

Abstract Submitted
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Double donors in Si quantum computer architecture MARIA J. CALDERON, Condensed Matter Theory Center, University of Maryland, BELITA KOILLER, Instituto de Fisica, Universidade Federal do Rio de Janeiro, Brazil, SANKAR DAS SARMA, Condensed Matter Theory Center, University of Maryland — We discuss the possibility of performing single spin measurements in Si-based quantum computers through electric field control of electrons bound to double donors near a barrier interface[1]. In particular, we investigate the feasibility of shuttling donor-bound electrons between the double donor impurity in the bulk and the Si/SiO₂ interface by tuning an external electric field. We find that both the required electric fields and the tunneling times involved are probably too large for practical implementations. We also investigate operations with double donors in their first excited state: In this case ionization fields are smaller and tunneling times are faster, as required in spin-to-charge conversion measurements. This work is supported by LPS and NSA.

[1] M.J. Calderon, B. Koiller, and S. Das Sarma, cond- mat/0610089.

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