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Asymmetric Berry-Phase Interference Patterns in a Mn_4 Single-Molecule Magnet H.M. QUDDUSI, Department of Physics, University of Central Florida, J. LIU, Department of Physics, University of Florida, S. SINGH, Department of Physics, University of Central Florida, K. HEROUX, Department of Chemistry and Biochemistry, University of California at San Diego, E. DEL BARCO, Department of Physics, University of Central Florida, S. HILL, National High Magnetic Field Laboratory and Department of Physics,, D. HENDRICKSON, Department of Chemistry and Biochemistry, University of California at San Diego — We present a low temperature magnetometry study of the quantum interference effect in a Mn_4 single-molecule magnet. Asymmetric modulations of the Berry phase interference patterns upon application of a transverse field are observed for $k > 0$ resonances (i.e. non-zero longitudinal field), contrary to the symmetric patterns obtained at $k = 0$. These asymmetries can be reversed by a full inversion of the total applied field. The observation of a fascinating motion of the Berry-phase minima as a function of both the magnitude and direction of the transverse field can be understood as an outcome of a competition between different intramolecular magnetic interactions. A multi-spin description using non-collinear zero-field splitting tensors and intra molecular dipolar interactions between the manganese ions is employed to explain the results.

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