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Disorder in a two-dimensional quantum spin liquid DAN HUVONEN, MARTIN MANSSON, SEVERIAN GVASALIYA, SHUANGYI ZHAO, ETH Zurich, TATIANA YANKOVA, Moscow State University, VASILIY GLAZKOV, Kapitza Institute for Physical Problems, ERIC RESSOUCHE, Institut Laue-Langevin, CHRISTOF NIEDERMAYER, MARK LAVER, Paul Scherrer Institut, GEORG EHLERS, Oak Ridge National Laboratory, ANDREY ZHELUDEV, ETH Zurich — We discuss magnetic field induced phase transition to magnon Bose-Einstein condensate state in a disordered two-dimensional spin gap antiferromagnet. Disorder was introduced into piperazinium hexachlorodicuprate (PHCC) by chemically substituting up to 10% of exchange interaction mediating Cl ions for Br. We present specific heat, magnetization, susceptibility, elastic and inelastic neutron scattering results in fields up to 14T. Data reveals that disorder enlarges significantly the spin gap and induces nonzero susceptibility in the gapped phase. Reduction of magnon bandwidth and lifetime are evident from inelastic neutron scattering measurements. Although the phase transition seems to survive, the condensate wavefunction aquires a history dependence. In contrary to theoretical expectations, the extracted critical exponents show no changes within experimental accuracy.

Dan Huvonen
ETH Zurich

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