Abstract Submitted
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Exchange in singlet-triplet qubits: spin funnel and magnetic field structure[1] MICHAEL STOPA, Harvard University, CHARLES MARCUS, Harvard University — We employ density functional (DF) calculated eigenstates as a basis for exact diagonalization studies of lateral semiconductor double quantum dots through the transition from the symmetric bias regime to the regime where both electrons occupy the same dot. The DF basis allows us to maintain the geometric fidelity of the device in the calculation while still capturing all of the many-body effects. Recent experiments by Petta *et al.* [Science **309**, 2184 (2005)] have shown the existence of a "spin funnel" in the behavior of the singlet-triplet splitting (the exchange coupling) as a function of bias detuning J(ε) in the vicinity of the crossover from the (1,1) to the (0,2) honeycomb stability cells. Here we calculate the spin funnel and explain its origin and functional form. For an applied magnetic field B we predict the existence of local minima where dJ(ε,B)/dε =0, and suppression of voltage noise can be expected.

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