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1. *EDUCATION*

B. A. Physics, University of California, Berkeley, June, 1983

Ph. D. Physics, Princeton University, October, 1988
Thesis advisor: D. C. Tsui

2. EMPLOYMENT

April 1 1999- Research Staff, Department of Physics and Laboratory for Physical Sciences, University of Maryland

1995- 1999 Senior Research Associate, Semiconductor Nanofabrication Facility, School of Physics, University of New South Wales, Sydney Australia

1988-1994 Member of Technical Staff, Bell Laboratories, Murray Hill, New Jersey

3. *RESEARCH INTERESTS*

Dr. Kane has worked in the field of experimental quantum device physics since he began his graduate school research at Princeton in 1985 in the laboratory of D. C. Tsui, recipient of the 1998 Nobel Prize in Physics. For most of the last decade Kane's primary interest has been in the development of semiconductor devices for quantum computing. His 1998 Nature paper in which an architecture for a silicon-based quantum computer was first proposed has been cited over 1800 times according to *Google Scholar*.

4. *ARTICLES IN PEER-REVIEWED PUBLICATIONS*

1. *Levitated spinning graphene flakes in an electric quadrupole ion trap,* **B. E. Kane**, *Phys. Rev. B* **82**, 115441 (2010).
2. *Temperature-dependent transport in a sixfold degenerate 2D electron system on a H-Si(111) surface,* R. N. McFarland, T. M. Kott, L. Sun, K. Eng, and **B. E. Kane**, *Phys. Rev. B* **80**, 161310 (2009).
3. *Detection of a single-charge defect in a metal-oxide-semiconductor structure using vertically coupled Al and Si single-electron transistors,* L. Sun and **B. E. Kane**, *Phys. Rev. B* **80**, 153310 (2009).
4. *Coulomb blockade in a Si channel gated by an Al single-electron transistor*, L. Sun, K. R. Brown, and B. E. Kane, *Appl. Phys. Lett.* **91**, 142117 (2007).
5. *Integer quantum Hall effect on a six valley hydrogen-passivated silicon (111) surface*, K. Eng, R. N. McFarland, and **B. E. Kane**, *Phys. Rev. Lett* **99**, 016801 (2007)
6. *Electric-field-dependent spectroscopy of charge motion using a single-electron transistor*, K. R. Brown, L. Sun, and **B. E. Kane** *Appl. Phys. Lett.* **88,** 213118 (2006).
7. *High mobility two-dimensional electron system on hydrogen-passivated silicon(111) surfaces,* K. Eng, R. N. McFarland and **B. E. Kane**, *Appl. Phys. Lett.* **87**, 052106 (2005).
8. *Can we build a large-scale quantum computer using semiconductor materials?* **B. E. Kane**, *MRS Bulletin* **30**, 105 (2005).
9. *Weak localization thickness measurements of Si : P delta-layers,* D. F. Sullivan, **B. E. Kane**, and P. E. Thompson, *Appl. Phys. Lett.* **85**, 6362 (2004).
10. *Millikelvin scanned probe for measurement of nanostructures,* K. R. Brown, L. Sun, and **B. E. Kane**, *Rev. Sci. Instrum.* **75**, 2029 (2004).
11. *Hydrogenic Spin Quantum Computing in Silicon: A Digital Approach*, A. J. Skinner, M. E. Davenport, and **B. E. Kane**, *Phys. Rev. Lett*. **90**, 087901 (2003).
12. *Density-Dependent Spin Polarization in Ultra-Low-Disorder Quantum Wires*, D. J. Reilly, T. M. Buehler, J. L. O'Brien, A. R. Hamilton, A. S. Dzurak, R. G. Clark, **B. E. Kane**, L. N. Pfeiffer, and K. W. West, *Phys. Rev. Lett.* **89**, 246801 (2002).
13. *Scanning tunnelling microscope fabrication of arrays of phosphorus atom qubits for a silicon quantum computer,* J. L. O'Brien, S. R. Schofield, M. Y. Simmons, R. G. Clark, A. S. Dzurak, N. J. Curson, **B. E. Kane**, N. S. McAlpine, M. E. Hawley, and G. W. Brown, *Smart Mat. & Struct*. **11**, 741 (2002).

