

## **RESUME of BARRY FRIEDMAN**

### **EDUCATION**

[1985] Ph.D., Physics, *UNIVERSITY of ILLINOIS*, Urbana, Illinois, thesis advisor: Y. Oono.

[1978] B.A., Physics, *RICE UNIVERSITY*, Houston, Texas.

### **EMPLOYMENT**

[9/2002-present] Professor of Physics, Sam Houston State University, Huntsville, Texas.

[9/96-9/2002] Associate Professor of Physics, Sam Houston State University, Huntsville, Texas.

[9/98-9/99] Visiting Scientist, Electrotechnical Laboratory, Tsukuba, Japan, Host: S. Abe.

[9/89-9/96] Assistant Professor of Physics, Sam Houston State University, Huntsville, Texas.

[1/90-9/90] Japan Society for the Promotion of Science Fellow, Institute for Solid State Physics of the University of Tokyo, Tokyo, Japan, Host: M. Kohmoto.

[1/88-9/89] Postdoctoral Research Associate, Physics Department, University of Houston, Houston, Texas, supervisor: W. P. Su.

[10/87-11/87] Visiting Scientist, Theoretical Condensed Matter, Cavendish Laboratory, Cambridge University, Cambridge England.

[10/85-10/87] Bantrell Postdoctoral Fellow, Chemical Physics Department, Weizmann Institute, Rehovot, Israel, supervisor: I. Procaccia.

### **CURRENT RESEARCH INTERESTS**

Theoretical Solid State Physics: Quantum Hall systems, Application of the Density Matrix Renormalization Group to strongly correlated electrons, Near Field Scanning Microwave Microscopy, High Temperature Superconductivity

### **FUNDING HISTORY**

[2007-2010] “RUI: Density Matrix Renormalization Group Studies of Quantum Hall Systems” National Science Foundation, \$126000.

[2006-2008] “ A Computational Study of Strongly Correlated Electron States in High Landau Levels” Texas Advanced Research Program (ATP) \$70000.

[2003-2006] “ New Approaches to Ground State and Transport Properties of Strongly Correlated Two dimensional Electron Systems” National Science Foundation,co-PI, (PI is Professor D. Sheng, California State University, Northridge) \$96000.

[2003-2004] “Computational Study of the Quantum Hall Stripe Phases Using the Density Matrix Renormalization Group , Enhancement Grant for Research (EGR), Sam Houston State University \$10732.

[2001-2003] ITP (Institute for Theoretical Physics, Santa Barbara) Scholar (three round trips to the ITP, plus local expenses)

[2002] "Inelastic X-ray Scattering Studies of Organic Aggregates", Research Council of Sam Houston State University, \$5000.

[2001] "Electron Correlation and Non-Adiabatic Effects in Low Dimensional Materials", Research Council of Sam Houston State University, \$5000.

[1998-1999] "Nonadiabatic Processes and Electron Correlation in Low Dimensional Systems", National Science Foundation, (Long-term Visit for Individual Research Projects to Japan)  
\$109,000.

[1998-1999] "Novel Consequences of Topological Zero Modes in Unconventional High- $T_c$  Superconductors", Texas Advanced Research Program, co-PI, (PI is Professor C. R. Hu, Texas A & M) \$36,000.

[1998] "Computational and Theoretical Studies of High Temperature Superconductors", Research Council of Sam Houston State University, \$5000.

[1995-1997] "Theory of Photo Induced Charge Transfer in Conducting Polymer C<sub>60</sub> Composites", Research Corporation \$21,000, matching Sam Houston State University, \$3000.

[1995] "Theoretical Study of Optical Properties of Fullerenes", Research Council of Sam Houston State University, \$7500.

[1994] "Optical Properties of Fullerenes", Research Council of Sam Houston State University, \$7500.

[1993] "A Theoretical and Computational Study of Optical Properties of Fullerenes", Research Council of Sam Houston State University, \$7500.

[1992] "A Computational and Theoretical Study of Strongly Correlated Electron Systems", Research Council of Sam Houston State University, \$7500.

## RECENT PUBLICATIONS

68. P. Chow and B. Friedman "Low Energy non-resonant X-ray Scattering of C<sub>60</sub>", Phys. Rev. B 77 073406 (2008).
67. B. Friedman and C. Withrow, "Stripes or an Anisotropic Crystal in the N=2 Landau Level?", Physica B 403 p1500 (2008).
66. A. Goker, B. A. Friedman and P. Nordlander, "Transient Current in a Quantum Dot Asymmetrically Coupled to Metallic Leads", 2007 J. Phys.: Condens. Matter 19 376206.
65. A. Babajanyan, J. Kim, S. Kim, K. Lee and B. Friedman "Sodium Chloride Sensing by Using a Near-Field Microwave Microprobe", Appl. Phys. Lett. **89**, 183504 (2006)
64. S. Yun, S. Na, A. Babayan, H. Kim, B. Friedman and K. Lee, "Noncontact Characterization of Sheet Resistance of Indium Tin Oxide Films by Using a Near-Field Microwave Microprobe", Thin Solid Films 515 (2006) 1354-1357.

