Evidence for Geometric-Phase Interference in a Mn_{12}-Acetate Single-Molecule Magnet$^{1}$ CHANGYUN YOO, JONATHAN FRIEDMAN, Amherst College, ADELINE FOURNET, GEORGE CHRISTOU, University of Florida, YURI MYAESOEDOV, ELI ZELDOV, The Weizmann Institute of Science — Recent work by our group has shown evidence for geometric-phase interference between tunneling paths in the Mn$_{12}$ BuAc single-molecule magnet, the first observation of this effect in a system that has true four-fold rotational symmetry [1]. This effect was not previously observed in the bellwether Mn$_{12}$Acetate molecule, presumably because of solvent disorder inherent to the crystal. Here we report measurements on a crystal of Mn$_{12}$Acetate·MeOH, which crystallizes without solvent disorder and therefore preserves the molecule’s four-fold symmetry. The relaxation rate $\Gamma$ as a function of transverse field $H_T$ exhibits structure indicative of interference between tunneling paths similar to that found in [1]. This suggests that the solvent disorder, and not the larger dipole interactions found in Mn$_{12}$Acetate, is the most important factor in suppressing the interference effect.


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