

## ROBERT JOYNT

### PUBLICATIONS AND PATENTS (2/16/07)

1. Conduction in a Strong Field in Two Dimensions: The Quantum Hall Effect, (with R. E. Prange) Phys. Rev. **B25**, 2943 (1982).
2. Conditions for the Quantum Hall Effect, (with R. E. Prange) Phys. Rev. **B29**, 3303 (1984).
3. Electrical Resistance of Itinerant Ferromagnets, J. Phys. **F14**, 2363 (1984).
4. Scattering Wavefunctions in the Quantum Hall Effect, J. Phys. **C17**, 4807 (1984).
5. Ground State Magnetovolume Effect in Alloys (with V. Heine) Jour. Magn. Mat. **45**, 74 (1984).
6. Theory of the AC Breakdown of the Quantum Hall Effect, J. Phys. **C18**, L331 (1985).
7. Effect of Single-Particle Lifetimes in High Temperature Magnetic Neutron Scattering, J. Phys. **F15**, 2203 (1985).
8. Semiclassical States in the Quantum Hall Effect, in Festkörperprobleme (Advances in Solid State Physics) vol. XXV, p. 413, P. Grosse (ed.), Vieweg, Braunschweig, 1985.
9. Strain Distortion in Anisotropic Superconductors, (with T. M. Rice) Phys. Rev. **B32**, 6074 (1985).
10. Sound Attenuation due to Domain Walls in Anisotropic Superconductors with Applications to  $U_{1-x}Th_xBe_{13}$ , (with T. M. Rice and K. Ueda) Phys. Rev. Lett. **56**, 1412 (1986).
11. Frequency and Temperature-dependent Conductivity in the Quantum Hall System, in Application of High Magnetic Fields in Semiconductor Physics, ed. G. Landwehr, p. 75 (Springer, Berlin, 1987).
12. Possibility of Additional Phases of Anisotropic Superconductors under Uniaxial Stress, (M. Sigrist, and T. M. Rice) Europhysics Lett. **3**, 629 (1987)
13. Experimental Identification of Unconventional Superconducting Phases, Physica Scripta **36**, 175 (1987).
14. Antiferromagnetic Correlation in Almost-localized Fermi Liquids, (with C. Gros, and T. M. Rice) Phys. Rev. **B36**, 381 (1987).
15. Photoemission Resonances of the High-Temperature Superconductor  $Ba_2YCu_2O_{7-x}$ , (with M. Onellion, et al.) Phys. Rev. **B36**, 819 (1987).
16. Experimental Evidence for Granular Superconductivity in Y-Ba-Cu-O at 100 to 160 K, (with X. Cai, and D. C. Larbalestier) Phys. Rev. Lett. **58**, 2798 (1987).
17. High-temperature Superconductor  $Ba_2YCu_2O_{7-x}$  : Plasmon and Ultraviolet Optical Transition Studies, (with Y. Chang, et al.) Sol. St. Comm. **63**, 717 (1987).
18. Experiments Concerning the Connective Nature of Superconductivity in  $YBa_2Cu_2O_{7-x}$ , (with D. C. Larbalestier, et al.) J. Appl. Phys. **62**, 3308 (1987).
19. Behavior of Anisotropic Superconductors Under Uniaxial Stress, (with M. Sigrist, and T. M. Rice) Phys. Rev. **B36**, 5186 (1987).
20. Superconducting Instability in the Large-U limit of the Two-dimensional Hubbard Model, (with C. Gros, and T. M. Rice) Z. Phys. **B68**, 425 (1987),

