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EDUCATION:

Sept 90–June 96	Ph.D. in Physics, The University of Michigan, Ann Arbor. Area: Condensed matter theory. Thesis Advisor: Professor Franco Nori. Thesis Title: Quantum Fluctuations in Condensed Matter Systems.
Sept 90–May 92	M.S. in Physics, University of Michigan.
Sept 85 –June 89	B.Sc. in Physics, Peking University, Beijing, China.

HONORS AND AWARDS:

May 97	1996 University of Michigan Distinguished Dissertation Award, Horace H. Rackham School of Graduate Studies, University of Michigan.
Sept 93 – June 94	Rackham Predoctoral Fellowship, University of Michigan. (fellowship given to the top graduate students annually)
Sept 90 – Apr 91	Frank Knoller Scholarship, University of Michigan.
Sept 85 – June 89	Top 5% yearly for three consequtive years in a physics class of 120 students at Peking University, which has the highest ranked physics department in China.

WORK EXPERIENCE:

Aug 02 –	Assistant Professor, University at Buffalo, SUNY.
Sept 98 –Aug 02	Research Associate, University of Maryland at College Park. Study spintronics and quantum computation. In particular, studied feasibility of spin-based quantum dot quantum computer. Calculated electron exchange coupling, inhomogeneous field response, and multi-electron energy spectra in quantum dots. Studied adiabatic time evolution of a two-electron system. Calculated donor electron exchange in Silicon bulk and heterostructures. Studying electron and nuclear spin relaxations. Calculating noise signatures of electron entanglement in transport experiments. Collaborating with experimentalists in searching for evidence of electron quantum entanglement. Supervising graduate students.
July 96– Aug 98	Postdoctoral Fellowship, University of Illinois at Chicago. Studied the prospect of optical coherent control in semiconductor quantum wells and other electron-confining structures such as quantum wires and dots. Particularly focused on optical properties such as possible gain without population inversion. Also studied possible optical control of phonon emissions.
Sept 90 – Aug 96	Teaching Assistant in Physics, University of Michigan. Worked both as an instructor of elementary physics labs and as a grader for graduate and undergraduate physics courses.
Sept 90 – Aug 96	Research Assistant in Physics, University of Michigan. Studied quantum fluctuation and coherence properties of various condensed matter systems including phonons, Josephson junctions, and Helium.

PROFESSIONAL SKILLS:

- Strong theoretical background in both condensed matter physics and quantum optics, especially on quantum fluctuations and coherence of phonons, quantum kinetic equations in semiconductor heterostructures, Josephson junctions and other mesoscopic and nanoscopic structures, and quantum computation and quantum information processing in both solid state structures and other systems.
- Knowledgeable of computational physics. Substantial scientific programming experience with Fortran. Knowledge in C/C++. Experienced with a variety of software packages and with Unix.

PUBLICATIONS:

