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Direct Measurement of the Bose-Einstein Condensation Universality Class in $\text{NiCl}_2\cdot 4\text{SC}(\text{NH}_2)_2$ at Ultralow Temperatures¹ LIANG YIN, J.S. XIA, N.S. SULLIVAN, Department of Physics, University of Florida, and NHMFL, V.S. ZAPF, NHMFL, Los Alamos National Laboratory, A. PADUAN-FILHO, Universidade de Sao Paulo — In this work, we demonstrate field-induced Bose-Einstein condensation (BEC) in the organic compound $\text{NiCl}_2\cdot 4\text{SC}(\text{NH}_2)_2$ using ac susceptibility measurements down to 1 mK. The Ni S=1 spins exhibit 3D XY antiferromagnetism between a lower critical field $H_{c1} \sim 2$ T and an upper critical field $H_{c2} \sim 12$ T. The results show a power-law temperature dependence of the phase transition line $H_{c1}(T) - H_{c1}(0) = aT^\alpha$ with $\alpha = 1.47 \pm 0.10$ and $H_{c1}(0) = 2.053$ T, consistent with the 3D BEC universality class. Near H_{c2} , a kink was found in the phase boundary at approximately 150 mK.

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