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Field-Induced 2D XY behavior in Molecular-Based Antiferromagnets CHRISTOPHER LANDEE, QING XU, MARK TURNBULL, Clark University — Two-dimensional XY behavior has long been observed in layered superfluids and superconductors but has never convincingly been detected in magnetic materials. Recent theoretical work¹ predicts that an external field can cause a well-isolated 2D Heisenberg antiferromagnet to crossover to 2D XY behavior at low temperatures, with characteristic behavior in the magnetization and specific heat. We report on the field-dependent magnetization $M(H,T)$ of $\text{Cu}(\text{pz})_2(\text{ClO}_4)_2$ (pz = pyrazine), a well-isolated, molecular-based $S=1/2$ Heisenberg antiferromagnet ($J/k = 17$ K), with behavior strongly resembling that predicted by Cuccoli. ¹ A. Cuccoli et al, Phys. Rev. B vol. 68, 060402 (2003).

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