

Spintronic devices: can they extend the semiconductor technology roadmap

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8500 Boelter Hall (Penthouse)

4:00 pm - 5:30 pm

Refreshments will be served

Abstract

Scaling of Si CMOS transistors brings them close to quantum limits within next 15 years. Spintronic devices have advantages in power dissipation which will drive computing beyond the current International Technology Roadmap for Semiconductors. Intel's directions of spintronics research, group IV material issues, promising spin-based devices will be reviewed. Scheme and principle of operation of a "spin gain transistor" discussed in more detail: a large unmagnetized current creates the carrier density sufficient for the ferromagnetic transition; a small magnetized current initiates spontaneous magnetization; large magnetized current is then extracted. Importance for cascade-able logic stressed.

Biography: Dmitri E. Nikonov received the M.S. degree in Aeromechanical Engineering from the Moscow Institute of Physics and Technology in 1992 and Ph.D. in Physics from Texas A&M University in 1996. From 1997 to 1998 he was on staff of Department of Electrical and Computer Engineering at University of California Santa Barbara. Presently he is a Project Manager in Strategic Research Group at Intel Corporation in Santa Clara, California and is responsible for joint research programs with universities on nanotechnology, optoelectronics and advanced devices. He has publications on quantum mechanics, quantum optics, free-electron, gas and semiconductor lasers, and patents on integrated optics devices. His current interests are in nanoelectronics, spintronics, semiconductor device simulation.

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