1. *Quantum Phonon Optics: Coherent and Squeezed Atomic Displacements*,
   X. Hu and F. Nori, cond-mat/9609223. *Physical Review B* **53**, 2419 (1996).
2. *Squeezed Phonon States: Modulating Quantum Fluctuations of Atomic Displacements*,
   X. Hu and F. Nori, cond-mat/9609188. *Physical Review Letters* **76**, 2294 (1996).
   Featured in the AIP *Physics News Update* (March 6, 1996). Also featured in the *Search and Discovery* section of *Physics Today* **50**, No 6, page 18, 1997.
3. *Phonon Squeezed States Generated by Second Order Raman Scattering*,
   X. Hu and F. Nori, cond-mat/9712078. *Physical Review Letters* **79**, 4605 (1997).
   Featured in a plenary talk by F. Nori at Phonon 98, an international phonon conference held once every three years. Also featured in *New Scientist* **161**, No. 2179, 36 (March 27,1999).
4. *Coherent Control of Intersubband Transitions in Semiconductor Nanostructures*,
   X. Hu and W. Pötz, *Phys. Stat. Sol. (B)* **204**, 350 (1997).
5. *Coherent Control of Interband Transitions in Semiconductor Heterostructures*,
   X. Hu and W. Pötz, *Proceedings of SPIE* **3277**, 36 (1998).
6. *Coherent Control of Light Absorption and Carrier Dynamics in Semiconductor Nanostructures*",
   W. Pötz and X. Hu, *VLSI Design* **8**, 203 (1998).
7. *Coherent Control of Optical Gain from Electronic Intersubband Transitions in Semiconductors*,
   X. Hu and W. Pötz, *Applied Physics Letters* **73**, 876 (1998).
8. *Phonon Squeezed States: Quantum Noise Reduction in Solids*,
   X. Hu and F. Nori, cond-mat/0112011. *Physica B* **263-264**, 16-29 (1999).
9. *Coherent control of intersubband optical gain and phonon emission in semiconductor heterostructures*,
   X. Hu and W. Pötz, *Proceedings of SPIE* **3624**, 119 (1999).
10. *Coherent manipulation of phonon emission rates in semiconductor heterostructures*,
    X. Hu and W. Pötz, *Physical Review Letters* **82**, 3116 (1999).
11. *Coherent Control Schemes in Semiconductor Double Wells*,
    X. Hu and W. Pötz, in *Coherent Control in Atoms, Molecules, and Semiconductors*, ed. by W. Pötz and W.A. Schroeder (Kluwer, Dordrecht, 1999).

12. *Hilbert space structure of a solid state quantum computer: two-electron states of a double quantum dot artificial molecule*,
X. Hu and S. Das Sarma, quant-ph/9911080. *Physical Review A* **61**, 062301 (2000).

13. *Spintronics: electron spin coherence, entanglement, and transport*,
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić, cond-mat/9912040. *Superlattice Microst* **27**, 289-295 (2000).

14. *Theoretical perspectives on spintronics and spin-polarized transport*,
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić, cond-mat/0002256. *IEEE Transactions on Magnetics* **36**, 2821 (2000).

15. *Interplay between Zeeman Coupling and Swap Action in Spin-based Quantum Computer Models: Error Correction in Inhomogeneous Magnetic Fields*,
X. Hu, R. de Sousa, and S. Das Sarma, cond-mat/0004459. *Physical Review Letters* **86**, 918 (2001).

16. *Issues, Concepts, and Challenges in Spintronics*,
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić, cond-mat/0006369. The 58th DRC (Device Research Conference) Conference Digest, 95-8 (IEEE, Piscataway, 2000).

17. *Spin Electronics and Spin Computation*,
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić, cond-mat/0105247. *Solid State Communications* **119**, 207 (2001).

18. *Spin-based Quantum Computation in Multielectron Quantum Dots*,
X. Hu and S. Das Sarma, cond-mat/0101102. *Physical Review A* **64**, 042312 (2001).

19. *Theoretical issues in spin-based quantum dot quantum computation*,
X. Hu and S. Das Sarma, cond-mat/0102019. In the *Proceedings of the 1st International Conference on Experimental Implementation of Quantum Computation*, ed. by R.G. Clark (Rinton, Princeton, 2001).

20. *Effect of an inhomogeneous external magnetic field on a quantum dot quantum computer*,
R. de Sousa, X. Hu, and S. Das Sarma, cond-mat/0103410. *Physical Review A* **64**, 042307 (2001).

21. *Exchange in silicon based quantum computer architecture*,
B. Koiller, X. Hu, and S. Das Sarma, cond-mat/0106259. *Physical Review Letters* **88**, 027903 (2002).

22. *Decoherence and dephasing in spin-based solid state quantum computers*,
X. Hu, R. de Sousa, and S. Das Sarma. Invited paper for the 7th International Symposium on Foundations of Quantum Mechanics in the Light of New Technology, Saitama, Japan (August, 2001). An extended version available at cond-mat/0108339.

23. *Strain effects on silicon donor exchange: Quantum computer architecture considerations*,
B. Koiller, X. Hu, and S. Das Sarma, cond-mat/0112078. *Physical Review B*, in press (2002).

24. *Gate errors in solid state quantum computer architectures*,
X. Hu and S. Das Sarma, cond-mat/0202152. *Physical Review A*, in press (2002).