- reprinted in *The Hubbard Model*, ed. M. Rasetti and A. Montorsi: (World Scientific, Singapore, 1991).
21. Heavy Fermions and Heavy Fermion Superconductivity (with T. M. Rice, M. Sigrist, and C. Gros) in *Proceedings of the Fifth International Conference on Valence Fluctuations* (Plenum, New York, 1987).
  22. Coarse-grained Disorder above  $T_c$  in Iron, (with V. Heine) *Europhysics Lett.* **5**, 81 (1988).
  23. Magnetic Properties of Anisotropic Superconductors, (with T. M. Rice) *Phys. Rev.* **B38**, 2345 (1988).
  24. Relative Stability of Anisotropic Superconducting Phases in  $UPt_3$ , (with W. O. Putikka) *Phys. Rev.* **B37**, 2372 (1988).
  25. Hole Propagation in Correlated Spin Systems, *Phys. Rev.* **B37**, 7979 (1988).
  26. Numerical Studies of Superconductivity in the Two-dimensional Hubbard Model, in *Proceedings of the Minnesota Workshop on Mechanisms of High-temperature Superconductivity* ed. J. W. Halley (Addison- Wesley, New York, 1988).
  27. Phase Diagram of d-wave Superconductors in a Magnetic Field, *Superconductor Science and Technology* **1**, 210 (1988).
  28. Mean Field RVB Theory: Degeneracy, Gauge Symmetry, and the Comparison to Exact Results (with F. C. Zhang, C. Gros, T. M. Rice and H. Shiba) *Physica C* **153**, 1251 (1988).
  29. Theoretical Determination of the Superconducting Phase of  $UPt_3$ , (with W. O. Putikka) *Phys. Rev.* **B39**, 701 (1989).
  30. Theoretical and Experimental Analysis of the Superconducting Transition Effects on the Fermi-edge Photoemission Spectra, (with Y. Chang et al. *Phys. Rev. B* **39**, 4740 (1989).
  31. Cleaved Single Crystals of High- $T_c$  Superconductors: Electron Spectroscopy and Electron Diffraction Studies, (with N. G. Stoffel et al.) *Surf. Sci.* **211/212**, 1123 (1989).
  32. Superconducting Phases of  $UPt_3$  in a Magnetic Field, (with S. K. Sundaram) *Phys. Rev.* **B40**, 8780 (1989).
  33. Superconducting Phases of Heavy Fermion Superconductors, *Physica C* **162-164**, 1673 (1989).
  34. Ground State of a Multiple Quantum Well: Possibility of Irrational Charge, (with X. Qiu, and A. H. MacDonald), *Phys. Rev.* **B40**, 11943 (1989).
  35. Upward Curvature of  $H_{c2}$  in High- $T_c$  Superconductors: Evidence for Anisotropic Pairing, *Phys. Rev.* **B41**, 4271 (1990).
  36. Shape of the Upper Critical Field Curves in  $Uru_2Si_2$ : Evidence for Anisotropic Pairing, (with W. Kwok, L. DeLong, G. Crabtree, and D. Hinks), *Phys. Rev.* **B41**, 11649 (1990).
  37. Dynamics of One Hole in the t-J Model (with E. Dagotto, A. Moreo, S. Bacci, and E. Gagliano), *Phys. Rev. B.* **41**, 2585 (1990).
  38. Possible Phase Diagrams of  $UPt_3$  (with V. P. Mineev, G. E. Volovik, and M. E. Zhitomirskii), *Phys. Rev. B.* **42**, 2014 (1990).

39. Strongly Correlated Electronic Systems with One Hole: Dynamical Properties (with E. Dagotto, A. Moreo, S. Bacci, and E. Gagliano), *Phys. Rev.* **B41**, 9049 (1990).
40. Phase Diagram of a Multiple Quantum Well in a Strong Perpendicular Field (with X. Qiu and A. H. MacDonald), *Phys. Rev. B* **42**, 1339 (1990).
41. Effects of Disorder on Superconductivity in the Two-dimensional Hubbard Model (with W. Halley, S. Davis, and P. Samsel), *Proc. of the Int. Conf. on Valence Fluctuations*, (New World Scientific, Singapore, 1990).
42. Superconductivity and Antiferromagnetism in  $U\text{Pt}_3$ , *J. Phys. Cond. Matt. Lett.* **2**, 3415 (1990).
43. Numerical Evaluation of Candidate Wavefunctions for High- $T_c$  Superconductors, in *Computer Simulation Studies of Condensed Matter Systems III* ed. D. P. Landau, B. Schuettler, and K. K. Mon (Springer, Berlin, 1990).
44. Phase Diagram of the t-J Model from Variational Monte Carlo Studies: Occurrence of Time-reversal Symmetry Breaking, (with G. J. Chen, F. C. Zhang, and C. Gros), *Phys. Rev.* **B42**, 2662 (1990).
45. Calculations of the Effect of Point Defects on Hubbard Models of High Temperature Superconductivity (with J.W. Halley, S. Davis, and P. Samsel), *Bull. Mater. Sci.* **14**, 1069 (1991)
46. Exact Solution of the Ginzburg-Landau Equations for the Upper Critical Field of a d-wave Superconductor (with S. K. Sundaram), *Phys. Rev. Lett.* **66**, 512 (1991).
47. Nature of the Lower Transition in  $U\text{Pt}_3$ , *Physica B* **171**, 305 (1991).
48. Theory of Dichroism in High-temperature Superconductors (with Q. P. Li) *Phys. Rev.* **B44**, 4720 (1991).
49. Staggered Flux Phase and d-wave Phase of the t-J Model, (with G. J. Chen and F. C. Zhang), *J. Phys. Cond. Matt. Lett.* **3**, 5213 (1991).
50. Domain Walls in S+id Superconductors, (with H. Bark), *Supercon. Sci. Tech.* **4**, 216 (1991).
51. Nature of the Lower Superconducting Transition in  $U\text{Pt}_3$ , *Europhys. Lett.* **16**, 289 (1991).
52. Elementary Excitations in One-Dimensional Quantum Wires: Exact Equivalence Between RPA and Tomonaga-Luttinger Model (with Q. P. Li and S. Das Sarma), *Phys. Rev.* **B54**, 13713 (1992).
53. The Phase Diagram of  $U\text{Pt}_3$ : A Status Report, *J. Mag. Mag. Mat.* **108**, 31 (1992)
54. Nuclear Relaxation Rates, Penetration Depth, and Energy-dependent Gap Functions in High- $T_c$  Superconductors (with Q. P. Li), *Mod. Phys. Lett.* **B6**, 1145 (1992).
55. Mott-Hubbard Metal-Insulator Transition in Hubbard Models at High Spin, (with Q. P. Li) *Phys. Rev.* **B47**, 3974 (1993).
56. Nuclear Relaxation in the Superconducting State of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ : Evidence for the s+id State, *Phys. Rev* **B47**, 530 (1993).
57. Mixed s-wave and d-wave Superconductivity in High- $T_c$  systems, (with B. Koltenbah and Q. P. Li) *Phys. Rev.* **B48**, 437(1993)

