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Magnetic-Field-Driven Ising Quantum Criticality of Two-Dimensional Square-Lattice Antiferromagnet $Cr(dien)(O_2)_2.H_2O$ N. KAUR, G. PREAMPLUME, N. DALAL, Department of Chemistry, Florida State University, A. KUMAR, Department of Physics, Florida State University, Y. H. KIM, Y. TAKANO, Department of Physics, University of Florida, S. NELLUTLA, Y. J. JO, L. BALICAS, National High Magnetic Field Laboratory, Tallahassee, FL — We report on a systematic study of magnetically driven quantum phase transition in a new compound based on Cr(IV). The compound, $Cr(dien)(O_2)_2.H_2O$, is a low dimensional antiferromagnet with a Neel temperature T_N of 2.55 K in zero field. We have used torque magnetometry, heat capacity and magnetocaloric-effect measurements down to 200 mK, to obtain a complete magnetic phase diagram. A detailed analysis of the dependence of T_N on magnetic field using the power law $T_N \sim (H_c\text{-}H)^{\alpha}$ yielded the critical exponent $\alpha = 2.01 \pm 0.02$, with $H_c = 12.392 \pm 0.003$ T, indicating that this system behaves like a 3-d Ising magnet at low temperatures.

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