14. *Towards the fabrication of phosphorus qubits for a silicon quantum computer*, J. L. O'Brien, S. R. Schofield, M. Y. Simmons, R. G. Clark, A. S. Dzurak, N. J. Curson, **B. E. Kane**, N. S. McAlpine, M. E. Hawley, and G. W. Brown, *Phys. Rev. B* **64**, 161401 (2001).
15. *Quantum measurement of coherent tunneling between quantum dots*. H. M. Wiseman, Dian Wahyu Utami, He Bi Sun, G. J. Milburn, **B. E. Kane**, A. Dzurak, and R. G. Clark, *Phys. Rev. B* **63**, 235308 (2001).
16. *Many-body spin-related phenomena in ultra low-disorder quantum wires,* D. J. Reilly, G. R. Facer, A. S. Dzurak, **B. E. Kane**, R. G. Clark, P. J. Stiles, R. G. Clark, A. R. Hamilton, J. L. O'Brien, N. E. Lumpkin, L. N. Pfeiffer and K. W. West, *Phys. Rev. B* **63**, 121311 (2001).
17. *Many-body spin interactions in semiconductor quantum wires,* D. J. Reilly, G. R. Facer, A. S. Dzurak, **B. E. Kane**, R. G. Clark, P. J. Stiles, J. L. O'Brien, N. E. Lumpkin, L. N. Pfeiffer, and K. W. West, *Australian J. Phys.* **53**, 543 (2000).
18. *Silicon-based quantum computation,* **B. E. Kane,** *Fortschritte der Physik*, **48**, 1023 (2000).
19. *Nanofabrication using liquid He films*, **B. E. Kane**, N. S. McAlpine, and R. G. Clark, *Physica E* **8**, 369 (2000).
20. *Cyclotron resonance in undoped, top-gated heterostructures,* R. J. Heron, R. A. Lewis, R. G. Clark, R. P. Starrett, **B. E. Kane**, G. R. Facer, N. E. Lumpkin, D. G. Rickel, L. N. Pfeiffer, and K. W. West, Semiconduct. Sci. Tech. **15**, 589 (2000).
21. *Experimental determination of the B-T phase diagram of YBCO to 150 T*, J. L. O'Brien, H. Nakagawa, A. S. Dzurak, R. G. Clark, **B. E. Kane**, *et al. Phys. Rev. B* **61**, 1584 (2000).
22. *Single-spin measurement using single electron transistors to probe two electron systems*, **B. E. Kane**, N. S. McAlpine, A. S. Dzurak, R. G. Clark, G. J. Milburn, He Bi Sun, H. Wiseman, *Phys. Rev. B*, **61**, 2961 (2000).
23. *Quantum point contact in a magnetic field: Far-infrared resonant heating observed in photoconductivity*, R. J. Heron and R. A. Lewis, **B. E. Kane**, G. R. Facer, R. G. Clark, A. S. Dzurak, N. E. Lumpkin, and R. P. Starrett, D. G. Rickel, L. N. Pfeiffer and K. W. West, *Appl. Phys. Lett*. **75**, 3150 (1999).
24. *Evidence for ballistic electron transport exceeding 160 μm in an undoped GaAs/AlGaAs field-effect transistor*, G. R. Facer, **B. E. Kane**, A. S. Dzurak, N. E. Lumpkin, R. G. Clark, L. N. Pfeiffer and K. W. West, *Physical Review **B*** **59**, 4622 (1999).
