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Spin-Jahn-Teller effect in the antiferromagnetic molecular wheel CsFe8 O. WALDMANN, Physikalisches Institut, Universität Freiburg, 79104 Freiburg, Germany, L. SCHNELZER, B. PILAWA, Physikalisches Institut, Universität Karlsruhe, 76128 Karlsruhe, Germany, M. HORVATIC, Grenoble High Magnetic Field Laboratory, CNRS, BP 166, 38042 Grenoble Cedex 9, France — In an antiferromagnetic (AF) molecular wheel magnetic metal ions are clamped together by organic ligands such as to form rings. Due to AF Heisenberg interactions in the wheel, the molecule's ground state at zero magnetic field is nonmagnetic with total spin $S = 0$. The higher lying states belong to $S = 1$, 2, ... In a magnetic field these states are Zeeman split, leading to a series of level-crossings (LCs) at characteristic fields at which the ground state changes from $S = 0$, $M = 0$ to $S = 1$, $M = -1$, and so on. Hence, via the field, the magnetic ground state of the molecule can be tuned through a degeneracy at the LC. Field-dependent measurements of the magnetic torque and ^{1}H-NMR on CsFe8 single crystals were performed, which show clear indications of a phase transition at the LCs at low temperatures [PRL 96, 027206 (2006); PRL 99, 087201 (2007)]. These phase transitions are explained by a field-induced spin-Jahn-Teller effect (JTE) due to a magneto-elastic coupling between the spins of the wheel and the lattice: For fields close to a LC, a spontaneous structural distortion of the CsFe8 wheel occurs such as to lift the degeneracy in the magnetic energy spectrum, hence the spin-JTE.

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