

UC SANTA BARBARA

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## **UCSB's Kavli Institute for Theoretical Physics Hosts National Conference for High School Physics Teachers on Nanoscience and Quantum Computing**

More than 65 high school physics teachers from across the nation will gather at UC Santa Barbara's Kavli Institute for Theoretical Physics (KITP) on Saturday, March 25 to attend a conference on "Nanoscience and Quantum Computing, the Flow of Electronic Spin and the Coming Quantum Computer Revolution."

This is a unique opportunity for teachers to come together with renowned scientists and to bring back the excitement and information to students in their classrooms.

The annual educational forum begins at 8 a.m.

It will be taught by some of the world's leading researchers in this pioneering technology who are attending a week-long conference on "spintronics" at the UCSB international research center.

The KITP brings together scientists from throughout the world to pursue research on the most challenging and exciting questions in physics and related sciences.

Electrons behave in some ways like small spinning charged spheres.

Conventional electronic devices are controlled by the motion of the electric charge (electric currents), making no use of the information contained in the spin that tags along for the ride on each electron.

Spintronics aims to use the information that is contained in the spins.

Information-processing technology has relied so far on charge-based devices, ranging from vacuum tubes to million transistor microchips.

Conference speakers will describe how the flow of electronic spins are already being used to read the media in computer hard drives, and how the quantum mechanical nature of a single electron spin can be used to suggest remarkable new types of "quantum computers" that would take full advantage of the possibilities of quantum mechanics to look through an entire database simultaneously to find a single piece of information, or to crack cryptographic problems that have stumped mathematicians for over a century, explained David Awschalom, a coordinator of the conference and teachers' forum and a professor of physics at UCSB.

Presenters are Robert Buhrman, the John Sweet Professor of Engineering, Applied and Engineering Physics at Cornell University and director of the Center for Nanoscale Systems; James Eisenstein, the Roshek Professor of Physics at the California Institute of Technology; Stephan von Molnar, the Robert A. Kromhout Professor of Physics at Florida State University and director of the Center for Materials Research and Technology; John Preskill, the John D. MacArthur Professor of Theoretical Physics at the California Institute of Technology and director of the Center for the Physics of Information; and Stuart Wolf, professor of materials science, engineering, and physics at the University of Virginia and director of the Center for Spins in Quantum Electronic Science and Technology.

In addition to funding visiting scholars and graduate fellows, the KITP undertakes many outreach activities, such as a popular public lecture series, special activities for its community group the Friends of the KITP, sponsorship of conferences on the interfaces between science and the humanities, visits of KITP postdoctoral researchers to local high schools to talk about exciting current research, and the series of educational forums for high school physics teachers.

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