polarized hydrogen
M.S., Cornell University, Physics.....1981
A.B., Harvard University, (magna cum laude), Physics 1978
Private Instruction/Piano Performance Master Classes 1971-Present
Degree in Music (Conducting/Piano), Romanian National School of Music.....1971

Positions:

Pro-Vice-Chancellor for Research (ad-interim), University of Lancaster, UK .....Jan-October 2014
Sabbatical Leave (Boston University School of Management) 2013-2014
Vice President for Research and Associate Provost, Boston University 2007-2013
Professor of Physics, Boston University 2007-Present
Director, BioMaPS Graduate Program in Quantitative Biology, Rutgers.....2001-2004
Director, BioMaPS Institute for Quantitative Biology, Rutgers University 2001-2004
Director, BioMaPS Program, Rutgers University.....2000-2001
Professor, Rutgers University.....1992-2007
Associate Professor, Rutgers University.....1988-1992
Assistant Professor, University of California, San Diego 1985-1988
Member Technical Staff (limited term), AT&T Bell Laboratories 1984-1985
Postdoctoral Fellow, Theoretical Physics Group, AT&T Bell Laboratories.....1983-1984

Professional Leadership, Board Memberships, and Service:

Member of the Strategic Advisory Board,
Sir Henry Royce Institute for Advanced Materials UK…….. 2016-Present
Member of the Board of the Massachusetts Technology Collaborative……..2013-Present
(appointed by Governor Patrick)
Member of the Committee on Big Data, Commonwealth of Massachusetts……...2012-Present
(appointed by Governor Patrick)
Member of the Board of CASIS - managing the International Space Station National Lab.…...2012-Present
(Chair of the Strategy & Budget Committee)
Member of the Executive Committee, and Member of the Board……...2011-2013
Massachusetts Green High Performance Computing Center, Inc.
President, Massachusetts Green High Performance Computing Center, Inc., ….. ...2009-2011
(a corporation involving BU, Harvard, MIT, Northeastern, and UMass)
Chair, Executive Committee, Massachusetts Green High Performance Computing Center, Inc.,
(involving BU, Harvard, MIT, Northeastern, and UMass) 2009-2011

Life-time Honorary Trustee, Aspen Center for Physics 2010-Present
Member of the Scientific Advisory Board of the Aspen Center for Physics 1995-2010
Co-Founder and Trustee, Aspen Science Center 2005-Present
President, Aspen Center for Physics 2004-2007
Member of the Board of Trustees of the Institute for Complex Adaptive Matter (ICAM) 2001-2004
Member of the Board of Trustees of the Aspen Center for Physics 2001-2004
Member of the Editorial Board of Springer-Verlag 1998-2007
Coordinator, Biomolecular Networks Program, ITP, Santa Barbara 2003
Co-organizer of the Aspen Workshop on Unconventional Metals 1994
Director, Strongly Correlated Systems Workshop, ICTP, Trieste 1989-1991
Associate of the Canadian Institute for Advanced Research 1990-1998
Coordinator, High-T_c Superconductivity Program, ITP, Santa Barbara 1989

Prizes, Awards, and Recognitions:

Elected Member of the Massachusetts Academy of Sciences 2013
Prize of the Romanian Academy for Outstanding Contributions to Science 2008
Fellow of the American Physical Society
Senior Humboldt Prize 1994
Alfred P. Sloan Research Fellow 1988-1993
Office of Naval Research Young Investigator Award 1986-1989

Other:

Member of the Board of the Halcyon Chamber Music Festival 2014-
(to be incorporated in New Hampshire by January 1, 2014)
Chair of the Board of "Danceworks" (a New York City modern dance company) .. 1990-1996

Publications:

