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Spin Qubit Quantum Computing with RKKY interaction YING ZHANG, CMTC, Department of Physics, University of Maryland, College Park, MD 20742, SANKAR DAS SARMA, CMTC, Department of Physics, University of Maryland, College Park, MD 20742 — Motivated by recent theoretical work that demonstrated the importance of the nonlocal coupling between two localized spins via RKKY interaction, we investigate the feasibility of GaAs quantum dot spin-qubit quantum computing scheme utilizing RKKY interactions as a means of spin exchange operation. We estimate the strength and decoherence of RKKY spin exchange with comparison to direct nearest neighbor spin exchange. We also estimate errors associated with RKKY spin interaction and develop schemes of the corresponding error corrections. This work is supported by LPS, ARO, and ARDA.

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