58. Superconducting  $\text{UPt}_3$  under Pressure, *Phys. Rev. Lett.* **71**, 3015 (1993)
59. Photoemission and Tunneling as Tests of Fluctuating Superconductivity in High- $T_c$  Superconductors (with K. Park), *Phys. Rev.* **B48**, 16833 (1993)
60. The Effect of Geometry on the Critical Currents of Thin Films (with G. Stejic, A. Gurevich, E. Kadyrov, D. K. Christen, and D. C. Larbalestier), *Phys. Rev.* **B49**, 1274 (1994)
61. Josephson Coupling and Magnetism in d-wave Superconductors (with H. Bark), *Jour. Korean Phys. Soc.* **27**, 76 (1994)
62. Metal-Insulator Transition and Magnetic Ordering near the Nagaoka Limit (with Q. P. Li), *Phys. Rev.* **B49**, 1632 (1994)
63. Temperature-dependent Gap Anisotropy in  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$  as Evidence for a Mixed-symmetry Ground State (with J. Betouras), *Europhys. Lett.* **31**, 119 (1995)
64. Phase Diagram of  $\text{UPt}_3$  in the  $E_{1g}$  model (with K. Park), *Phys. Rev. Lett.* **74**, 4734 (1995)
65. Theoretical Study of the Critical Current of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  Bicrystals with Oxygen-deficient Grain Boundaries (with J. Betouras), *Physica C* **250**, 256 (1995)
66. Mixed Symmetry Superconductivity in Two-dimensional Fermi liquids (with K.A. Musaelian, J. Betouras, A.V. Chubukov), *Phys. Rev. B* **53**, 3598 (1996)
67. Broken Rotation Symmetry in the Fractional Quantum Hall System, (with K. Musaelian), *Journal of Physics: Cond. Matter* **8**, L105 (1996)
68. Phase Diagram of Superconducting  $\text{UPt}_3$  in the  $E_{1g}$  model (with K. Park), *Phys. Rev. B* **53**, 12346 (1996)
69. Ginzburg-Landau Theory of Josephson Field Effect Transistors (with J. Betouras, Z. Dong, T. Venkatesan, and P. Hadley), *Appl. Phys. Lett.* **69**, 2432 (1996)
70. Interpretation of Photoemission Spectra of  $(\text{TaSe}_4)_2\text{I}$  as Evidence for Charge Density Fluctuations, *J. Phys: Cond. Matt.* **8**, 10493 (1996)
71. Superfluid densities in Neutron Star Matter, (with M. Borumand and W. Kluzniak), *Phys. Rev. C* **54**, 2745 (1996)
72. Material-Specific Calculations of Gap Symmetry in High- $T_c$  Superconductors (with B. Koltenbah), *Repts. Prog. in Phys.* **60**, 23 (1997)
73. Theory of Neutron Diffraction from the Flux Lattice of  $\text{UPt}_3$ , *Phys. Rev. Lett.* **78**, 3191 (1997)
74. Bound States and Impurity Averaging in Unconventional Superconductors, *J. Low Temp. Physics* **109**, 811 (1997)
75. The Anderson model in a superconductor:  $\Phi$ -derivable theory, (with A. Alastalo and M.M. Salomaa), *J. Phys.: Condens. Matter* **10**, L63 (1998)
76. Nonlinear Magnetization in Superconductors with s+d Ordering, (with J. Betouras), *Phys. Rev. B* **57**, 11752 (1998)
77. c-axis Tunneling in YBCO (with R. Haslinger and J. Betouras), *J. Phys. Chem. Solids* **59**, 2026 (1998)
78. Analysis and Experimental Evidence of s+d Ordering in High- $T_c$  Superconductors (with J. Betouras), *Physica C: Superconductivity* **317-318**, 669 (1999)