1. *Bose Condensation in Spin Polarized Atomic Hydrogen*, E. Siggia and A. E. Ruckenstein, Phys. Rev. Lett. **44**, 1423 (1980).
2. *Bose Condensation in Spin Polarized Hydrogen*, E. Siggia and A. E. Ruckenstein, J. de Phys. (Paris) **C7**, 15 (1980).
3. *Longitudinal and Transverse Relaxation in Spin Polarized Hydrogen*, A.E.Ruckenstein and E. Siggia, Physica **107B**, 519 (1981).
4. *Hydrodynamics of the Condensed Phases of Spin Polarized Hydrogen*, E. D. Siggia and A. E. Ruckenstein, Phys. Rev. B **23**, 3580 (1981).
5. *Surface Magnetic Relaxation Rates in Spin Polarized Hydrogen*, A. E. Ruckenstein, E. Siggia, Phys. Rev. B **25**, 6031 (1982).
6. *On the Hydrodynamics of the Condensed Phase of Spin Polarized Hydrogen*, A. E. Ruckenstein, to be published in Annals of Physics.
7. *Collective Spin Oscillations in Spin Polarized Quantum Gases: Spin Polarized Hydrogen*, L. P. Levy and A. E. Ruckenstein, Phys. Rev. Lett. **52,** 1512 (1984).
8. *Evidence of strong spin correlations in Si:P*, M. A. Paalanan, G. A. Thomas and A. E. Ruckenstein, in *Proceedings of the 17th International Conference on the Physics of Semiconductors*, J.D. Chadi and W.A. Harrison, eds., Springer (1985).
9. *Enhanced Spin-Lattice Relaxation Near the Metal-Insulator Transition*, M. A. Paalanen, A. E. Ruckenstein, and G. A. Thomas, Solid State Electronics **28**, 121 (1985).
10. *Spin Fluctuation in Disordered Metals*, A. E. Ruckenstein, M. A. Paalanen, and G. A. Thomas, in *Proceedings of the 17th International Conference on the Physics of Semiconductors*, J.D. Chadi and W.A. Harrison, eds., Springer (1985), p. 1083.
11. *Spins in Si:P Close to the Metal-Insulator Transition*, M. A. Paalanen, A. E. Ruckenstein, G. A. Thomas, Phys. Rev. Lett. **54**, 1295 (1985).
12. *Comments on the Kinetic Equations of Spin Polarized Gases*, A. E. Ruckenstein, L. P. Levy, Phys. Rev. Lett. **55**, 1427 (1985).
13. *Upper Critical Fields in Triplet Superconductors*, P. Hirschfeld, A. E. Ruckenstein, J. Sauls, (preprint).
14. *Infrared and Polarization Anomalies in the Optical Spectra of Modulation-Doped Semiconductor Quantum Well Structures*, A. E. Ruckenstein, S. Schmitt- Rink and R. C. Miller, Phys. Rev. Lett. **56**, 504 (1986).
15. *New Functional Integral Approach to Strongly Correlated Fermi Systems: The Gutzwiller Approximation as a Saddle Point*, G. Kotliar, A. E. Ruckenstein, Phys. Rev. Lett. **57**, 1362 (1986).
16. *Spin Dynamics of Nearly Localized Electrons*, M. A. Paalanen, S. Sachdev, R. N. Bhatt and A. E. Ruckenstein, Phys. Rev. Lett. **57**, 2061 (1986).

17. *Many-Body Aspects of the Optical Spectra of Bulk and Low-Dimensional Doped Semiconductors*, A. E. Ruckenstein, and S. Schmitt-Rink, Phys. Rev. B **35**, 7551 (1987).

18. *A Mean Field Theory of High-T_C Superconductivity: The Superexchange Mechanism*, A. E. Ruckenstein, P. J. Hirschfeld, and J. Appel, Phys. Rev. B **36**, 857 (1987).

19. *Superexchange Mediated Superconductivity in the Single Band Hubbard Model*, S. Doniach, P. J. Hirschfeld, M. Inui, and A. E. Ruckenstein, in *Proceedings of the International Conference on New Mechanisms of Superconductivity*, edited by V.Kresin and S. Wolf (Plenum, New York, 1987).

20. *Coexistence of Antiferromagnetism and Superconductivity in a Mean Field Theory of the Hubbard Model*, M. Inui, S. Doniach, P. Hirschfeld, A. E. Ruckenstein, Phys. Rev. B **37**, 2320 (1988).

21. *Magnetic Relaxation in Spin Polarized Hydrogen*, A. E. Ruckenstein, J. Low Temp. Physics **70**, 327 (1988).

22. *Escape Rates of Electrons from the Surface of Liquid Helium*, J. J. M. Goodkind, G. F. Saville, A. E. Ruckenstein, and P. M. Platzman, Surface Science **196**, 38 (1988).

23. *Spectral Function of Holes in a Quantum Antiferromagnet*, S. Schmitt-Rink, C. M. Varma, and A. E. Ruckenstein, Phys. Rev. Lett. **60**, 2793 (1988).

