

Shaffique Adam

Condensed Matter Theory Center
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Education

- 2006 PhD Theoretical Physics, *Cornell University*
Thesis: "*Magnetic Properties of Nanoscale Conductors*"
Advisor: *Piet W. Brouwer*
- 2004 MS Physics, *Cornell University*
- 2000 BS Physics with distinction (highest honor), *Stanford University*
with minor in Mathematics and Physics departmental honors

Experience

- 2006-2008 Post-doctoral Research Associate with *Sankar Das Sarma, University of Maryland*
- 2004-2006 Graduate Research Associate with *Piet W. Brouwer, Cornell University*
- 2004-2006 Graduate Resident Fellow, *Alice H. Cook House, Cornell University*
- 2000-2002 Graduate Fellow, *Cornell University*
- 1998-2000 Undergraduate Research Assistant with *Giorgio Gratta, Stanford University*
- 1997-1998 Undergraduate Research Assistant, *Gravity Probe B, Stanford University*

Related Experience

- 2008 Summer program at the Aspen Center for Physics. Participant in the workshop on complexity, disorder and algorithms, and the workshop on the physics of graphene
- 2008 Summer school on condensed matter physics sponsored by the Princeton Center for Complex Materials and the Princeton Center for Theoretical Science, Princeton University
- 2007 Fourth Windsor condensed matter theory summer school on quantum transport and dynamics in nanostructures, held at Cumberland Lodge, Windsor, UK
- 2006 College on the physics of nano-devices, held at the International Center for Theoretical Physics, Trieste, Italy
- 2006 Summer school on quantum magnetism, organized by Pacific Institute for Theoretical Physics, held at the Ecole de Physique, Les Houches, France
- 2005 Summer school on transport in mesoscopic and single molecule systems held at Niels Bohr Institute, Copenhagen, Denmark
- 2004 Summer school on the application of random matrices in physics held at the Ecole de Physique, Les Houches, France
- 2000 Tutorial on the foundations of quantum field theory, taken as an exchange student at Magdalen College, Oxford University, UK
- 1997 Sophomore college on the chemistry and physics of the origin of life with Richard Zare, Chemistry Department, Stanford University, USA

Research Publications

ISI citation metrics [as of Nov 12, 2008]: based on the earlier 19 of the 21 publications below:
h-index = 8. Total citations = 276. Average citations per publication = 14.53

1. "Crossover from quantum to Boltzmann transport in graphene"
S. Adam, P. W. Brouwer, and S. Das Sarma; arXiv:0811.0609
2. "Effective medium theory for disordered two dimensional graphene"
E. Rossi, S. Adam and S. Das Sarma; arXiv:0809.1425
3. "Tuning the effective fine structure constant in graphene: opposing effects of dielectric screening on short- and long-range potential scattering"
C. Jang, S. Adam, J.-H. Chen, E. D. Williams, S. Das Sarma and M. S. Fuhrer; Phys. Rev. Lett. **101**, 146805 (2008)
4. "Density inhomogeneity driven percolation metal-insulator transition and dimensional crossover in graphene nanoribbons"
S. Adam, S. Cho, M. S. Fuhrer and S. Das Sarma; Phys. Rev. Lett. **101**, 046404 (2008)
- Reprinted in the August 4, 2008 issue of Virtual Journal of Nanoscale Science & Technology (Ed. David Awschalom)
5. "Transport in suspended graphene"
S. Adam and S. Das Sarma; Solid State Communication **146**, 356 (2008)
6. "Charged-impurity scattering in graphene"
J. H. Chen, C. Jang, S. Adam, M. S. Fuhrer, E. D. Williams and M. Ishigami; Nature Physics **4**, 377 (2008) [**21 citations**]
7. "Boltzmann transport and residual conductivity in bilayer graphene"
S. Adam and S. Das Sarma; Phys. Rev. B **77**, 115436 (2008)
8. "Scattering mechanisms and Boltzmann transport in graphene", proceedings for an oral presentation at the International Conference on Electronic Properties of Two-dimensional Systems (EP2DS-17) in Genoa, Italy on July 17, 2007
S. Adam, E. H. Hwang, and S. Das Sarma; Physica E **40**, 1022 (2008)
9. "Measurement of scattering rate and minimum conductivity in graphene"
Y.-W. Tan, Y. Zhang, K. Bolotin, Y. Zhao, S. Adam, E. H. Hwang, S. Das Sarma, H. L. Stormer, and P. Kim; Phys. Rev. Lett. **99**, 246803 (2007) [**39 citations**]
10. "A self-consistent theory for graphene transport"
S. Adam, E. H. Hwang, V. M. Galitski, and S. Das Sarma; Proc. Nat. Acad. Sci. USA **104**, 18392 (2007) [**56 citations**[†]]
11. "Statistics of random voltage fluctuations and the low density residual conductivity of graphene"
V. M. Galitski, S. Adam, and S. Das Sarma; Phys. Rev. B **76** 245405 (2007)
12. "Transport in chemically doped graphene in the presence of adsorbed molecules" E. H. Hwang, S. Adam, and S. Das Sarma; Phys. Rev. B **76** 195421 (2007)

