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Bose-Einstein Condensation of Ni spin degrees of freedom observed from susceptibility measurements at high magnetic field in $NiCl_2$-$4SC(NH_2)_2$ CATALIN MARTIN, KENNETH PURCELL, TIMOTHY MURPHY, ERIC PALM, STAN TOZER, National High Magnetic Field Laboratory, FSU, Tallahassee, FL, VIVIEN ZAPF, ALEX LACERDA, National High Magnetic Field, Los Alamos, NM, ARMANDO PADUAN-FILHO, Instituto de Fisica, Universidade de Sao Paulo, Sao Paulo, Brazil, NHMFL, FSU, TALLAHASSEE, FL TEAM, LANL, LOS ALAMOS, NM TEAM, INSTITUTO DE FISICA, UNIVERSIDADE DE SAO PAULO, SAO PAULO, BRAZIL TEAM — The organic compound $NiCl_2$-$4SC(NH_2)_2$ is a new candidate for Bose-Einstein condensation (BEC) of spins system. Involving a technique based on a self-resonant LC-oscillator, we measured the change in magnetic susceptibility of $NiCl_2$- $4SC(NH_2)_2$ in magnetic field up to 18 Tesla, and temperatures down to 60 mK. We have found the existence of two phase boundaries. One appears at H_{c1} $\sim$2 T, where the gap between the S_z= 0 ground state and the S_z=-1 excited state is overcome by the Zeeman effect and the spin condensation starts. The other boundary is at H_{c2} $\sim$12 T, where the system saturates. Our results on temperature and angular dependence of critical fields will be discussed in connection with previous experimental reports and theoretical predictions for BEC.

Catalin Martin
NHMFL

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