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UCSB Physicist David Awschalom Wins American Physical Society's Buckley Prize

David D. Awschalom, a professor of physics and of electrical and computer engineering at the University of California, Santa Barbara, has been awarded the 2005 Oliver E. Buckley Prize for fundamental contributions to experimental studies of quantum spin dynamics and spin coherence in condensed matter systems.

The Buckley Prize is given annually by the American Physical Society, leaders in the international physics community, to recognize and encourage outstanding theoretical or experimental contributions to condensed matter physics. The prize was endowed in 1952 by AT&T Bell Laboratories (now Lucent Technologies) to recognize outstanding scientific work. It is named in memory of Oliver E. Buckley, a past president of Bell Labs. Only 70 other scientists have received the award, and 13 of them have gone on to win a Nobel Prize.

At UCSB, Awschalom is director of the Center for Spintronics and Quantum Computation, and is associate scientific director of the California Nanosystems Institute. Awschalom and his research group at UCSB have pioneered new experimental techniques that made possible the discovery of long-lived electron spin lifetimes and coherence in semiconductors and nanostructures. They recently demonstrated all-electrical generation and manipulation of both electron and nuclear spins in prototype solid-state devices. This work opens the door to new

opportunities for research and technology in the emerging fields of semiconductor spintronics and quantum computation.

"We're enormously proud of David Awschalom," said Martin Moskovits, dean of the Division of Mathematical, Life and Physical Sciences. "David and his coworkers are pioneer founders of a new branch of physics dubbed 'spintronics,' which exploits a previously underused property---a kind of fundamental magnetism---of the familiar particle of electricity, the electron," he added. "This magnetism could be harnessed to create a whole new technology for carrying out computation, communication and control. This accomplishment could, one day, rank alongside the discovery of the transistor in its impact."

The spintronics center that Awschalom heads is affiliated with the California Nanosystems Institute, one of the four California Institutes for Science and Innovation established in 2000 and supported by the state and private industry. The nanosystems institute is a joint project of UC Santa Barbara and UCLA. Evelyn Hu, the institute's director at UCSB, said Awschalom "continues to make substantial and groundbreaking contributions to the field of spin dynamics and spin coherence, discoveries that are answering important questions and opening new frontiers in physics."

Said Matthew Tirrell, dean of the College of Engineering at UCSB:

"This distinguished award is a testament to David Awschalom's inspired work and to the creative, collaborative, entrepreneurial environment here."

Awschalom earned his B.S. in physics at the University of Illinois at Urbana-Champaign, and his Ph.D. in experimental physics at Cornell University. He joined the UC Santa Barbara faculty as a professor of physics in 1991. His research has been chronicled in his more than 250 scientific journal articles, and has also been featured in The New York Times, The Wall Street Journal, San Francisco Chronicle, Dallas Morning News, Discover magazine, Scientific American, Physics World, and New Scientist. His research focuses on optical and magnetic interactions in semiconductor quantum structures, spin dynamics and coherence in condensed matter systems, macroscopic quantum phenomena in nanometer-scale magnets, and quantum information processing in the solid state.

Awschalom's other honors include the IBM Outstanding Innovation Award, the Outstanding Investigator Prize from the Materials Research Society, and the 2003

Magnetism Prize of the International Union of Pure and Applied Physics (IUPAP).

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