25. *Far-infrared studies of extremely high mobility gated GaAs/AlGaAs structures in magnetic fields,* R. J. Heron, R. A. Lewis, R. G. Clark, R. P. Starrett, **B. E. Kane**, G. R. Facer, N. E. Lumpkin, D. G. Rickel, L. N. Pfeiffer, and K. W. West, *Physica B* **258**, 481 (1998).
26. *Quantum Computers*, G. J. Milburn and **B. E. Kane**, Australian & New Zealand Physicist, **35,** 191 (1998).
27. *Quantized conductance in a 5μm long quantum wire with gate-controlled width and electron density,* **B. E. Kane**, G. R. Facer, A. S. Dzurak, N. E. Lumpkin, R. G. Clark, L. N. Pfeiffer and K. W. West, *Appl. Phys. Lett.* **72**, 3506 (1998).
28. *Anomalous carrier lifetime enhancement and effective mass discontinuity observed during magnetic-field-induced subband depopulation in a wide parabolic quantum well,* G. R. Facer, **B. E. Kane**, R. G. Clark, L. N. Pfeiffer, and K. W. West, *Physica B* **251**, 946 (1998).
29. *Low-temperature transport measurements of superconductors and semiconductors in magnetic fields to 800 T,* A. S. Dzurak, **B. E. Kane**, R. G. Clark, N. E. Lumpkin, J. O'Brien, G. R. Facer, R. P. Starrett, A. Skougarevsky, H. Nakagawa, N. Miura, D. G. Rickel, J. D. Goettee, L. J. Campbell, C. M. Fowler, C. Mielke, J. C. King, W. D. Zerwekh, D. Clark, B. D. Bartram, M. von Ortenberg, F. Herlach, H. Yokoi, A. I. Bykov, O. M. Tatsenko, V. V. Platonov, E. E. Mitchell, J. Hermann, K. H. Muller, K. D. Maranowski, and A. C. Gossard, *Physica* B **246,** 40 (1998).
30. *Quantum jumps in magneto-optical effects and magnetization of rare-earth compounds in ultrahigh magnetic fields,* O. M. Tatsenko, V. V. Platonov, A. I. Bykov, M. I. Dolotenko, A. K. Zvezdin, J. C. Solem, C. M. Fowler, J. D. Goettee, D. Rickel, L. J. Campbell, L. Veeser, M. Sheppard, A. H. Lacerda, J. C. King, P. J. Rodriguez, D. E. Bartram, R. G. Clark, **B. E. Kane**, A. S. Dzurak, G. R. Facer, N. Miura, T. Takamasu, H. Nakagawa, H. Yokoi, J. S. Brooks, L. W. Engel, L. Pfeiffer, K. W. West, A. W. Maverick, L. G. Butler, W. Lewis, C. H. Gallegos, and B. Marshall, *Physica* B **246**, 315 (1998).
31. *The Faraday effect in Cd0.57Mn0.43Te in high magnetic field*, V. V. Platonov, O. M. Tatsenko, A. I. Bykov, M. I. Dolotenko, J. C. Solem, C. M. Fowler, J. D. Goettee, D. Rickel, L. J. Campbell, L. Veeser, M. Sheppard, A. H. Lacerda, J. C. King, P. J. Rodriguez, D. E. Bartram, R. G. Clark, **B. E. Kane**, A. S. Dzurak, G. R. Facer, N. Miura, T. Takamasu, H. Nakagawa, H. Yokoi, J. S. Brooks, L. W. Engel, L. Pfeiffer, K. W. West, A. W. Maverick, L. G. Butler, W. Lewis, C. H. Gallegos, and B. Marshall, *Physica* B **246**, 319 (1998).

