Emily J. Pritchett - Curriculum Vitae

CONTACT INFORMATION

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RESEARCH INTERESTS

Quantum Computation, Information and Algorithm Design
Superconducting Qubit Architectures

EDUCATION

Ph.D., Theoretical Physics, The University of Georgia, Athens, GA USA
(expected graduation date: May 2010)
Thesis Topic: Quantum Computation with Weakly Coupled Qubits
Advisor: Professor Michael R. Geller

B.S., Mathematics, The University of Georgia, Athens, GA USA June 2003

AWARDS AND SCHOLARSHIPS

James L. Carmon Scholarship Award, 2007
Hope Scholarship, 2000-2003
Post-Secondary Options Scholarship (for early enrollment), 1999-2000

RESEARCH EXPERIENCE

Research Assistantships

- Exploratory theoretical research toward building a general quantum molecular collision simulator funded under an NSF-EAGER grant (2009 to present)
- Continuous research in topics related to quantum computation with superconducting qubits and nanomechanical devices (2004 to 2009)
- Research toward simulation of fractional quantum Hall states (2002 to 2003)

Publications

- "Simulating Hamiltonians with Weakly Coupled Qubits,"
  E.J. Pritchett, M.R. Geller
  (currently in publication)

- "Quantum Logic with Weakly Coupled Qubits,"
  M.R. Geller, E.J. Pritchett, A. Galiautdinov and J.M. Martinis
  arXiv 0906.5209 (2009)

- "Quantum Gate Design: A Perspective,"
  M.R. Geller, E.J. Pritchett, A.Galiautdinov and J.M. Martinis
  Physics Status Solidi B 246, 972 (2009)

- "Quantum Computing with Superconductors I: Architectures,"
  M.R. Geller, E.J. Pritchett, A.T. Sornborger and F.K. Wilhelm
  in **Manipulating Quantum Coherence in Solid State Systems**, edited by M. E. Flatte and I. Tifrea (Springer, 2007), p.171

- "Quantum Memory for Superconducting Qubits,"
  E.J. Pritchett and M.R. Geller
  Physical Review A 72, 10301 (2005)

Presentations

- "Simulating Quantum Spin Systems with Superconducting Electrical Circuits"
  with M.R. Geller
  APS Annual Meeting, Pittsburg, PA, March 2009

- "Progress towards Scalable Quantum Information Processing"
  with M.R. Geller, A. Galiautdinov and J. Martinis
  APS Annual Meeting, Pittsburg, PA, March 2009

- "Quantum Computation with NEMS Devices"
  Nanomechanics: From Cells to Solids Summer School, Pasadena, CA, July 2007

- "A General Approach to 2-Qubit Gate Construction for Coupled-Qubit Models"
  with M.R. Geller
  APS Annual Meeting, Denver, CO, March 2007

- "Algebraic Approach to CNOT Construction for General Qubit Models"
  Center for Simulational Physics Annual Workshop, Athens, GA, Feb 2007

- "Measuring the Quantum Phase Coherence of a NEMS Resonator" (poster)
  Quantum Electromechanical Systems 2, Morro Bay, CA, Dec 2006

- "CNOT Logic on Superconducting Quantum Computers" (poster)
  Gordon Research Conference: Quantum Information, Lucca, Italy, May 2006

- "Finding the Coherence Time of a NEMS Resonator in Quantum Superposition"
  NanoSec Annual Workshop and Meeting, UGA, Athens, GA, May 2006

- "Determining the Quantum Phase Coherence Time of a NEMS Resonator"
  APS Annual Meeting, Baltimore, MD, March 2006

- "CNOT logic for Josephson Phase Qubits"
  with M.R. Geller, A. Sornborger, M. Steffen and J. Martinis
  APS Annual Meeting, Baltimore, MD, March 2006

- "Designing Controlled-Not Logic for Superconducting Quantum Computers"
  Center for Simulational Physics Annual Workshop, Athens, GA, Feb 2006

- "Memory Devices for Superconducting Quantum Computing"
  NATO Advanced Study Institute, Cluj-Napoca, Romania 2005

- "Using Nanomechanical Resonators as State Storage Devices"
  NanoSec Annual Workshop and Meeting, UGA, Athens, GA May 2005

- "Nanomechanical Quantum Memory for Superconducting Qubits"
  with M.R. Geller
  APS Annual Meeting, Los Angeles, CA, March 2005

- "Memory Devices for Superconducting Quantum Computing" (poster)
  Gordon Research Conference: Quantum Information, Ventura, CA, March 2005

- "Memory Devices for Superconducting Quantum Computing"
  Center for Simulational Physics Annual Workshop, Athens, Ga, Feb 2005

Lecturing Experience

Seminars

Listed are extracurricular research seminars that participation in has not only enhanced my graduate education, but also given invaluable experience leading discussion for a highly demanding audience.

- Quantum Simulation Journal Club (Aug 2009 to present)
  Participated as organizer and primary speaker in a group of researchers from the physics and mathematics departments at UGA dedicated to becoming experts on quantum computer simulation algorithms.

- Quantum Computing Journal Club (2005 to present)
  Participated as organizer and alternate speaker in a group of professors, postdocs and graduate students from the physics, computer science and mathematics departments at UGA interested in following advances in the field of quantum computation.

- Vertical Integration of Research and Education (VIGRE) (2004 to present)
  Participated in the Mathematical Physics Group of this NSF funded research program in UGA's mathematics department, lecturing on the following topics:
  - String Theory (2009-2010)
  - Renormalization Theory (2008-2009)
  - Statistical Mechanics (2007-2008)
  - Quantum Mechanics (2006-2007)
  - Feynman Diagrams (2005-2006)
  - Clifford Algebras, Spinors and the Dirac Equation (2004 - 2005)

Teaching Assistantships

Graduate

- Instruction of introductory labs and grading of midterms and finals for introductory physics courses at UGA, including trigonometry based and calculus based Mechanics and Electricity and Magnetism (2003 to present)

Undergraduate

- Grading for Differential/Integral/Multivariable Calculus and Differential Equations (2001-2003)

Other Teaching Experience

- Symmetries of Molecules, Crystals and Space-Time (Fall 2008)
  Participated as a graduate student coordinator of this Introductory VIGRE Research Group (IVGR), directing undergraduates from the mathematics, physics, and chemistry departments to design and present research projects.

- Tutoring in undergraduate and AP high school physics (2003 to present)