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Magnetization and Specific Heat Investigations of the Bose Glass: Br-doped $NiCl_2$-4SC$(NH_2)_2$ FRANZISKA WEICKERT, CORNELIU MICLEA, ROMAN MOVSHOVICH, VIVIEN ZAPF, Los Alamos National Laboratory, RONG YU, Rice University Houston, TOMMASO ROSCILDE, ENSL, Lyon, France — $NiCl_2$-4SC$(NH_2)_2$ (DTN) is an insulating material, which shows field induced XY-AFM order between $H_{c1} = 2.1$ T and $H_{c2} = 12.6$ T. In boson language, the ground state of DTN can be described as a Mott insulator, and the ordered state as a Bose-Einstein condensation of magnons. Bond disorder is introduced by substituting Br atoms on Cl positions, which simultaneously changes the super exchange interaction along the c-direction on a local scale and leads to a Mott-glass ground state in zero field. Furthermore, the system develops a gapless Bose glass for magnetic fields $0 < H < H_{c1}$ and $H > H_{c2}$, followed by a Mott insulating state above the saturation field H_{sat}. Note, that the critical fields $H_{c1,2}$ and H_{sat} are shifted compared to those of pure DTN. In this talk, we report on measurements of the magnetization and specific heat at very low temperatures between 50 mK and 3 K in high magnetic fields up to 14 T on an 8% Br-doped single crystal DTN. We compare our data with the local gap model, which reduces the low-temperature and low-field behavior to those of an ensemble of individual three level systems with local magnetization $M_S = 0, \pm 1$ and a finite energy gap for $H = 0$.

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