

Abstract Submitted
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Extended interface states enhance valley splitting in Si/SiO₂¹ ANDRE SARAIVA, BELITA KOILLER, U. F. Rio de Janeiro, MARK FRIESEN, U. of Wisconsin — Interface disorder and its effect on valley degeneracy in the conduction band present an important theoretical challenge for operating spin qubit in silicon. Here, we demonstrate and investigate a counterintuitive effect occurring at Si/SiO₂ interfaces. By applying tight binding methods, we show that intrinsic interface states can hybridize with conventional valley states to produce an anomalously large ground state energy gap. Such hybridization effects have not previously been explored in detail for valley splitting. We find that the splitting can be enhanced by disorder in the chemical bonds at the interface, in agreement with recent experiments.

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Andre Saraiva
U. F. Rio de Janeiro

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