CURRICULUM VITAE

Prof. Jorge Berger פרופ"ח ג'ורג' ברגר

December, 2012

ORT Braude College, Department of Physics and Optical Engineering,
P.O. Box 78, Karmiel 2161002, Israel
Telephone: +972-4-990-1991
Email: jorge.berger@braude.ac.il

ACADEMIC EDUCATION

PhD 1980 Physics, Technion, Haifa, Israel

MSc 1973 Physics, Weizmann Institute of Science, Rehovot, Israel

Licencia 1970 Physics, Universidad de Chile, Santiago, Chile

RESEARCH INTERESTS

- Superconductivity
- Brownian motors
- Molecular dynamics
- Science teaching

ACADEMIC APPOINTMENTS

2005 - present, Associate Professor, Ort-Braude College

2001, Senior Researcher A, Technion

2000, Senior Lecturer, Ort-Braude College

2000, Senior Researcher B, Technion

1997, Senior Teaching Associate, Technion

1993, Senior Research Associate, Technion

1983, Lecturer, University of Haifa

1980, Research Associate with teaching option, Technion

TEACHING EXPERIENCE

ORT Braude College of Engineering:

Undergraduate Courses

Physics for Biotechnologists

Modern Physics for Biotechnologists

Physics for Software Engineers

Mechanics

Mechanics, Extended Level

Electromagnetism

Electromagnetism, Extended Level

Modern Physics, Extended Level

Electromagnetic Phenomena in Solids

OTHER INSTITUTIONS

Dep. of Physics, Technion: Mechanics.

Dep. of Education in Tech. & Science, Technion: Enrichment course for intermediate-school teachers.

Oranim (College): Basic Concepts in Science.

Weizmann Institute: Adaptation course for new immigrant high-school teachers.

Feinberg Graduate School, Weizmann Institute: Assistant teacher in Statistical Mechanics.

Oranim (University of Haifa): Statistical Mechanics; Thermodynamics; Electromagnetism; Laboratories (mainly in modern physics); Selected Topics in Physics.

Center for Pre-Academic Studies, Technion: General Physics.

RESEARCH GRANTS

- Israel Science Foundation, Dynamic Phenomena in Mesoscopic Supercoductors, Oct 2010 – Sept 2014; 195,000 NIS per year. Principal investigators: Jacob Rubinstein and Jorge Berger.
- Israel Science Foundation, Broken Symmetry and Spontaneous Topological Charges in Multi-Connected Superconductors, Oct 2003 – Sept 2006; 191,000 NIS per year. Principal investigators: Jorge Berger and Boris Shapiro.
- Israel Science Foundation, Patterns in the Ginzburg-Landau Equation, Oct 1998 – Sept 2001; 108,000 NIS per year. Principal investigators: Jacob Rubinstein and Jorge Berger.

PROFESSIONAL ACTIVITIES

Head of the Physics Department at ORT Braude College during Oct. 2006 – Sept. 2010.

Reviewing for professional journals on a regular basis: Physical Review

Reviewing for professional journals (sporadic): Science, Mathematical Reviews, Europhysics Letters, Physica A, Physica C, American Journal of Physics, Journal of Mathematical Physics, Journal of Chemical Information and Modeling, Computational Materials Science, Journal of Physics: Condensed Matter, International Journal of Theoretical Physics, Physics Letters A.

Member of the Editorial Board of the virtual journal "Entropy" (www.mdpi.org/entropy/editors.htm) during the years 2003-2006.

Chairman of the Organizing Committee of the Workshop "Fluctuations and Phase Transitions in Superconductors", Nazareth Illit, June 10-14, 2007.

Member of the Organizing Committee of the 2005 annual meeting of the Israel Physical Society.

Member of the team that developed the program for BSc in Optical Engineering at ORT Braude College

LIST OF PUBLICATIONS

Refereed Papers

1. J. Berger and R.M. Hornreich, Temperature dependence of the field induced magnetization reorientation in Dzialoshinsky-Moriya type weak ferromagnets, Journal of Physics and Chemistry of Solids **34** (1973), pp. 2011-2020.
2. J. Berger, Ordered motion of a plasma under appropriate geometry and external magnetic field, Collective Phenomena **2** (1977), pp. 171-174.
3. J. Berger and S.G. Eckstein, Criterion for nonexponential decay, Physical Review A **26** (1982) pp. 1226-1227.
4. J. Berger and S.G. Eckstein, Quasiparticle properties for a dense electron gas within the random-phase approximation, Physical Review B **26** (1982) pp. 4305-4311.
5. M. Privman, J. Berger and D.S. Tannhauser, Structure of ITO electrodes on zirconia, Thin Solid Films **102** (1983) pp. 117-122.