79. Density of States in Impure Unconventional Superconductors, *Physica B: Condensed Matter* **259-261**, 479 (1999)
80. Pseudogaps and Extrinsic Losses in Photoemission Experiments on Poorly Conducting Materials, *Science* **284** 777 (1999)
81. Theory of Percolative Conduction in Polycrystalline High-temperature Superconductors (with R. Haslinger), *Phys. Rev. B* **61**, 4206 (2000)
82. The Spectral, Structural and Transport Properties of the Pseudogap System  $(\text{TaSe}_4)_2\text{I}$ , (with N. Shannon), *Solid State Comm.* **115**, 411 (2000)
83. Theory of Josephson Tunneling along the c-axis in YBCO, (with R. Haslinger) *J. Phys.: Cond. Mat.* **12**, 8179 (2000)
84. Can Inelastic Processes Mimic a Pseudogap in Photoemission Experiments? *Chinese Journal of Physics* **38**, 295 (2000)
85. Theory of the Transition at 0.2 K in Ni-Doped  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$  *Phys. Rev. Lett.* **84**, 3954 (2000)
86. Ohmic Losses in Valence-band Photoemission Experiments (with R. Haslinger) *J. Elec. Spectr. Rel. Phen.* **117-118**, 31 (2001)
87. Transport and the Order Parameter of  $\text{Sr}_2\text{RuO}_4$  (with W.C. Wu), *Phys. Rev. B* **64**, 100507 (2001)
88. Comment on "Final-state interactions in photoemission: Energy loss by the exiting electron", *Phys. Rev. B* **65**, 077403 (2002)
89. Thermodynamics of Superconducting  $\text{UPt}_3$  (with W.C. Wu), *Phys. Rev. B* **65**, 104502 (2002)
90. The Superconducting Phases of  $\text{UPt}_3$  (with L. Taillefer), *Rev. Mod. Phys.* **74**, 235 (2002)
91. Practical design and simulation of silicon-based quantum dot qubits, (with M. Friesen, M. Eriksson, D. van der Weide, D. Savage, P. Rugheimer, and M. Lagally), *Phys. Rev. B* **67**, 121301(R) (2003)
92. Decoherence of Spin Qubits in Si-based Quantum Computers (with C. Tahan and M. Friesen), *Phys. Rev. B* **66**, 035314 (2002)
93. Ultrafast carrier relaxation dynamics in single-layer cuprates (with M.L. Schneider, et al.), *Europhysics Lett.* **60**, 460 (2002)
94. Pseudo-digital Qubits (with M. Friesen and M. Eriksson), *Appl. Phys. Lett.* **81**, 4619 (2002)
95. A Relativistic Mean Field Model for Entrainment in General Relativistic Superfluid Neutron Stars, (with G. Comer), *Phys. Rev. D* **68**, 023002 (2003)
96. Pseudo-Digital Qubits: A General Approach, M. Friesen, R. Joynt, and M. A. Eriksson, in *Proc. 6th International Conf. on Quantum Communication, Measurement and Computing (QCMC02)* (Rinton Press, Princeton, NJ, 2003)
97. Electronic Inhomogeneity at Magnetic Domain Walls in Strongly-correlated Systems (with M. Rzchowski), *cond-mat/0304287*, *Europhys. Lett.* (2004)
98. One-dimensional quantum walks with absorbing boundaries (with E. Bach, M. Goldschen, S. Coppersmith and J. Watrous), *Journal of Computer and System Sciences* **69**, 562 (2004)
99. Theory of Optical Orientation in n-type Semiconductors, (with W.O. Putikka), *cond-mat 0309155*, *Phys. Rev. B* **70**, 113201 (2004)

