Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

A singlet - triplet T_+ based qubit HUGO RIBEIRO, University of Konstanz, JASON PETTA, Princeton University, GUIDO BURKARD, University of Konstanz — We theoretically show that the electronic two-spin states singlet and triplet T_+ are promising candidates for the implementation of a *qubit* in GaAs double quantum dots (DQD). A coherent superposition of the two-spin states is obtained by finite time Landau-Zener-Stückelberg interferometry [1] and the single qubit rotations are performed by means of an external magnetic field with a typical amplitude of about 100 mT. In such a system, the coherent manipulation of the qubit takes place in a time scale of about 1 ns. We also study the nuclear induced decoherence, mainly due to hyperfine contact coupling between the electronic and nuclear spins, and compute the decoherence time $T_2^* \sim 10$ ns.

[1] H. Ribeiro and G. Burkard, Phys. Rev. Lett. **102**, 216802 (2009)

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Date submitted: 22 Nov 2009 Electronic form version 1.4