25. *Theory of Micro-Raman Spectroscopy for Entangled Donor States in Silicon*,
B. Koiller, X. Hu, H.D. Drew, and S. Das Sarma, cond-mat/0207455.

26. *Gate errors in solid state quantum computation*,
X. Hu and S. Das Sarma, cond-mat/0207457.

27. *Entanglement and exchange in coupled quantum dots*,
X. Hu and S. Das Sarma.
Invited review for Journal of Physics: Condensed Matter. In preparation.

INVITED PRESENTATIONS AT CONFERENCES:

1. "*Coherent Control of Interband Transitions in Semiconductor Heterostructures*",
W. Pötz and X. Hu. *Optoelectronics 98* (San Jose, CA, Jan., 1998).

2. "*Phonon Squeezed States: Quantum Noise Reduction in Solids*".
American Physical Society 1998 March Meeting (Los Angeles, CA).
Abstract published in the *Bulletin of the American Physical Society* **43**, 603 (1998).

3. "*Coherent Control Schemes in Semiconductor Double Wells*",
International Workshop on the Coherent Control in Semiconductors (Chicago, Illinois, May, 1998).

4. "*Coherent Control of Optical Gain and Phonon Emission in Semiconductor Heterostructures*",
The *29th Winter Colloquium on the Physics of Quantum Electronics* (Snowbird, Utah, Jan., 1999).

5. "*Theoretical investigation of coherent control of optical gain and phonon emission*",
Photonic West 99 (San Jose, California, Jan., 1999).

6. "*Spintronics*",
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić. *Surfaces and Interfaces of Mesoscopic Devices 99* (Maui, Hawaii, Dec., 1999).

7. "*Theoretical perspectives on spintronics and spin-polarized transport*",
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić. *INTERMAG 2000* (Toronto, Canada, April, 2000).

8. "*Issues, Concepts, and Challenges in Spintronics*",
S. Das Sarma, J. Fabian, X. Hu, and I. Žutić. *DRC 2000* (Denver, Colorado, June, 2000).

9. "*Theoretical Study of Spin-Based Quantum Dot Quantum Computer*",
International Conference on Experimental Implementation of Quantum Computation (Sydney, Australia, January, 2001).

10. "*Entanglement and exchange in coupled quantum dots*",
American Physical Society 2001 March Meeting (Seattle, WA, March, 2001).
Abstract published in the *Bulletin of the American Physical Society* **46**(1), 428 (2001).

11. "*Solid state quantum computing*",
Conference on Quantum Computing and Communication (Athens, GA, September, 2001).

12. "*Gate errors in solid state quantum computation*",
Workshop on Quantum Device Technology (Potsdam, NY, May, 2002).

13. "*Gate errors in solid state quantum computation*",
Third Workshop on Macroscopic Quantum Coherence and Computation (Naples, Italy, June, 2002).

14. "*Donor exchange in silicon: Quantum computer architecture considerations*", *Feynman Festival* (College Park, Maryland, August, 2002).

15. "*Spin-based quantum dot quantum computing*", *Second International Conference on Semiconductor Quantum Dots (QD2002)* (Tokyo, Japan, September, 2002).

REFERENCES:

- Sankar Das Sarma, Distinguished University Professor. Email: dassarma@physics.umd.edu. Mailing address: Department of Physics, University of Maryland, College Park, MD 20742-4111. Phone: 301-405-6145.
- Richard A. Webb, Alford Ward Chaired Professor of semiconductor physics. Email: rawebb@squid.umd.edu. Mailing address: Department of Physics, University of Maryland, College Park, MD 20742-4111. Phone: 301-405-6175.
- Professor Walter Pötz. Email: walter.poetz@kfunigraz.ac.at. Mailing address: Institut für Theoretische Physik Karl-Franzens Universität Graz, Universitätsplatz 5, A-8010 Graz, Austria.
- Professor Franco Nori. Email: nori@umich.edu. Mailing address: Department of Physics, University of Michigan, Ann Arbor, MI 48109-1120.
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