

# Kyle Michael Keane

## Curriculum Vitae

Dept. of Physics and Astronomy  
University of California, Riverside  
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### EDUCATION

BS, Physics ( <i>Cum Laude</i> )	California State University, Fullerton	2007
PhD, Physics	University of California, Riverside	2012

### PROFESSIONAL EXPERIENCE

**Graduate Student Researcher**, University of California, Riverside      Winter 2009-Spring 2012

My theoretical research in Alexander Korotkov's physics laboratory focuses on Weak Quantum Measurements and Uncollapsing, Quantum Error Correction/Detection, Decoherence Suppression, and Quantum State and Process Tomography. Participate in an informal research group process: present weekly updates on current progress and findings, assist colleagues with research processes and writing, prepare manuscripts for publication, and perform general organizational, training, and research duties around the laboratory.

**Teaching Assistant**, University of California, Riverside      Fall 2007-Fall 2008, Spring 2010

Instructed laboratory classrooms and led supplemental conceptual physics discussions. Developed and delivered lectures. Structured class for engaged learning. Evaluated student performance and consulted with students regarding course progress. Created grading rubrics for laboratory notebooks. Developed and evaluated weekly quizzes. Held regular office hours. Guided discussions of relevant topics in physics. Courses included: Intro calculus-based classical mechanics lab, Intro algebra-based electricity and magnetism lab, Intro calculus-based electricity and magnetism lab, Intro algebra-based classical mechanics lab, Intro calculus-based modern physics discussion.

**Physics Tutor**, California State University, Fullerton      Fall 2005 - Spring 2007

Assisted undergraduate major and non-major students in acquisition and comprehension of material for various physics classes. Helped students prepare and organize lecture and laboratory assignments and notes. Created drills, study aids, and other assistive interventions for students at all levels.

**Laboratory Technician/Machinist**, California State University, Fullerton      Fall 2005 – Summer 2007

Maintenance, repair, and fabrication of laboratory set-ups in a large experimental physics lab at a regional comprehensive university. Trouble-shooting, diagnosis, and remediation of issues with a wide array of technical instrumentation and basic lab equipment, hardware, and software.

### RELATED EXPERIENCE AND INTERESTS

**Electron Scattering:** Dr. Murtadha Khakoo, CSUF. Designed and built a precision vibration-resistant rotary table for an electron scattering spectrometer. Repaired electrical circuits and replaced necessary components. Designed and implemented a new data importation and analysis procedure.

**Physics Education Research:** Dr. Michael Loverude, CSUF. Interpreted student answers on pedagogical-development quizzes and logged for statistical analysis.

**Biophysics-Virus Formation:** Dr. Roya Zandi, UCR. Investigated numerical simulations of biophysical self-assembly at finite temperature.

**Frustrated Magnetism:** Dr. Kirill Shtengel, UCR. Developed algorithm to find analytical solution to complex combinatorial problems. Optimized and implemented orthonormalization of large complex vector spaces.

## INVITED PRESENTATIONS

**Commencement Speaker**, presented June 15, 2007, at the CSUF College of Natural Sciences and Mathematics commencement ceremony, Fullerton, California.

**Colloquium Speaker**, “Beyond Traditional Quantum Measurement: A Game of Quantum Peek-a-Boo with a Purpose,” presented November 5, 2011, at the CSUF Department of Physics Colloquium, Fullerton, California

## PROFESSIONAL CONFERENCES ATTENDED

**American Physical Society: Division of Atomic, Molecular, and Optical Physics (DAMOP)**, 2007 Calgary, Alberta, Canada

**Quantum Computation and Quantum Algorithms Program Review (IARPA)**, 2009 Minneapolis, Minnesota

**Coherence in Superconducting Qubits (Army Research Office)**, 2010 San Diego, California

**American Physical Society: March Meeting**, 2010 Portland, OR, 2011 Dallas, TX, 2012 Boston, MA

## CONTRIBUTED CONFERENCE PRESENTATIONS AND POSTERS

Poster: Murtadha A. Khakoo, Kyle Keane, Colin Campbell, Shayne Cairns, “An accurate, but novel application of the relative flow technique, using a moveable aperture source of gas atoms to measure elastic electron scattering differential cross sections,” Bull. Amer. Phys. Soc. R1.99 (2007)

Poster: Kyle Keane, Shayne Cairns, Colin Campbell, Murtadha A. Khakoo “Elastic Differential Cross sections for electron scattering from polyatomic molecules—an accurate, but novel application of the relative flow technique, using a moveable aperture source of gas atoms,” Bull. Amer. Phys. Soc. Q3.3 (2007)