24. *A New Approach to Strongly Correlated Systems: The $1/N$ Expansion Without 'Slave Bosons'*, A. E. Ruckenstein, and S. Schmitt-Rink, Phys. Rev. B., **38**, 7188 (1988).

25. *Evaporation and Quantum Tunneling of Electrons from a Helium Surface*, J. M. Goodkind, G. F. Saville, A. E. Ruckenstein and P. M. Platzman, Phys. Rev. B **38**, 8778 (1988).

26. *Spin Diffusion in Paramagnetic Quantum Fluids*, A. E. Ruckenstein, and L. P. Levy, Phys. Rev. B **39**, 183 (1989).

27. *Holes in the Infinite U Hubbard Model: Instability of the Nagaoka State*, Y. Fang, A. E. Ruckenstein, E. Dagotto, and S. Schmitt-Rink, Phys. Rev. B **40**, 7406 (1989).

28. *Pairing in two dimensions*, S. Schmitt-Rink, C. M. Varma, and A. E. Rucken- stein, Phys. Rev. Lett. **63**, 445 (1989).

29. *Single spin flip in the infinite U Hubbard model: Hubbard operators, three-body Fadeev equations and Gutzwiller wave functions*, A. E. Ruckenstein, and S. Schmitt-Rink, Int. J. Mod. Phys. B **3**, 1809 (1989).

30. *Phenomenology of the Normal State of Cu-O High-Temperature Superconduc- tors*, C. M. Varma, P. B. Littlewood, S. Schmitt-Rink, E. Abrahams, and A. E. Ruckenstein, Phys. Rev. Lett. **63**, 1996 (1989); **64**, 497 (1990) (E).

31. *Comment on "Pairing in Two Dimensions: Resilience of Fermi Liquid Theory"*, A. E. Ruckenstein, S. Schmitt-Rink, and C. M. Varma. (preprint).

32. *Single Spin-Flip in the Nagaoka State: Problems with the Gutzwiller Wave Function*, T. Kopp, A. E. Ruckenstein, and S. Schmitt-Rink, Phys. Rev. B **42**, 6850 (1990).

33. *Optical Absorption in Non-BCS Superconductors*, S. Orenstein, S. Schmitt- Rink, and A. E. Ruckenstein, in Electronic Properties of High T_c Superconduc- tors and Related Compounds (Springer, Berlin, 1990).

34. *Interference of the Fermi Edge Singularity with an Excitonic Resonance in Deped Semiconductors* J. Mueller, A. E. Ruckenstein, and S. Schmitt-Rink, Mod. Phys. Lett.B **5**, 135-138 (1991).

35. *Optical Singularities in Quasi-one-dimensional Electron Systems*, J. M. Calleja, B. S. Dennis, J. S. Wiener, A. Pinczuk, S. Schmitt-Rink, L. N. Pfeiffer, K. W. West, J. Mueller and A. E. Ruckenstein, published in the MRS Proceedings 1990.

36. *Large Optical Singularities in the Electron Gas of Semiconductor Quantum Wires*, J. M. Calleja, B. S. Dennis, J. S. Wiener, A. Pinczuk, S. Schmitt-Rink, L. N. Pfeiffer, K. W. West, J. Mueller and A. E. Ruckenstein, Solid State Commun., **79**, 911 (1991).

37. *Optical Singularities in GaAs/AlGaAs Multiple Quantum Wires*, J. M. Calleja, B. S. Dennis, J. S. Wiener, A. Pinczuk, S. Schmitt-Rink, L. N. Pfeiffer, K. W. West, J. Mueller and A. E. Ruckenstein, in the Proceedings of the Second Conference on Quantum Electronics and Laser Science (1991).

38. *Spectral Function of a Hole in the Quantum Antiferromagnet*, F. Marsiglio, A. E. Ruckenstein, S. Schmitt-Rink, and C. M. Varma, Phys.Rev.B., **43**, 10882 (1991).

39. *Long-wave-length Behavior, Impurity Scattering and Magnetic Excitations in a Marginal Fermi Liquid*, G. Kotliar, E. Abrahams, A. E. Ruckenstein, C. M. Varma, P. B. Littlewood and S. Schmitt-Rink, Europhys. Lett., **15**, 655 (1991).