32. *Dirac series experiments in 800T fields: Innovations for transport measurements,* N. E. Lumpkin, **B. E. Kane**, A. S. Dzurak, R. G. Clark, R. P. Starrett, J. O'Brien, G. R. Facer, A. V. Skougarevsky, N. Miura, H. Nakagawa, K. D. Maranowski, A. C. Gossard, E. E. Mitchell, and K. H. Muller, *Physica* B **246**, 395 (1998).
33. *Transport measurements of in-plane critical fields in $YBa_2Cu_3O_{7-\delta}$ to 300 T*, A. S. Dzurak, **B. E. Kane**, R. G. Clark, N. E. Lumpkin, J. O'Brien, G. R. Facer, R. P. Starrett, A. Skougarevsky, H. Nakagawa, N. Miura, Y. Enomoto, D. Rickel, J. D. Goettee, L. J. Campbell, C. M. Fowler, C. Mielke, J. C. King,W. D. Zerwekh *et al*., *Phys. Rev. B* **57**, 14084 (1998).
34. *A Silicon-based Nuclear Spin Quantum Computer*, **B. E. Kane**, *Nature* .**393**, 133 (1998).
35. *Carrier Lifetime Enhancement and Mass Discontinuity Inferred from Transport in a Parabolic Quantum Well during Subband Depopulation*, G. R. Facer, **B. E. Kane**, R. G. Clark, L. N. Pfeiffer, and K. W. West, *Phys. Rev. B* **56**, 10036 (1997).
36. *Measurement instrumentation for electrical transport experiments in extreme magnetic fields generated by flux compression*, **B. E. Kane**, A. S. Dzurak, G. R. Facer, R. G. Clark, R. P. Starrett, A. Skougarevsky, N. E. Lumpkin, J. S. Brooks, L. W. Engel, N. Miura, H. Yokoi, T. Takamasu, H. Nakagawa, J. D. Goettee and D. G. Rickel, *Review of Scientific Instruments* **68**, 3843 (1997).
37. *High Mobility GaAs Heterostructure FET for Nanofabrication in which Dopant-Induced Disorder is Eliminated*, **B. E. Kane**, L. N. Pfeiffer, and K. W. West, *Appl. Phys. Lett.* **67** 1262 (1995).
38. *Separately Contacted Electron-Hole Double Layer in a GaAs/AlGaAs Heterostructure*, **B. E. Kane**, J. P. Eisenstein, W. Wegscheider, L. N. Pfeiffer, and K. W. West, *Appl. Phys. Lett.* **65**, 3266 (1994).
39. *Junctions between Coplanar 2D Gases: a Probe of Boundary Effects in the Quantized Hall Regime*, **B. E. Kane**, L. N. Pfeiffer, and K. W. West, *Surface Sci.* **305**, 176 (1994).
40. *Variable Density High Mobility 2D Electron and Hole Gases in a Gated GaAs/AlGaAs As Heterostructure*, **B. E. Kane**, L. N. Pfeiffer, K. W. West, and C. K. Harnett, *Appl. Phys. Lett.* **63**, 2132 (1993).
41. *Evidence for an electric-field-induced phase transition in a spin polarized two-dimensional electron gas,* **B. E. Kane**, L. N. Pfeiffer, and K. W. West, *Phys. Rev. B* **46**, 7264 (1992).
42. *Far infrared photovoltaic effect in a Landau level diode*, C. T. Liu, **B. E. Kane**, and D. C. Tsui, *Appl. Phys. Lett.* **55**, 162 (1989).
43. *Evidence of inter Landau level tunneling in the integral quantum Hall effect*, **B. E. Kane**, D. C. Tsui, and G. Weimann, *Physical Review Letters* **61**, 1123 (1988).
44. *Low frequency noise in the integral quantum Hall effect,* **B. E. Kane**, D. C. Tsui, and G. Weimann, *Surface Science* **196**, 183 (1988).
45. *Evidence for edge currents in the integral quantum Hall effect*, **B. E. Kane**, D. C. Tsui, and G. Weimann, *Physical Review Letters* **59**, 1353 (1987).

6. PATENTS

1. *Electron devices for single electron and nuclear spin measurement*, United States Patent 6,369,404, assigned April 9, 2002.
2. *Quantum Computer*, United States Patent 6,472,681, assigned October 29, 2002.