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Magnetic Field Effects on Pure-state and Thermal Entanglement of Anisotropic Magnetic Nanodots[1] ANDREI Y. ISTOMIN, R. SKOMSKI, ANTHONY F. STARACE, D.J. SELLMYER, The University of Nebraska-Lincoln.

— Anisotropic magnetic nanodots have recently been proposed as promising candidates for qubits for scalable quantum computing [1,2]. The main advantages of such magnetic qubits are their well-separated energy levels (which may allow operation at temperature of the order of a few K), nanometer size (which simplifies fabrication), and large spin values (which facilitates measurement of qubit states). The entanglement properties of eigenstates of a pair of Heisenberg-interacting nanodots have been analyzed in [2], where we have shown that ferromagnetic (FM) coupling produces two significantly entangled excited states. Here we investigate the magnetic field effects on the entanglement of these and other states. We show that entanglement of excited FM eigenstates of two non-identical nanodots can be tuned to its maximum value by applying a relatively weak non-uniform magnetic field. [1] J. Tejada, E.M. Chudnovsky, E. del Barco, J.M. Hernandez, and T.P. Spiller, Nanotechnology **12**, 181 (2001). [2] R. Skomski, A.Y. Istomin, A.F. Starace, and D.J. Sellmyer, Phys. Rev. A **70**, 062307 (2004).

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