

BIOGRAPHICAL SKETCH

December 12, 2017

Name: Lu Jeu Sham

(a) Professional Preparation

UG	Imperial College, University of London	Mathematics	B.Sc. 1960
G	University of Cambridge, England	Physics	Ph.D. 1963
PD	University of California, San Diego	Condensed Matter Theory	Postdoc. 1963-66

(b) Appointments

Distinguished Professor Emeritus of Physics,	12/2012 – present
Adjunct Professor Emeritus of EECS	12/2012 – present
Adjunct Professor in Electrical and Computer Engineering	8/2005 – 11/2012
Distinguished Professor of Physics	11/2004- 11/2012
University of California, San Diego - Chair, Department of Physics	8/95 -7/98
UCSD Director, Inst. for Pure and Applied Physical Sciences	9/91 -7/95
UCSD Dean, Division of Natural Sciences	11/85- 6/89
University of California, San Diego - Professor of Physics	7/75 – 11/04
IBM Corporation, Yorktown Heights, NY - Research Physicist	7/74 - 7/75
University of California, San Diego - Associate Professor	9/68 - 7/76
Queen Mary College, Univ. of London - Reader in Applied Math	9/67 - 9/68
University of California, Irvine - Assistant Professor in Physics	7/66 - 8/67

(c) **Publications** – ISI 309 papers, Citations 52129, and h-index 70.

SELECTED PUBLICATIONS

1. C.-K. Chan and L. J. Sham, “Robust distant entanglement generation using coherent multi-photon scattering”, Phys. Rev. Lett. **110**, 070501 (2013) 5 pages.
<http://dx.doi.org/10.1103/PhysRevLett.110.070501>
2. C.-K. Chan and L. J. Sham, “Precision of electromagnetic control of a quantum system”, Phys. Rev. A **84**, 032116 (2011) 9 pages. <http://dx.doi.org/10.1103/PhysRevA.84.032116>
3. H. Dery, P. Dalal, L. Cywinski, and L. J. Sham. Spin-based logic in semiconductors for reconfigurable large-scale circuits. Nature, 447:573 (2007).
<http://dx.doi.org/10.1038/nature05833>
4. W. Yao, R.-B. Liu, and L. J. Sham. Restoring coherence lost to a slow interacting mesoscopic spin bath. Physical Review Letters 98, 077602 (2007) 4 pages.
<http://link.aps.org/abstract/PRL/v98/e077602>
5. Wang Yao, Ren-Bao Liu, and L. J. Sham, "Theory of electron spin decoherence by interacting nuclear spins in a quantum dot", Phys. Rev. B **74**, 195301 (2006) 11 pages.
<http://link.aps.org/abstract/PRB/v74/e195301>
6. X. Li, Y. Wu, D. Steel, D. Gammon, T. H. Stievater, D. S. Katzer, D. Park, C. Piermarocchi, and L. J. Sham. An All-Optical Quantum Gate in a Semiconductor Quantum Dot. Science, 301:809 (2003). <http://www.sciencemag.org/cgi/reprint/301/5634/809.pdf>
7. T. Östreich, K. Schönhammer, and L. J. Sham. Exciton-exciton correlation in the nonlinear optical regime. Phys. Rev. Lett., 74, 4698, (1995).
<http://dx.doi.org/10.1103/PhysRevLett.74.4698>

8. M. Z. Maialle, E. A. de Andrada e Silva, and L. J. Sham. Exciton spin dynamics in quantum wells. *Phys. Rev. B*, 47, 15776 (1993). <http://dx.doi.org/10.1103/PhysRevB.47.15776>
9. L. J. Sham and M. Schlüter. Density-functional theory of the energy gap. *Phys. Rev. Lett.*, 51, 1888 (1983). <https://link.aps.org/doi/10.1103/PhysRevLett.51.1888>
10. M. Sparks, D. L. Mills, R. Warren, T. Holstein, A. A. Maradudin, L. J. Sham, E. Loh, and D. F. King. Theory of electron-avalanche breakdown in solids. *Phys. Rev. B*, 24:3519 (1981). <https://link.aps.org/doi/10.1103/PhysRevB.24.3519>

(d) Research Activities

1. The current effort includes concluding the single photon detector project in collaboration with ECE professor Yuhwa Lo and his group. The work involves modeling single-photon transduction into electric current and the cyclic electronic processes involving the Auger effect. It has a mixture of quantum mechanically derived rate equations and single electron-matter interaction process involving quantum field theoretic techniques.
2. Working on a manuscript on the optical reversal of magnetization with ECE professor Vitaliy Lomakin and his student Macro Menarini.
3. There is also an ongoing project with Duncan Steel on the optical control of a single electron in a quantum dot interacting with an ensemble of interacting nuclear spins. Collaboration with Steel's experimental group on optical control of the electron spin for quantum information has been going on for about twenty years.
4. Sham had also worked on the theory of nonlinear optical processes in semiconductor heterostructures, including interacting excitons, and on collaboration with former Bell Laboratory experimentalists, Jag Shah and Daniel Chemla.
5. In the density functional theory, the Kohn-Sham equation has been for the last 50 years serving the computations of materials in the physics (condensed matter, atomic and nuclear), chemistry, biology, and engineering communities.
6. Sham and Schlüter had extended the theory to cover the band gap of semiconductors and metals.
7. His main research has been on the many-body theory of solids, including intra and interspecies interaction effects of electrons and phonons. His thesis work started the electronic computer computation of the phonon spectra including electronic contributions.

(e) Selected Awards

1. Member, U.S. National Academy of Sciences (1998) and of Academia Sinica, Taiwan (1998).
2. Fellow of American Physical Society, of Optical Society of America, and of AAAS.
3. W.E. Lamb medal for Laser Science and Quantum Optics, January 2004.
4. Chancellor's Associates Faculty Award for Excellence in Research, UCSD 1994.
5. Humboldt Foundation Award, Germany, February 1978.
6. Visiting Miller Professorship, University of California Berkeley, August-December, 1998. C.N. Yang Visiting Professor, Chinese University of Hong Kong, 2001. Doctorate honoris causa: National Chiao Tung University, Taiwan, June, 2006; Baptist University, Hong Kong, November, 2006.

(f) Service to the community

1. Served on the Executive Board and the Council of the American Physical Society and the Executive Committee of its Division of Condensed Matter Physics.
2. Served on the University Grant Council of Hong Kong which keeps research to international standards. Advised universities and Institute of Physics, Academia Sinica in Taiwan.
3. Served nine years (six years as chair) on the IUPAP Commission C8 Physics of Semiconductors to bring its international conferences around the world.