

BIOGRAPHICAL SKETCH

NAME Hammel, Peter Christopher		POSITION TITLE Professor	
eRA COMMONS USER NAME			
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of California, San Diego	BA	1977	Physics Magna Cum Laude
Cornell University, Ithaca, NY	PhD	1984	Physics

A. Positions and Honors

Positions and Employment

2002-present	Professor and Ohio Eminent Scholar, Departments of Physics and Electrical Engineering, The Ohio State University
2000-2004	Fellow, Los Alamos National Laboratory
1989-2002	Staff member, Condensed Matter and Thermal Physics Group, Los Alamos National Laboratory
1996-2004	Visiting Associate in Physics, California Institute of Technology, Pasadena, CA
1986-1989	J. Robert Oppenheimer Fellow, Los Alamos National Laboratory
1984-1986	Postdoctoral Fellow, MIT with Prof. John S. Waugh
1979-Jan, 1984	Research Assistant, Laboratory of Atomic and Solid State Physics, Cornell University, Ithaca, NY

Other Experience and Professional Memberships

2001	Co-organizer, International Conference on Experimental Implementation of Quantum Computation, January 16-19, 2001, Sydney, Australia
2001	Co-organizer of workshop on Scanned Probe Microscopy in Biology, Chemistry and Physics, December 9-12, 2001 Santa Fe, NM.
2000-present	Member, Quantum Information Science and Technology Expert Panel, tasked with developing a national quantum information roadmap
2000-2002	Member, International Advisory Committee, Australian Research Council Special Research Centre for Quantum Computer Technology
1979-present	Member, American Physical Society
2001-2005	Member, Executive Committee of the Instrumentation and Measurement Sciences Topical Group of the American Physical Society
2002-present	Member, American Association for the Advancement of Science
2000-2002	Member, Los Alamos National Laboratory Postdoctoral Committee
2001-2002	Leader, Complex Functional Nanomaterials Thrust of the LANL/Sandia Center for Integrated Nanomaterials
2005-present	Director, OSU Center for Electronic/Magnetic Nanoscale Composite Multifunctional Materials Proposal referee and regular panelist, National Science Foundation Proposal referee, Department of Energy, The Research Foundation and the Petroleum Research Foundation Manuscript referee, Physical Review Letters, Science, Nature, Physical Review B, Applied Physics Letters, Journal of Applied Physics and Physica C.

Awards and Honors

Fellow, Los Alamos National Laboratory
February 1995, Los Alamos National Laboratory Fellows Prize
Fellow, The American Physical Society
Fellow, American Association for the Advancement of Science