40. *A Theory of Marginal Fermi Liquids*, A. E. Ruckenstein and C. M. Varma, Physica C **185-189**, 134 (1991).

41. *Charge Fluctuations in a Three Band Model of the Cu-O Superconductors*, J. C. Hicks, A. E. Ruckenstein, and S. Schmitt-Rink, Phys.Rev.B., **45**, 8185 (1992).

42. *Motion of a Particle in the Fermi Sea I: One Dimension*, J. F. Mueller, A. E. Ruckenstein and S. Schmitt-Rink, Phys. Rev. B., **45**, 8902 (1992).

43. *Exact Results in a Hubbard Chain with Long-Range Hopping*, F. Gebhard and E. Ruckenstein, Phys. Rev. Lett., **68**, 244 (1992).

44. *Spectral Properties and AC Conductivity of the Falikov-Kimball Model in Infi- nite Dimensions*, Goetz Moeller, A. E. Ruckenstein and S. Schmitt-Rink, Phys. Rev. B., **46**, (1992).

45. *Non-Fermi-Liquid States of a Magnetic Ion in a Metal*, I. E. Perakis, C. M. Varma and A. E. Ruckenstein, Phys. Rev. Lett. **70**, 3467 (1993).

46. *Singular Low Energy Properties of an Impurity Model with Non-local Interactions*, T. Giamarchi, C. M. Varma, A. E. Ruckenstein and P. Nozières, Phys. Rev. Lett., **70**, 3967 (1993).

47. *Correlation Effects on the Tunneling of Electrons from the Surface of Liquid Helium*, Yu. M. Vilk and A. E. Ruckenstein, Phys. Rev. B **48**, 11196 (1993).

48. *Theory of Multiple Excitonic Peaks in the Luminescence Spectra of Doped Quantum Wells in a Magnetic Field*, Yu. M. Vilk, A. E. Ruckenstein and S. Schmitt-Rink, Int. J. Mod. Phys. B **7**, 3435 (1993).

49. *Spin-Charge Separation and Non-Fermi Liquid Behavior in the Multi-Channel Kondo Problem: A large-N Approach*, D. Cox and A. E. Ruckenstein, Phys. Rev. Lett. **71**, 1613 (1993).

50. *Charge and Spin Gap Formation in Exactly Solvable Hubbard Chains with Long-Range Hopping*, F. Gebhard, A. Girndt and A. E. Ruckenstein, Phys Rev B**49**, 10926 (1994).

51. *Correlation Induced Insulator to Metal Transitions*, Q. Si, M. J. Rozenberg, G. Kotliar and A. E. Ruckenstein, Phys. Rev. Lett. **72**, 2761 (1994).

52. *Low-Temperature Spin Diffusion in a Spin-Polarized Fermi Gas*, D. Golosov and A. E. Ruckenstein, Phys. Rev. Lett. **74**, 1613 (1995).

53. *Chemical Potential Pinning near a van Hove Singularity in the Cuprates*, D. Golosov, M. Horbach and A. E. Ruckenstein, J. of Supercond. **8**, 659 (1995).

54. *Transverse Spin Diffusion in a Dilute Spin-Polarized Degenerate Fermi gas*, D. Golosov and A. E. Ruckenstein, J. Low Temp. Phys. **112**, 265 (1998).

55. *Band Crossing and Novel Low-Energy Behaviour in a Mean Field Theory of a Three-Band Model on a Cu–O lattice*, D. Golosov, A. E. Ruckenstein, and M. Horbach, J. Phys.: Condens. Matter **10** L229 (1998).

56. *The Kondo Lattice in Infinite Dimensions*, G. Moeller, V. Dobrosavljievic, and E. Ruckenstein, Phys. Review B**59**, 6846 (1999).

57. *Superconducting and Magnetic Fluctuations of the Two Dimensional Hubbard Model*, Raymond Frésard and A.E. Ruckenstein, Physica B**281**, 890 (2000).

58. *Bose Condensation Without Broken Symmetries*, A. E. Ruckenstein, Founda- tions of Phys. **30**, 2113 (2000)

59. *Looking Forward to Pricing Options from Binomial Trees*, Dario Villani and E. Ruckenstein (xxx.lanl.gov-archive, physics/0008111), December 2000.

60. *Statistical Properties of a New Multiple Local Alignment Algorithm*, E. Balkovsky, A.E. Ruckenstein, and B.I. Shraiman, BioMaPS Report (2004).

