

# PHYSICS DEPARTMENT COLLOQUIUM

"ACCEPTORS AS QUBITS FOR  
QUANTUM COMPUTING"

BY

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A scalable solid-state quantum computer based on qubits with dipolar coupling is proposed. The qubits are realized by localized electronic states on substitutional acceptors in silicon. The states have small energy separations and possess electric dipole moments. Operation in the microwave region gives millisecond decoherence times at low temperatures. Strong interactions should allow fast clock rates while maintaining 100 nm interqubit separation. Ideas for fabrication and operation of the acceptor-based quantum computer are described.

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