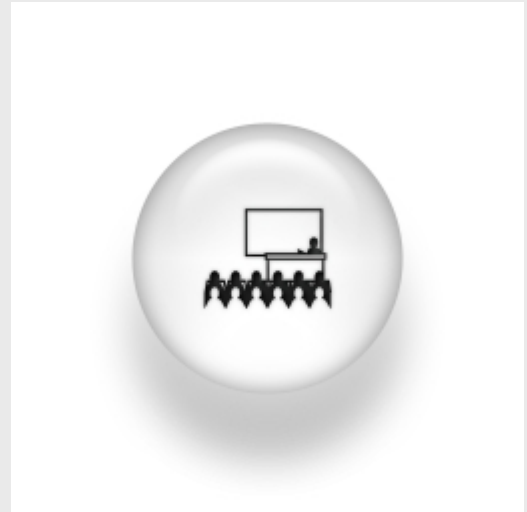


Quantum control of spin qubits in Silicon

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ABSTRACT:

Doped Si is a promising candidate for quantum computing [1] due to its scalability properties, long spin coherence times, and the astonishing progress on Si technology and miniaturization in the last few decades.

This proposal for a quantum computer ultimately relies on the quantum control of electrons bound to donors near a Si/barrier (e.g. SiO₂) interface. I will address several important issues and define critical parameters that establish the conditions that allow the manipulation of donor electrons in Si by means of external electric and magnetic fields [2-4]. In particular, I will discuss the effect of the conduction band degeneracy in Si on this manipulation [3] and how this degeneracy may be lifted at an interface with an insulator [5].

[1] B. Kane, Nature 393, 133 (1998)

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