B. Selected peer-reviewed publications (selected from 88 peer-reviewed publications)

1. Urban R, Putilin A, Wigen PE, Liou S-H, Cross MC, **Hammel PC**, Roukes ML. Perturbation of magnetostatic modes observed by ferromagnetic resonance force microscopy, *Phys Rev B* 2006, 73, 212410.
2. Pelekhov DV, Selcu C, Banerjee P, Fong KC, **Hammel PC**, Bhaskaran H, Schwab K. Light-free magnetic resonance force microscopy for studies of electron spin polarized systems, *J. Magn. Magn. Matls.* 2005, 286 324.
3. **Hammel PC**. Seeing Single Spins, *Nature* 2004, 430 300.
4. Simovic B, Nicklas M, **Hammel PC**, Hucker M, Buchner B, Thompson J D. Interplay between freezing and superconductivity in the optimally doped $\text{La}_{1.65}\text{Eu}_{0.2}\text{Sr}_{0.15}\text{CuO}_4$ under hydrostatic pressure, *Europhys. Lett.* 2004, 66 722728.
5. **Hammel PC**, Pelekhov DV, Wigen PE, Gosnell TR, Midzor MM, Roukes ML. The Magnetic-Resonance Force Microscope: A New Tool for High-Resolution, 3-D, Subsurface Scanned Probe Imaging, *Proceedings of the IEEE* 2003, 91, 789.
6. Simovic B, **Hammel PC**, Hucker M, Buchner B, Revcolevschi A. Experimental evidence for a glass forming stripe liquid in the magnetic ground state of $\text{La}_{1.65}\text{Eu}_{0.2}\text{Sr}_{0.15}\text{CuO}_4$, *Phys. Rev. B*, 2003, 68, 012145.
7. Berman GP, Borgonovi F, Chapline G, Gurvitz SA, **Hammel PC**, Pelekhov DV, Suter A, Tsifrinovich VI, Application of magnetic resonance force microscopy cyclic adiabatic inversion for a single-spin measurement, *J. Phys. A: Mathematical and General* 2003, 36, 4417.
8. Mozyrsky D, Martin I, Pelekhov D, **Hammel PC**. Theory of spin relaxation in magnetic resonance force microscopy, *Appl. Phys. Lett.* 2003, 82 1278.
9. Berman GP, Borgonovi F, Chapline G, **Hammel PC**, Tsifrinovich VI. Magnetic-resonance force microscopy measurement of entangled spin states, *Physical Review A* 2002, 66, 32106.
10. Pelekhov DV, Martin I, Suter A, Reagor DW, **Hammel PC**. Magnetic resonance force microscopy and the solid state quantum computer, *Proc. SPIE* 4656 p. 1-9, *Quantum Dot Devices and Computing*, James A. Lott, Nikolai N. Ledentsov, Kevin J. Malloy, Bruce E. Kane, Thomas W. Sigmon, Eds. (2002).
11. Allen JW, Aronson M, Boebinger GS, Broholm, CL, Cooper SL, Crowe JE, **Hammel PC**, Lander G. Future probes in materials science, *Physica B* 2002, 318, 12-23.
12. Suter A, Pelekhov DV, Roukes ML, **Hammel PC**. Probe-Sample Coupling in the Magnetic Resonance Force Microscope, *Journal of Magnetic Resonance* 2002, 154 210.
13. Berman GP, Doolen GD, **Hammel PC**, Tsifrinovich VI. Magnetic resonance force microscopy quantum computer with tellurium, *Phys. Rev. Lett.* 2001, 86 2894.
14. Curro NJ, **Hammel PC**, Suh BJ, Hucker M, Buchner B, Ammerahl U, Revcolevschi A. Inhomogeneous Low Frequency Spin Dynamics in $\text{La}_{1.65}\text{Eu}_{0.2}\text{Sr}_{0.15}\text{CuO}_4$, *Phys. Rev. Lett.* 2000, 85 642.
15. Gorny K, Vyaselev OM, Martindale JA, Pennington CH, **Hammel PC**, Hults WL, Smith JL, Kuhns PL, Reyes AP, Moulton WG. Magnetic field independence of the spin gap in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$. *Phys. Rev. Lett.* 1999, 82 177.
16. Yoshinari Y, **Hammel PC**, Cheong S-W. Magnetism of Stripe-Ordered $\text{La}_{5/3}\text{Sr}_{1/3}\text{NiO}_4$, *Phys. Rev. Lett.* 1999, 82 3536.
17. Zhang Z, **Hammel PC**. Towards a Magnetic Resonance Force Microscope Employing a Ferromagnetic Probe Mounted on the Force Detector, *Solid State Nuclear Magnetic Resonance* 1998, 11 65.
18. **Hammel PC**, Zhang Z, Midzor M, Roukes ML, Wigen PE, Childress JR. The Magnetic Resonance Force Microscope: A New Microscopic Probe of Magnetic Materials, *Frontiers in Reduced Dimensional Magnetism*, edited by V. G. Bar'yakhtar, P. E. Wigen and N. A. Lesnik, Kluwer Academic Publishers (Dordrecht), p. 441 (1998).
19. Suh BJ, Yoshinari Y, Thompson JD, **Hammel PC**, Sarrao JL, Fisk Z. Suppression of Antiferromagnetic Order by Light Hole Doping in $\text{La}_2\text{Cu}_{1-x}\text{Li}_x\text{O}_4$: A ^{139}La NQR Study, 1998, *Phys. Rev. Lett.* 81 2791.
20. Zhang Z, **Hammel PC**, Midzor M, Roukes ML, and Childress JR. Ferromagnetic Resonance Force Microscopy on Microscopic Co Single Layer Films, *Appl. Phys. Lett.* 1998, 73 2036.
21. Yoshinari Y, **Hammel PC**, Martindale JA, Moshopoulou E, Thompson JD, Sarrao JL, Fisk Z, Magnetic Excitations of the Doped-Hole State in Diamagnetic $\text{La}_2\text{Cu}_{0.5}\text{Li}_{0.5}\text{O}_4$, *Phys. Rev. Lett.* 1996, 77 2069.
22. Zhang Z, Wigen PE, **Hammel PC**. Observation of Ferromagnetic Resonance in a Microscopic Sample Using Magnetic Resonance Force Microscopy, *Appl. Phys. Lett.* 1996, 68 2005.
23. **Hammel PC**, Takigawa M, Heffner RH, Fisk Z, Ott KC. Spin dynamics at oxygen sites in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$, *Phys. Rev. Lett.* 1989, 63 1992. [Cited over 300 times.]
24. **Hammel PC**, Richardson RC. Relaxation of nuclear magnetization of liquid ^3He -substrate systems, *Phys. Rev. Lett.* 1984, 52 1441.

