David Awschalom

Liew Family Professor in Spintronics and Quantum Information
Deputy Director for Space, Infrastructure, and Facilities

Areas of Research Expertise

Spintronics, solid-state quantum information processing, quantum materials, nanomagnetism, time-resolved magneto-optical spectroscopies

Research Overview: Awschalom Group

The Awschalom Group has active research activities in spin dynamics and coherence in condensed matter systems ("spintronics"), implementations of quantum computing, communication, and sensing in the solid state, optical and magnetic interactions in engineered semiconductor quantum structures, and macroscopic quantum phenomena in nanometer-scale magnets.

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Research

David Awschalom is one of the world's leading scientists in spintronics and quantum information engineering. His research involves understanding and controlling the spins of electrons, ions, and nuclei for fundamental studies of quantum systems, as well as potential applications in computing, communication, imaging, and encryption.

Awschalom's accomplishments include development of a variety of femtosecond-resolved spatiotemporal spectroscopies and micromagnetic sensing techniques aimed at exploring charge and spin motion in the quantum domain to the level of single electrons and nuclei. These measurements resulted in the discovery of robust electron spin coherence, transport and control of quantum coherent states, and the spin Hall effect in semiconductors.

Bio

Awschalom earned his PhD in experimental physics from Cornell University. After beginning his career at the IBM Watson Research Center, he was named Professor of Physics and of Electrical and Computer Engineering at the University of California-Santa Barbara where he served as the Director of the Center for Spintronics and Quantum Computation, and the Peter J. Clarke Professor and Director of the California NanoSystems Institute.

Awschalom has received the American Physical Society Oliver E. Buckley Prize and the Julius Edgar Lilienfeld Prize, the European Physical Society Europhysics Prize, the Materials Research Society David Turnbull Award and the Outstanding Investigator Prize, the AAAS Newcomb Cleveland Prize, the International Magnetism Prize and Néel Medal from the International Union of Pure and Applied Physics, and an IBM Outstanding Innovation Award. He has been named a Thomson Reuters/ISI Highly Cited Researcher, and is an Honorary University Professor at Xi'an Jiaotong University in China. He has been elected a member of the American Academy of Arts and Sciences, the National Academy of Sciences, the National Academy of Engineering, and the European Academy of Sciences.