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CCT Colloquium Series

Toward Quantum Computing in a Silicon Device

Paul von Allmen, Jet Propulsion Laboratory

Johnston Hall 338
May 08, 2009 - 11:30 am

Abstract:
Quantum computing is holding the promise of enabling exponential speedup of a class of NP-complete algorithms. I will introduce a few elements of quantum computing before describing recent progress toward implementation in a silicon device. Si/SiGe quantum wells with top gates allow for efficient confinement of electrons in a quantum dot. If the number of electrons in the dot is small enough (one electron is best) a qubit can be formed, on which basic quantum computing operations can be performed. I will review experimental results obtained in this system and present simulations of the electronic properties that help guide the fabrication process. Remarks on future directions will conclude the presentation.

Speaker's Bio:
Dr. Paul von Allmen is managing the High Capability Computing and Modeling group at the NASA Jet Propulsion Laboratory and is a visiting associate in chemistry at the California Institute of Technology. His research interests are in computational physics with on-going projects in astrophysics, earth science, nanotechnology and materials science. He earned a Ph.D. in physics from the Swiss Federal Institute of Technology and held positions at the IBM Zurich Research Laboratory, the University of Illinois at Urbana Champaign, and the Motorola Phoenix Research Laboratory.

Refreshments will be served.
This lecture has a reception.

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