13. "Carrier transport in 2D graphene layers"
E. H. Hwang, S. Adam, and S. Das Sarma; Phys. Rev. Lett. **98** 186806 (2007) [**82 citations**]
14. "Ferromagnetic resonance in a current driven nanopillar"
J. N. Kupferschmidt, S. Adam, and P. W. Brouwer; Phys. Rev. B **74** 134416 (2006)
- Reprinted in the October 30, 2006 issue of Virtual Journal of Nanoscale Science & Technology
(Ed. David Awschalom)
15. "Mesoscopic anisotropic magnetoconductance fluctuations in ferromagnets"
S. Adam, M. Kindermann, S. Rahav, and P. W. Brouwer; Phys. Rev. B **73** 212408 (2006)
16. "Current induced spin-wave instability in thin ferromagnets: beyond linear stability analysis"
S. Adam, M. L. Polianski, and P. W. Brouwer; Phys. Rev. B **73**, 024425 (2006)
17. "Scaling approach to electron-electron interactions in a chaotic quantum dot"
S. Adam, P. W. Brouwer, and P. Sharma; Phys. Rev. B **68**, R241311 (2003)
18. "Conductance-peak height correlations for a Coulomb-blockaded quantum dot in a weak magnetic field"
S. Braig, S. Adam, and P. W. Brouwer; Phys. Rev. B **68**, 035323 (2003)
19. "Magnetic-field dependence of energy levels in ultrasmall metal grains"
S. Adam, M. L. Polianski, X. Waintal, P. W. Brouwer; Phys. Rev. B **66**, 195412 (2002)
20. "Enhanced mesoscopic fluctuations in the crossover between random matrix ensembles"
S. Adam, P. W. Brouwer, J. P. Sethna, and X. Waintal; Phys. Rev. B **66**, 165310 (2002)
21. "Sensitivity of an underwater acoustic array to ultra-high energy neutrinos"
N.G. Lehtinen, S. Adam, G. Gratta, T. K. Berger, and M. J. Buckingham; Astroparticle Physics **17**
(3) 279 (2002)

† includes 15 citations to preprint arxiv:0705.1540

Other Publications

1. "*Dollars and nonsense?*" opinion column published in the Cornell Daily Sun, Ithaca, NY, September 6, 2005
2. "*Alice among the redbuds*" opinion column published in the Cornell Daily Sun, Ithaca, NY, May 3, 2005
3. "*Hotel Darfur*" opinion column published in the Cornell Daily Sun, Ithaca, NY, April 19, 2005
4. "*Race, power, politics and student elected trustees*" opinion column published in the Cornell Daily Sun, Ithaca, NY, April 5, 2005
5. "*Ivy leagues and the online-degree roulette*" opinion column published in the Cornell Daily Sun, Ithaca, NY, March 8, 2005
6. "*Unionization, two years on*" opinion column published in the Cornell Daily Sun, Ithaca, NY, February 22, 2005
7. "*Cornell tuition: worth its weight in gold?*" opinion column published in the Cornell Daily Sun, Ithaca, NY, February 8, 2005
8. "*Women and science*" opinion column published in the Cornell Daily Sun, Ithaca, NY, January 25, 2005
9. "*Philosophy, poster art and stem cell research*" opinion column published in the Cornell Daily Sun, Ithaca, NY, November 23, 2004