C. Research Support

Completed Research Support

DAAD19-02-1-031 Hammel (PI)

07/15/02–01/14/06

Army Research Office

Single spin readout for the silicon-based quantum computer

Develop single spin sensitivity in MRFM, and apply this to spin qubit readout, device characterization and fabrication process development in spin-based quantum computer devices.

Role: PI

DE-FG02-03ER46054 Hammel (PI)

07/15/03-07/14/05

Department of Energy

Microscopic subsurface characterization of layered magnetic materials using magnetic resonance force microscopy

Study structural and magnetic properties of buried interfaces in layered magnetic structures and the magnetic and spin-polarized transport properties of spin electronics systems and microscopic ferromagnets by means scanned probe nuclear magnetic resonance (NMR), electron spin resonance (ESR) and ferromagnetic resonance (FMR).

Role: PI

EIA-0323783 Hammel (PI)

08/15/03-07/31/06

NSF Physics

Magnetic Resonance Force Microscopy for Characterization and Readout of a Quantum Computer Employing Endohedral Fullerenes

The goal of the project is the application of a magnetic resonance force microscope to the detection and study of individual endohedral fullerenes, and to the fabrication, characterization and readout of a fullerene-based quantum computer, ultimately with single spin sensitivity.

Role: PI

N00014-02-1-0963 Hammel (PI)

08/07/02-07/31/05

Office of Naval Research

Imaging injected nonequilibrium spin polarization by MRFM

Develop very sensitive scanned probe microscopy for imaging electrical spin-injection effects across high quality, epitaxial semiconductor interfaces, and to understand the fundamental physics of spin injection across interfaces.

Role: PI

DAAD19-03-C-0079 Hammel (PI)

07/21/03-07/20/05

US Army Office of Research (subcontract through Pixon LLC)

Essential image processing for magnetic-resonance force microscopy

This project's specific objectives are to incorporate the knowledge gained during MRFM hardware development into the design of software tools for MRFM image formation and, in turn, for the image-processing research to feed back to the hardware development.

Role: PI

W9113M-04-1-0007 Hammel (PI)

03/29/04-03/28/05

US Army Space and Missile Def Cmd

Ultra sensitive micromechanical accelerometer/force detector with an integrated displacement read-out

The project is focused on the development of a compact high sensitivity accelerometer based on detection of the displacement a micromachined suspended beam.

Role: PI

NSF-2T-7008/341 OS/VT Hammel (PI)

08/15/03-07/15/05

LUNA INNOVATIONS INC

This subcontract is for characterization of C₈₀ fullerenes to determine magnetic resonance properties such as lineshape and relaxation.

Role: PI