63. A. F. Izmaylov, A. Goker, B. A. Friedman and P. Nordlander, "Transient Current in a Quantum Dot Subject to a Change in Coupling to its Leads", 2006 *J. Phys.: Condens. Matter* **18** 8995-9006.
62. B. Friedman and C. Yeung "Renormalization Group Analysis of Polymer Cyclization with Non-equilibrium Initial Conditions" *European Physical Journal E* 21 (1) p25 (2006).
61. C. Yeung and B. Friedman "Relation between cyclization of polymers with different initial conditions", *Europhys. Lett.* 73 (4) p621 (2006).
60. B. Friedman and B. McCarty "The effect of disorder on symmetry breaking in quantum hall systems", *J. Phys.: Condens. Matter* 17 (2005) 7335-7344.
59. Sensitive, Label-Free DNA Diagnostics Based on Near-Field Microwave Imaging Friedman, B.; Gaspar, M. A.; Kalachikov, S.; Lee, K.; Levicky, R.; Shen, G.; Yoo, H.; *J. Am. Chem. Soc.*; (**Communication**); **2005**; 127(27); 9666-9667.
58. Chuck Yeung and B. Friedman "Cyclization of Rouse Chains at Long and Short Time Scales", *J. of Chem. Phys.* **122**, 214909 (2005).
57. S. Kim, H. Yoo, K. Lee, B. Friedman, M. A. Gaspar, and R. Levicky "Distance control for a near-field scanning microwave microscope in liquid using a quartz tuning fork", *Appl. Phys. Lett.* 86, 153506 (2005).
56. M. Kim, J. Kim, H. Kim, S. Kim, J. Yang, H. Yoo, S. Kim, K. Lee and B. Friedman "Nondestructive high spatial resolution imaging with a 60 Ghz near-field scanning millimeter microscope", *Rev. Sci. Instrum.* 75, 684 (2004).
55. J. Dumoit and B. Friedman "Symmetry breaking by periodic potentials in quantum Hall systems", *J. Phys.:Condens. Matter* 16 (2004) 3663-3670.
54. J. Kim, M. Kim, K. Lee, J. Lee, D. Cha and B. Friedman, "Development of a near-field scanning microwave microscope using a tunable resonance cavity for high resolution", *Meas. Sci. Technol.* 14 (2003) 7-12.
53. J. Kim, M. Kim, H. Kim, D. Song, K. Lee and B. Friedman, "Improving images from a near-field scanning microscope using a hybrid probe", *Appl. Phys. Lett.* 83, 1026 (2003).
52. J. Kim, K. Lee, B. Friedman, and D. Cha, "Near-field scanning microwave microscope using a dielectric resonator", *Appl. Phys. Lett.* 83, 1032 (2003).
51. [J. E],[S. Kim],[E. Lim],[K. Lee],[D. Cha], and B. Friedman, "Effects of substrate temperature on copper(II) phthalocyanine thin films", *Applied Surface Science* 205, p274-279 (2002).

50. [S. Kim], [J. E], [K. Lee],[ T. Ishibashi], [K. Sato] and B. Friedman, "Polaronic Quasiparticle Injection in Organic Copper (II) Phthalocyanine/Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+ $\delta$</sub>  Tunnel Junctions", Applied Physics Letters 80, p 2526-2528 (2002).
49. B. Friedman, "Quantum Solitons in CuGeO<sub>3</sub>: A Density Matrix Renormalization Group Study", J. Phys.:Condens. Matter **14**, 4621 (2002).
48. [D. N. Sheng], [Ziqiang Wang], and B. Friedman, "The role of disorder in half-filled high Landau levels", Phys. Rev. B **66**, 161103 (2002).
47. Yukihiro Shimoï and Barry A. Friedman, "Ab Initio Study on the Structural and Optical Properties of Phenylacetylene Molecules", Nonlinear Optics, 2000, Vol. 26, pp169-176.
46. B. Friedman, "An Optimal Phonon Approach to the Spin Peierls Model with Non Adiabatic Spin-Phonon Coupling", Phys. Rev. B 61, 6701 (2000).
45. J.-X. Zhu, C. S. Ting and B. Friedman "Spin-Polarized Quasiparticle Transport in Ferromagnet/d-wave Superconductor Junctions" Superlattices and Microstructures, Vol. 25, No. 5/6, 1155 (1999).
44. K. Lee, W. Wang, I. Iguchi, B. Friedman, T. Ishibashi and K. Sato, "Spin-Polarized Quasiparticle Tunnel Injection in a YBa<sub>2</sub>Cu<sub>3</sub>O<sub>y</sub>/Au/Co Junction" Appl. Phys. Let. 75, 1149 (1999).
43. Y. Shimoï and B. Friedman "A Tight-Binding Model of Phenylene Molecules with Meta Connections – Implications for Phenylacetylene Dendrimers", Chem. Phys. 250, 13 (1999).
42. B. Friedman and G. Levine "Cutoff Dependence of a Configuration Interaction Approach to the Two Dimensional Hubbard Model", Phys. Rev. B 62, 16378 (2000).
41. J.-X. Zhu, B. Friedman, and C. S. Ting "Spin-polarized Quasiparticle Transport in Ferromagnet-d-wave Superconductor Junctions with a {110} Interface" Phys. Rev. B. 59, 9558 (1999).
40. J.-X. Zhu, B. Friedman, and C. S. Ting, "A Lattice Model for the Broken-Time-Reversal-Symmetry Pairing State Near a Surface of d-Wave Superconductors" Phys. Rev. B 59, 3353 (1999).
39. J. Bruening and B. Friedman, "Photo Induced Charge Transfer in Conducting Polymer C<sub>60</sub> Composites", J. Chem. Phys. 106 (23), (15 June 1997) 9634-9638.
38. B. Friedman, "A Density Matrix Renormalization Group Approach to Interacting Quantum Systems on Cayley Trees", J. Phys. C 9 (1997) 9021-9029.

