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Investigation of the magnetic susceptibility of the disordered BEC system $NiCl_{0.85}Br_{0.15}$-4SC$(NH_2)_2$ at ultralow-temperatures LIANG YIN, CHAO HUAN, JIAN-SHENG XIA, NEIL SULLIVAN, University of Florida, VIVIEN ZAPF, LANL, ARMANDO PADUAN-FILHO, Universidade de Sao Paulo, RONG YU, Rice University, TOMMASO ROSCILDE, ENS Lyon — We report measurements of the magnetic susceptibility of a disordered BEC system of magnons for single crystals of $NiCl_{0.85}Br_{0.15}$-4SC$(NH_2)_2$ (with 15% Cl atoms replaced by Br). $NiCl_{0.85}Br_{0.15}$-4SC$(NH_2)_2$ is a potential candidate for a Bose glass (BG) phase of the spins adjacent to a region of Bose-Einstein condensation (BEC). The BG to BEC phase is the bosonic analog of a metal-insulator transition for fermions. The measurements were carried out for temperatures down to 1mK and for applied magnetic fields up to 14.5T. The results show that the critical fields H_c do not obey the conventional 3D universality class for a BEC, $H_c(T)$ – $H_c(0) \sim T^{\alpha}$, where $\alpha = 1.5$ [1]. The values of α changes from $\alpha = 0.52$ for T $>$ 300 mK to $\alpha = 0.91$ for T $<$ 250 mK and then again at 70$\sim$90mK to $\alpha = 0.48$ for T$<$ 70 mK, indicating a crossover to possible BG behavior.

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