100. Spin Readout and Initialization in a Semiconductor Quantum Dot, (with M. Friesen, M.A. Eriksson, and C. Tahan), cond-mat 0304422, Phys. Rev. Lett. **92**, 037901 (2004)
101. Coulomb Blockade in a Si:SiGe Two-Dimensional Electron Gas Quantum Dot, L.J. Klein, K. Slinker, J.L. Truitt, S Goswami, K.L.M. Lewis, S.N. Coppersmith, D.W. van der Weide, Mark Friesen, R. Blick, D.E. Savage, M.G. Lagally, Charlie Tahan, Robert Joynt, M.A. Eriksson, cond-mat/0404399, Appl. Phys. Lett. **84**, 4047 (2004)
102. Spin-based Quantum Dot Quantum Computing in Silicon, M. A. Eriksson, M. Friesen, S. N. Coppersmith, R. Joynt, L. Klein, K. Slinker, C. Tahan, P. M. Mooney, J. O. Chu, and S. Koester, Quantum Information Processing **3**, 133 (2004)
103. Solid State Quantum Computing using Spin Qubits in Silicon Quantum Dots, (Invited Review), M.A. Eriksson, . . Blick, S.N. Coppersmith, M. Friesen, R. Joynt, M.G. Lagally, D. W. van der Weide, A.J. Rumberg, P. Mooney, J Chu, and S. Koester, Quantum Information Processing **3**, 133 (2004)
104. Spin relaxation in SiGe two-dimensional electron gases, C. Tahan and R. Joynt, cond-mat/0401615, Phys. Rev. B **71**, 075315 (2005)
105. Physically-motivated dynamical algorithms for the graph isomorphism problem, Shiue-yuan Shiau, Robert Joynt, and S.N. Coppersmith, Quantum Information and Computation **5**, 492 (2005)
106. Rashba spin-orbit coupling and spin relaxation in silicon quantum wells C. Tahan and R. Joynt, Phys. Rev. B **71**, 075315 (2005)
107. "Quantum dots in Si/SiGe 2DEGs with Schottky top-gated leads," K.A. Slinker, K.L.M. Lewis, C.C. Haselby, S. Goswami, L.J. Klein, J.O. Chu, S.N. Coppersmith, Robert Joynt, R.H. Blick, Mark Friesen, and M.A. Eriksson, New Journal of Physics **7**, 246, 2005.
108. Exact solution of qubit decoherence models by a transfer matrix method, D. Nghiem and R. Joynt, Phys. Rev. A **73**, 032333 (2006), (also selected for the April 3, 2006 issue of Virtual Journal of Nanoscale Science & Technology and the April, 2006 issue of Virtual Journal and Quantum Information Science).
109. Electron spin coherence in Si/SiGe quantum wells, J.L. Truitt, K.A. Slinker *et al.*, submitted, 2006
110. "Spectroscopy of valley splitting in a Si/SiGe two-dimensional electron gas", S. Goswami, J.L. Truitt *et al.*, submitted, 2006
111. "Detection and measurement of the Dzyaloshinskii-Moriya interaction in double quantum dot systems", S. Chutia, M. Friesen, and R. Joynt, cond-mat/0601098, accepted in Phys. Rev. B
112. "Energy Level Statistics of Quantum Dots", Chien-Yu Tsau, Diu Nghiem, Robert Joynt, J. Woods Halley, submitted to J. Phys.: Cond. Matt., 2006
113. "Valley Kondo Effect in Silicon Quantum Dots", by Shiue-yuan Shiau, Sucismita Chutia, and Robert Joynt, cond-mat/0611722, submitted to Phys. Rev. B, 2007

### **BOOKS EDITED:**

High- $T_c$  Superconducting Thin Films, Devices, and Applications (Am. Inst. of Physics, Conf. Proc. American Vacuum Society Meeting, Atlanta, GA 1988) (with G. Margaritondo and M. Onellion).

### **PATENTS:**

1. U.S. Patent No. 6,597,010: “Solid-state quantum dot devices and quantum computing using nanostructured logic gates”, awarded 7/22/2003. Inventors: M.A. Eriksson, M. Friesen, R. Joynt, M. Lagally, D. van der Weide, P. Rugheimer, and D. Savage.
2. U.S. Patent No. 7,137,697 “A self-contained, patterned quantum dot device for spin to charge transduction, readout and initialization, for use in quantum computing and quantum information processing”, awarded 11/14/2007. Inventors: M. Friesen, C. Tahan, R. Joynt, and M.A. Eriksson.