10. *"Throw away the key?"* opinion column published in the Cornell Daily Sun, Ithaca, NY, November 9, 2004
11. *"Darfur: scratching below the surface,"* opinion column published in the Cornell Daily Sun, Ithaca, NY, October 26, 2004
12. *"United States of Africa"*, opinion column published in the Cornell Daily Sun, Ithaca, NY, September 28, 2004
13. *"Out of classroom, into real world"*, opinion column published in the Cornell Daily Sun, Ithaca, NY, September 14, 2004
14. *"How to determine Avogadro's number"* response to an Ask a Scientist question, published Ithaca Journal, Ithaca, NY, September 12, 2001

Select Fellowships and Awards

2008 I2CAM Travel grant to International Center for Theoretical Physics, Trieste, Italy
2006 I2CAM Travel grant to International Center for Theoretical Physics, Trieste, Italy
2004–2006 Graduate Research Fellowship, Cornell Center for Nanoscale Systems
2004–2006 Graduate Resident Fellowship, Alice H. Cook House, Cornell University
2004 I2CAM Travel grant to International Center for Theoretical Physics, Trieste, Italy
2003 NATO ASI Travel grant to Ecole de physique, Les Houches, France
2002 Youth Award for Academic Excellence, Nairobi, Kenya
2000 Awarded two year Graduate Fellowship, Cornell University
2000 Student Baccalaureate speaker, Stanford University
2000 Blanche and Candace Porteous undergraduate scholarship, Stanford University
1999 Physics department undergraduate research grant, Stanford University
1998 Undergraduate Research Opportunities grant, Stanford University

Conferences, Seminars, Talks and Posters

"Theoretical study of the crossover between various graphene transport regimes", poster at International Centre for Theoretical Physics conference Graphene Week 2008, Trieste, Italy, August 25-29, 2008

"Hierarchy of approximations to understand graphene transport properties", talk at the workshop on the physics of graphene, Aspen Center for Physics, Aspen CO, June 12, 2008

"Introduction to the physics of graphene",

- seminar at National Institute of Standards and Technology, Washington, DC (hosted by David Newell), October 17, 2008
- seminar at Syracuse University, NY (hosted by Jen Schwarz), July 30, 2008
- invited speaker at the U.S. Government Naval Research Laboratory, Washington, DC (hosted by Wayne Witzel), July 25, 2008
- invited plenary speaker at the Connecticut Symposium on Microelectronics and Optoelectronics (CMOC), University of Connecticut (hosted by Faquir Jain), April 9, 2008
- talk at University of Maryland condensed matter theory symposium on quantum phenomena, September 27, 2007

"Graphene Field Effect Transistors: Fundamental Advantages and Challenges", colloquium at the University of Connecticut (hosted by Ali Gokirmak), November 30, 2007

"A self-consistent theory for graphene transport", seminar at Cornell University (hosted by the atomic membranes Interdisciplinary Research Group of the Cornell Center for Materials Research), October 18, 2007

“Carrier transport in 2D graphene layers”, talk at the seventeenth International Conference on Electronic Properties of Two-dimensional Systems (EP2DS-17), Genoa, Italy, July 17, 2007

“RPA-Boltzmann theory for graphene transport”, seminar at Middle East Technical University, Ankara, Turkey (hosted by Hande Ustunel), June 12, 2007

“*International Conference on Graphene*”, as part of the workshop on Dynamics and Relaxation in Complex Quantum and Classical Systems and Nanostructures, held at the Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, September 25-29, 2006

“*Mesoscopic Anisotropic Magnetoconductance Fluctuations in Ferromagnets*”, talk at the fourth Stig Lundqvist Conference on Advancing Frontiers of Condensed Matter Physics, ICTP, Trieste, Italy, July 7, 2006

“*Quantum Coherent Transport in Ferromagnets*”, contributed talk at PiTP/Les Houches Summer school on Quantum Magnetism, France, June 21, 2006

