Keith C. Schwab

PROFESSOR OF PHYSICS AND APPLIED PHYSICS

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Education

- Bachelor of Arts in Physics, University of Chicago, 1990.
- Ph.D. in Physics, University of California, Berkeley, 1996.
- Thesis topic: "Experiments with Superfluid Oscillators"
- Advisor: Prof. Richard Packard.

Employment and Appointments

- Professor of Applied Physics, Caltech (1/2009-present).
- Associate Professor of Physics, Cornell University (4/2006 to 12/2008).
- Senior Physicist, National Security Agency, 3/2000-4/2006, (GS-15).
- Sherman Fairchild Postdoctoral Scholar, California Institute of Technology, 1996-2000.

Research Interests

- Quantum effects in nano-mechanical/electronic systems at ultra-low temperatures.
- Thermal transport and calorimetry at the nanoscale.
- Ultra-sensitive force detection with fully integrated cantilevers / detectors.
- Microdevices to bridge atomic and condensed matter physics experiments.
- Ultra-sensitive, quantum-limited microwave measurement techniques.
- Superfluid helium quantum devices, matterwave interferometers, gyroscopes.

Awards and Honors

- Invited participant at the World Economic Forum, Annual Meeting in Davos, Switzerland, 2005, 2007, and 2008, selected as a member of "The Forum of Young Global Leaders," 2004.
- Panelist for Fred Friendly Seminar on Nanotechnology, Security, and Privacy. Appeared nation-wide on PBS in spring of 2008.
- An image of a nanodevice created during our research has been accepted into the permanent collection at MoMA (New York) and was displayed during the exhibit "Design and the Elastic Mind," 2/2008-5/2008.
- Attended the International Atomic Energy Agency's (IAEA) World Nuclear University, 2005 Summer Institute, an intensive program to study many aspects of nuclear technology (power, weapons, proliferation, waste.)
- Named one of the "10 most innovative in America under 40 years old," by Fortune Magazine September 2003.
- Named one of the "world's top 100 innovators in science and technology" by MIT's Technology and Review magazine, May 2002.
- Michelson Postdoctral Prize Lectureship for 2000, awarded by Case Western-Reserve.
- Awarded the Sherman Fairchild Prize Postdoctoral Fellowship at Caltech, 1996-2000.
- "Best Research Project" at the Fifth Undergraduate Summer Institute on Contemporary Topics in Applied Physics, Lawrence Livermore Laboratories, 1989.
- Eagle Scout, 1986.

I have published 50 peer reviewed papers with over 10,000 citations, h-index = 37.

Given over 50 Invited Talks at International Conferences and Workshops

Given over 70 Colloquia and Seminars

Selected Publications

"Detecting continuous gravitational waves with superfluid 4He," S. Singh, L.A. DeLorenzo, I. Pikovski, K.C. Schwab, *New J. Phys.* **19**, 073023 (2017).

"Quantum squeezing of motion in a mechanical resonator," E.E. Wollman, C.U. Lei, A.J. Weinstein, J. Suh, A. Kronwald, F. Marquardt, A.A. Clerk, K.C. Schwab, *Science* **349** (6251), 952-955, (2015).

"Mechanically detecting and avoiding the quantum fluctuations of a microwave field," A.J. Weinstein, C.U. Lei, E.E. Wollman, J. Suh, A. Metelmann, A.A. Clerk, K.C. Schwab, *Science* **344**, 1262-1265 (2014.)

"Preparation and Detection of a Mechanical Resonator Near the Ground State of Motion," T. Rocheleau, T. Ndukum, C. Macklin, J.B. Hertzberg, A.A. Clerk, K.C. Schwab, *Nature* **463**, 72-75 (2010).

"Nanomechanical measurements of a superconducting qubit," M.D. LaHaye, J. Suh, P.M. Echternach, K.C. Schwab, M.L. Roukes , *Nature* **459**, 960-964 (2009).

"Radio Frequency Scanning Tunneling Microscopy," U. Kemiktarak, T. Ndukum, K.C. Schwab, K.L. Ekinci, *Nature* ***450****, 85-89* (2007).

"Self-cooling of a micro-mirror by radiation pressure," S. Gigan, H.R. Boehm, M. Paternostro, F. Blaser, G. Langer, J. Hertzberg, K.C. Schwab, D. Baeuerle, M. Aspelmeyer, A. Zeilinger, *Nature* **444**, 67-70 (2006).

"Quantum Measurement Backaction and Cooling Observed with a Nanomechanical Resonator," A. Naik, O. Buu, M.D. LaHaye, M.P. Blencowe, A.D. Armour, A. A. Clerk, K.C. Schwab, *Nature* **443**, 193 (2006.)

"Ion Trap in a Semiconductor Chip," D. Stick, W.K. Hensinger, M.J. Madsen, S. Olmschenk, K.C. Schwab, C. Monroe, cover article *Nature Physics* **1**, 36 (2006.)

"Putting *Mechanics* into Quantum Mechanics," K.C. Schwab and M.L. Roukes, cover article *Physics Today* **58**, *36* (2005.)

"Approaching the Quantum Limit of a Nanomechanical Resonator," M.D. LaHaye, O. Buu, B. Camarota, K.C. Schwab, *Science* **304**, 74 (2004).

"Entanglement and decoherence of a micromechanical resonator via coupling to a Cooper-pair Box," A.D. Armour, M.P. Blencowe, K.C. Schwab, *Phys. Rev. Lett.* **88**, 148301 (2002).

"Measurement of the Quantum of Thermal Conductance," K.C. Schwab, E.A. Henriksen, J.M. Worlock, and M.L. Roukes, *Nature* **404**, 974-977 (2000.)

"Detection of the Earth's Rotation Using Superfluid Phase Coherence," K.C. Schwab, N. Bruckner, and R. E. Packard", *Nature* **386**, pp. 585-587 (1997.)

"Faceted Crystal Growth in Two Dimensions," B. Berge, L. Faucheux, K.C. Schwab, A. Libchaber, *Nature* 350, p. 320 (1991).