Kyle Keane, Alexander N. Korotkov, “Decoherence suppression of a solid state qubit by uncollapsing,” Bull. Amer. Phys. Soc. Z33.11 (2010)

Kyle Keane, Alexander N. Korotkov, “Currently realizable quantum error detection/correction algorithms for superconducting qubits” Bull. Amer. Phys. Soc. D29.14 (2011)

Murtadha A. Khakoo, Kyle Keane, Colin Campbell, Shayne Cairns, “An accurate, but novel application of the relative flow technique, using a moveable aperture source of gas atoms to measure elastic electron scattering differential cross sections,” Bull. Amer. Phys. Soc. R1.99 (2007)

Brent R. Yates, Kyle Keane, Murtadha A. Khakoo, “Low energy impact ionization of neon and xenon,” Bull. Amer. Phys. Soc. Y1.38 (2009)

Alexander N. Korotkov, Kyle Keane, Ricardo Pinto, “Theoretical analysis of phase qubits,” presented August 19, 2009, at Quantum Computing and Quantum Algorithms Program Review

Kyle Keane, Alexander Korotkov, “Suppression of T1-type decoherence of phase qubits using uncollapsing and quantum error detection/correction,” presented April 26, 2010, at Coherence in Superconducting Qubits

## REFEREED PUBLICATIONS

M A Khakoo, K Keane, C Campbell, N Guzman, and K Hazlett, “Low energy elastic electron scattering from ethylene,” J. Phys. B: At. Mol. Opt. Phys. 40 3601 (2007)

M A Khakoo , J Blumer, K Keane, C Campbell, H Silva, M C A Lopes, C Winstead, V McKoy, R F da Costa, L G Ferreira, M A P Lima, and M H F Bettega, “,” Phys. Rev. B 77 042705 (2008)

B R Yates, K Keane, and M A Khakoo, “Near-threshold electron impact doubly differential cross sections for the ionization of neon and xenon,” J. Phys. B: At. Mol. Opt. Phys. 42 095206 (2009)

Alexander N. Korotkov and Kyle Keane, “Decoherence suppression by quantum measurement reversal,” Phys. Rev. A 81, 040103(R) (2010)

## IN PREPARATION PUBLICATIONS

Alexander N. Korotkov and Kyle Keane, "Currently realizable quantum error detection/correction algorithms for superconducting qubits," Phys. Rev. A

Alexander N. Korotkov and Kyle Keane, "Analysis of quantum measurement reversal experiments," Phys. Rev. A

Alexander N. Korotkov and Kyle Keane, "Modeling of a Flying Microwave Qubit," Phys. Rev. A

## PROFESSIONAL SKILLS

**Computer Languages:** C++, Python, Latex. (Error checked complex python modules for quantum simulation)

**Computer Programs:** Microsoft Office, Mathematica

**Procedural Skills:** Designed data analysis template for electron scattering experiment; Quantum simulations (numerical and analytical work); Matrix differential equations

**Laboratory Skills:** Advanced Machining (Lathe, Mill, Steel work, Tapping); Built precision rotary table and vibration resistant supports for an electron scattering spectrometer; Basic Electronics (Soldering, Wiring)

**Organizational Skills:** Started and organized a weekly graduate student colloquium; Started and maintained a weekly physics department soccer match; Organized and taught a free weekly yoga class for graduate students

## COMMUNITY SERVICE

Volunteer, Blindness Support Services (2010, one time)

*Physics Club Officer*, California State University, Fullerton

Fall 2006 - Spring 2007

Camp counselor and activity leader, Foundation for the Junior Blind

Summer 2002

Volunteer, Braille Institute

2006

Volunteer, Goodwill

2006

Volunteer, Salvation Army

2006

Volunteer, Foundation Fighting Blindness

2008-2011

Musician, FUN yoga studio

2010-2011

Musician, Breathe yoga studio

2010-2011

Yoga Instructor, UC Riverside, The WELL (Wellness Center)

2010-2011

Facilitator, UC Riverside, Services for Student with Disabilities

2010-2011

## HONORS AND AWARDS

2009 Molly Adams Scholarship (UCR)

2007 Norman Nitzburg Award in Experimental Physics (CSUF)

Wolfram Award in Computational Science (CSUF)

Outstanding Scholarship Award (CSUF)

Dan Black Scholarship (CSUF)

UCR Chancellor's Distinguished Fellowship (UCR)

2006 Norman Nitzburg Award in Experimental Physics (CSUF)

Dan Black Scholarship (CSUF)

2002 California Governor's Scholarshare Award

Kellogg Scholars (Cal Poly Pomona)