“*Magnetization dependent transport in nanomagnets*”,

- seminar at the U.S. Government Naval Research Laboratory, Washington, DC (hosted by Steve Erwin), November 21, 2008

- seminar at McGill University, Canada (hosted by Aashish Clerk), February 24, 2006

“*Mesoscopic transport in ferromagnets*”, Science Colloquium at Wells College, NY (hosted by Niamh O' Leary), February 17, 2006

“*Yesterday's noise is tomorrow's signal -- the physical signatures of spin-transfer effects*”, talk at Cornell Electron Device Seminar, Cornell University, December 2, 2005

“*Current Induced Instabilities in thin nanomagnets*”,

- contributed talk at Niels Bohr Institute Symposium on transport in mesoscopic and single-molecule systems, University of Copenhagen, August 24, 2005

- poster at ICTP conference on strongly interacting systems at the nanoscale, Trieste, Italy, August 10, 2005

“*Scaling approach to electron-electron interactions*”, talk at Service de physique de l'état condensé, CEA Saclay, France, (hosted by Xavier Waintal), June 4, 2004

“*Magnetic Field Dependence of Energy Levels in Ultrasmall metal grains*”, seminar for Cornell Center for Material Research, Cornell University, June 13, 2002

American Physical Society March Meetings:

“A self-consistent theory for graphene transport”, Pittsburg, Pennsylvania (2009), **[invited]**

“Theoretical study of graphene transport regimes”, New Orleans, Louisiana (2008)

“*Carrier transport in 2D graphene layers near the Dirac point*”, Denver, Colorado (2007)

“*Mesoscopic anisotropic magnetoconductance fluctuations*”, Baltimore, Maryland (2006)

“*Current induced dynamics in thin ferromagnets*”, Los Angeles, California (2005)

“*Spin wave instabilities in thin ferromagnets*”, Montreal, Canada (2004)

“*Wavefunction correlations in Random Matrix Crossover Ensembles*”, Austin, Texas (2003)

“*Avoided Crossings in small-metal grains*”, Indianapolis, Indiana (2002)

Select University Service, Extracurricular Activities and Outreach

Referee, Physical Review Letters (since 2007) and Physical Review B (since 2005)
Referee, Nature Nanotechnology, Nano Letters, and Applied Physics Letters (since 2008)
Professional Society membership: American Physical Society (since 2001)
Cornell Daily Sun, Opinion Columnist (2004-2005)
Cornell Nanoscale Systems Institute for Physics Teachers (2004-2006)
 NYS Regents level curriculum development (2004-2005)
 Demonstration at Whitney Point High School, November 15, 2005
 Demonstration at Ithaca High School, May 24, 2006
Cornell Center for Materials Research Outreach
 Saturday Academy for minority students (2001-2003)
 Outreach curriculum development (2002 – 2003)
 Initiated and developed Outreach program in Clayton, NY (Summer 2002)
 “*Ask a Scientist*” column, published Ithaca Journal, September 12, 2001
Cornell University West Campus Council, graduate student representative (2003-2006)
 Hans A. Bethe House Dean Search Committee
 Hans A. Bethe House Naming Committee
 Carl L. Becker House Dean Search Committee
 Graduate Resident Fellows Search Committee
Cornell University Graduate and Professional Student Assembly (2001-2003)
 Secretary, elected (2002-2003)
 Physical Sciences Representative, elected (2001-2003)
 University Trustee Election Nominating Committee (2002)
 Cornell Dining advisory committee (2003)
 Cornell United Religious Work, advisory board (2001-2003)
 Initiated and enabled online PhD thesis submission (2003)
 Increased flexibility of graduate student travel grant (2002)
Cornell University Committee on Academic Freedom and Professional Status of the Faculty
 Graduate student member (2002-2004)
 Taskforce on policy for faculty suspension (2002-2003)
Stanford University, Physics Department Undergraduate Study Committee. Evaluated curriculum and implemented changes to course requirements (1997-1999)
Cornell University James A. Perkins Prize for Interracial Harmony and Understanding, runner-up, awarded \$1000 (2005)
Cornell University Class of '67 Award for best campus program promoting understanding, respect and amicable relations among students of different races and cultures (2001)
Ithaca City of Asylum, Board of Directors (2003-2006)