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Single Molecule Metamagnetism and the Single Energy Scale

Model BELLAVE SHIVARAM, University of Virginia, PRADEEP KUMAR, University of Florida, RICHARD WINPENNY, University of Manchester, MICHAEL OSOFSKY, Naval Research Labs, V. CELLI, University of Virginia — Measurements of the magnetization isotherms at low temperatures are used to extract the linear, χ_1 and third order, χ_3 , magnetic susceptibilities of two distinct single molecule magnets (SMM), $(\text{UO}_2\text{-L})_3$ and Cr_9F_{11} . In $(\text{UO}_2\text{-L})_3$ the behavior of χ_3 is consistent with a peak appearing at a temperature T_3 which is $\sim 0.5 T_1$ the temperature at which a peak in χ_1 is observed. In Cr_9F_{11} a peak in χ_1 is not present neither is a peak in χ_3 observed. Nevertheless, a simple phenomenological model with only a single energy scale, is able to account for the two distinct behaviors in the linear and nonlinear magnetic response of these two SMMs.

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