61. *Bose-Einstein Transition Temperature in a Dilute Gas: a Quasiparticle Approach*, M. Haque and A. E. Ruckenstein, preprint, ArXive.org (2005).

62. *A Ratchet Mechanism for Transcription Elongation and its Control*, G. Bar-Nahum, V. Epshtein, A. E. Ruckenstein, R. Rafikov, A. Mustaev, and E. Nudler, Cell **120**, 183 (2005).

63. *Optimal Path to Epigentic Switching*, D. Roma, R. O'Flanagan, A.E. Ruckenstein, A.M. Sengupta, and R. Mukhopadhyay, Phys. Rev. E **71**, 011902 (2005).

64. *Thermodynamic and Kinetic Modeling of Transcriptional Pausing*, Vasisht R. Tadigotla, Daibhid O'Maoileidigh, Anirvan M. Sengupta, Vitaly Epstein, Richard H. Ebright, Evgeny Nudler, and Andrei E. Ruckenstein, PNAS **103**, 4439 (2006).

65. *Squeezing in the Weakly Interacting Uniform Bose-Einstein Condensate*, M. Haque and A.E. Ruckenstein, Phys. Rev. A **74**, 43622 (2006)

66. *The New Romanian Institute for Advanced Studies: a Proposal for Revitalizing Romanian Science*, A.E. Ruckenstein, E. Sorel, A. Balaban, D. Daianu, E. Gheorghiu, and I. Haiduc, Academica (Romanian Academy of Sciences), **56-57**, (2006).

67. *An Allosteric Path to Transcription Termination*, V. Epshtein, C. Cardinale, A.E. Ruckenstein, S. Borukhov and E. Nudler, Mol. Cell **28**, 991 (2007).

68. *Mitochondrial DNA Haplogroup D4a Is a Marker for Extreme Longevity in Japan*, E. Bilal, R. Rabadan, G. Alexe, N. Fuku, H. Ueno, Y. Nishigaki, Y. Fujita, M. Ito, Y. Arai, N. Hirose, A. Ruckenstein, G. Bhanot, and M. Tanaka, PLoS ONE **3(6)**, 2421 (2008).

69. *Towards a detailed model of transcription elongation: What have we learned from single-molecule experiments*?, D. O'Maoileidigh, V. Tadigotla, E. Nudler and A.E. Ruckenstein, Biophysical Journal **100**, 1157 (2011).

70. *We can't go on like this*, Andrei E. Ruckenstein, Mark E. Smith, and Nicola C. Owen, Times Higher Education, February 25, 2016.

71. *Solving Classical Computational Problems byAnnealing a Planar Quantum Vertex Model*, C. Chamon, E. R. Mucciolo, A. E. Ruckenstein, and Z.-C. Yang (Accepted to Nature Communications, December 2016).

72. *On the Kinetics of Transcription Elongation: Cases of Mistaken Identify, Com- peting Mechanisms and Model Selection*, V. Tadigotla, C. Bena, E. Nudler, and A.E. Ruckenstein, in preparation, to be submitted to Nature.

73. *Statistical Mechanics of Intrinsic Termination in Single Gene Transcription in E. coli* , V. Tadigotla, E. Nudler, and Andrei Ruckenstein, in preparation, to be submitted to PNAS.

74. *Editing and Fidelity in Transcription Elongation in Single Gene Transcription in E. coli* , A.E. Ruckenstein, E. Nudler and D. O'Maoileidigh, in preparation, to be submitted to Physical Review Letters.

75. *Three-Body Resonances and Novel Instabilities in a 1D Two-Band Hubbard Model*, A. E. Ruckenstein, A. Sudbo and C. M. Varma, preprint.

76. *The Breakdown of Fermi Liquid Theory: Three-Body Correlations and Beyond*, A. E. Ruckenstein, Proceedings of the School on Low-Dimensional Systems, Beijing, China.

Books:

Strongly Correlated Electron Systems, Vol. 1-3, 1989-1991, Edited by G. Baskaran, A. E. Ruckenstein, E. Tosatti, and Yu Lu.

Modelling Integrated Biological Systems – A Primer in the Unified Computation of Cellular and Developmental Processes, M. Kerszberg and A.E. Ruckenstein (in preparation, contracted by Springer-Verlag, 2007).