6. J. Berger and D.S. Tannhauser, Personal computer as an inexpensive lock-in analyzer operating at very low frequencies, Review of Scientific Instruments **54** (1983) pp. 1781-1783.
7. J. Berger, Drift of excitons induced by static electromagnetic field, Solid State Communication **53** (1985), pp. 387-389.
8. J. Berger, Relationship between angular distribution of reflected particles and the second principle of thermodynamics in the presence of a magnetic field, American Journal of Physics **53** (1985) pp. 899-902.
9. J. Berger, I. Riess and D.S. Tannhauser, Dynamic measurement of oxygen diffusion in indium-tin oxide, Solid State Ionics **15** (1985) pp. 225-231.
10. J. Berger, Comment on "Gas concentration nonuniformity and kinetic anistropy in high vacuum", Journal of Vacuum Science and Technology A **5** (1987) p. 382.
11. J. Berger, On potential energy, its force field and their measurement along an air track, European Journal of Physics **9** (1988), pp. 47-50.
12. J. Berger, Kinetic illustration for thermalization, American Journal of Physics **56** (1988) pp. 923-928.
13. J. Adler, J. Berger, J.A.M.S. Duarte and Y. Meir, Directed percolation in 3+1 dimensions, Physical Review B **37** (1988) pp. 7529-7533.
14. J. Berger, Do heavy gases fall? European Journal of Physics **9** (1988) p. 335
15. J. Berger, Szilard's demon revisited, International Journal of Theoretical Physics **29** (1990) pp. 985-995.
16. J. Berger, An almost simple counterexample to "microscopic inversibility", European Journal of Physics **11** (1990) pp. 155-159.
17. E. Berger and J. Berger, A game with a non-obvious symmetry, European Journal of Physics **11** (1990) pp. 245-247.
18. T. Tlusty and J. Berger, A simple maximization technique for statistical mechanics expressions, American Journal of Physics **60** (1992) pp. 379-380.
19. J. Berger and A. Aharony, Field-dependent magnetic phases in La_2CuO_4 at zero temperature, Physical Review B **46** (1992) pp. 6477-6487.
20. J. Berger and A. Aharony, Temperature dependence of the field-induced magnetic phases in La_2CuO_4, Physical Review B **47** (1993) pp. 1016-1023.
21. J. Berger, R.M. Hornreich and M. Warner, Instabilities and melting in a two-dimensional magnetic dipolar system, Physica A **194** (1993) pp. 199-208.

22. J. Berger, The fight against the second law of thermodynamics, Physics Essays **7** (1994) pp. 281-296.
23. J. E. Avron and J. Berger, Tiling rules for toroidal molecules, Physical Review A **51** (1995) pp. 1146-1149.
24. J. Berger and J. Rubinstein, Topology of the order parameter in the Little-Parks experiment, Physical Review Letters **75** (1995) pp. 320-322.
25. J. Berger and J.E. Avron, A classification scheme for toroidal molecules, Journal of the Chemical Society - Faraday Transactions **91** (1995) pp. 4037-4045.
26. J. E. Avron, J. Berger and Y. Last, Piezoelectricity: quantized charge transport driven by adiabatic deformations, Physical Review Letters **78** (1997) pp. 511-514.
27. J. Berger and J. Rubinstein, Signatures for the second critical point in the phase diagram of a superconducting ring, Physical Review B **56** (1997) pp. 5124-5127.
28. J. Berger and J. Rubinstein, Formation of topological defects in thin superconducting rings, Philosophical Transactions of the Royal Society A **355** (1997) pp. 1969-1978.
29. J. Berger and J. Rubinstein, Design for the detection of the singly-connected superconducting state, Physica C **288** (1997) pp. 105-114.
30. J. Avron and J. Berger, Toroidal graphitic molecules, Fullerene Science and Technology **6** (1998) pp. 31-37.
31. J. Berger and J. Rubinstein, Bifurcation analysis for phase transitions in superconducting rings with nonuniform thickness, SIAM Journal of Applied Mathematics **58** (1998) pp. 103-121.
32. J. Avron and J. Berger, The Longuet-Higgins phase and charge transport in molecular rings, Chemical Physics Letters **294** (1998) pp. 13-18.
33. J. Berger and J. Rubinstein, Flux-induced vortex in mesoscopic superconducting loops, Physical Review B **59** (1999) pp. 8896-8901.
34. J. Avron and J. Berger, Quantum transport in molecular rings and chains, Proceedings of the Royal Society A **455** (1999) pp. 2729-2750.
35. J. Berger and J. Rubinstein, On the zero set of the wave function in superconductivity, Communications in Mathematical Physics **202** (1999) pp. 621-628.
36. J. Berger, Position of a vortex in mesoscopic samples, Physica C **332** (2000) pp. 281-284.

