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Study of the Quantum Phase Transition in the Two-dimensional Heisenberg Antiferromagnet $Cr(dien)(O_2)_2{\cdot}H_2O$ by means of Proton NMR TIGLET BESARA, Department of Physics, Florida State University & National High Magnetic Field Laboratory, Y.H. KIM, Department of Physics, University of Florida, N. KAUR, Department of Chemistry, Florida State University, P.L. KUHNS, A.P. REYES, National High Magnetic Field Laboratory, Y. TAKANO, Department of Physics, University of Florida, N.S. DALAL, Department of Chemistry, Florida State University — We have investigated $Cr(dien)(O_2)_2{\cdot}H_2O$, a Cr(IV) based compound, by means of proton solid state NMR. The compound is a two-dimensional square-lattice antiferromagnet, experiencing a phase transition at 2.55 K in zero field. We present data from spectrum and spin-lattice relaxation time measurements in the vicinity of the critical field, $H_c \approx 12.4$ T, and in the temperature region $0.3 - 1.5$ K, along with high temperature single crystal angular variation spectra. The spin-lattice relaxation time goes through a minimum as the phase boundary is crossed, emphasizing the change in the spin dynamics of $Cr(dien)(O_2)_2{\cdot}H_2O$ due to fluctuations near the quantum critical point.

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