37. J. Berger, Order of the normal-superconducting transition in mesoscopic rings, Physica B **284-288** (2000) pp. 1886-1887.
38. J. Berger, Spontaneous breaking of axial symmetry for the Schrödinger equation in the presence of a magnetic field, Physical Review B **63** (2001) pp. 172507(1-3).
39. J. Berger and J. Rubinstein, Continuous phase transitions in mesoscopic systems, Zeitschrift für angewandte Mathematik und Physik **52** (2001) pp. 347-355.
40. J. Berger, Flux transitions in a superconducting ring, Physical Review B **67** (2003) pp. 014531(1-7).
41. J. Berger, Extension of the de Broglie-Bohm theory to the Ginzburg-Landau equation, Foundations of Physics Letters **17** (2004) pp. 287-294.
42. J. Berger, Noise rectification by a superconducting loop with two weak links, Physical Review B **70** (2004) pp. 024524(1-6).
43. J. Berger, Nonlinearity of the field induced by a rotating superconducting shell, Physical Review B **70** (2004) pp. 212502(1-3).
44. J. Berger, The Chernogolovka Experiment, Physica E **29** (2005) pp. 100-103.
45. J. Berger, Time-dependent Ginzburg-Landau equations with charged boundaries, Journal of Mathematical Physics **46** (2005) pp. 095106 (1-14).
46. J. Berger, Spontaneous superconducting islands and Hall voltage in superconductors with large electric penetration depth, Physical Review B **71** (2005) pp. 174504 (1-11).
47. J. Berger, Ginzburg-Landau equations with consistent Langevin terms for nonuniform wires, Physical Review B **75** (2007) pp. 184522 (1-18).
48. A. Kanda, B. J. Baelus, D. Y. Vodolazov, J. Berger, R. Furugen, Y. Ootuka, and F. M. Peeters, Evidence for a different type of vortex that mediates a continuous fluxoid-state transition in a mesoscopic superconducting ring, Physical Review B **76** (2007) pp. 094519 (1-8).
49. J. Berger, Consistent Langevin terms in the numeric treatment of superconducting wires, Physica C **468** (2008) pp 268-271.
50. J. Berger, Confinement into a metastable state with persistent current by thermal quenching of loop of Josephson junctions, Physica C **468** (2008) pp 294-298.
51. J. Berger, A. Kanda, R. Furugen, and Y.Ootuka, Location of flux-induced vortex, Physica C **468** (2008) pp 848–851.

52. J. Berger, Derivation of the Langevin equation from the principle of detailed balance, The Journal of Statistical Mechanics: Theory and Experiment (2010) P07022 (11 pages).
53. J. Berger, The influence of thermal fluctuations on uniform and nonuniform superconducting rings according to the Ginzburg--Landau and the Kramer--Watts-Tobin models, Journal of Physics: Condensed Matter **23** (2011) pp. 225701(1-13).
54. J. Berger, Thermal fluctuations in superconducting rings with general shape, Physical Review B **83** (2011) pp. 172504 (1-3).
55. J. Berger and M. Milosevic, Fluctuations in superconducting rings with two order parameters, Physical Review B **84** (2011) pp. 214515 (1-9).
56. J. Berger, Supercurrent fluctuations in filaments, Physical Review B **85** (2012) pp. 144507(1-8).
57. G. Drachuck, M. Shay, G. Bazalitsky, J. Berger, and A. Keren, Parallel and perpendicular susceptibility above T_c in $La_{2-x}Sr_xCuO_4$ single crystals, Physical Review B **85** (2012) pp. 184518 (1-7).

Books

1. J. Berger and J. Rubinstein (eds.), *Connectivity and Superconductivity*, Springer Verlag, Lecture Notes in Physics, vol. m62 (2000).
2. J. Berger, Y. Oreg, D. Shahar, and B. Shapiro (guest editors), Volume 468/4 of *Physica C* devoted to Fluctuations and Phase Transitions in Superconductors (2008).
3. J. Berger, Mechanics à la Braude (a textbook in mechanics at extended level, ~140 pages), Magnes Press (accepted).

Chapters in Books

1. J. Berger, The fight against the second law of thermodynamics, in Horizons of Physics, Vol. II (New Age, 1996, A.W. Joshi, editor) pp. 62-89.
2. J. Berger, J. Rubinstein and M. Schatzman, Multiply connected mesoscopic superconducting structures in "Calculus of Variations and Differential Equations" (A. Ioffe, S. Reich and I. Shafrir, editors), Chapman & Hall/CRC Research Notes in Mathematics Series, Vol. 410, CRC Press, Boca Raton, FL, 2000, pp. 21-40.

3. J. Berger, Zero set of the order parameter, especially in rings in "Connectivity and Superconductivity" (J. Berger and J. Rubinstein, editors), Springer Verlag, Lecture Notes in Physics, vol. m62 (2000), pp. 138-173.

Conference Proceedings

S.G. Eckstein and J. Berger, A superfluid with mixed singlet and triplet pairs, in "Liquid and Solid Helium" (John Wiley, 1975, C. G. Kuper et al., editors), pp. 171-175.

J. Berger, Objectivity of thermodynamic quantities, in "Quantum Limits to the Second Law" (AIP, 2002, D. P. Sheehan, editor), pp. 456-459.

J. Berger, Fluctuations in a Superconducting Wire, AIP Conf. Proc. **850** (2006) 773.

J. Berger, A nonconventional scenario for thermal equilibrium, Foundations of Physics **37** (2007) pp. 1738-1743.

J. Berger, Fluctuation superconductivity in uniform and nonuniform rings, Journal of Physics: Conference Series **150** (2009) 052020 (1-4).

J. Berger, Fluctuation current in superconducting loops, Journal of Physics: Conference Series, accepted (LT26, scheduled for 2012).