

Abstract Submitted  
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**Nonmagnetic impurities in a frustrated spin ladder**<sup>1</sup> ERIK WULF, SEBASTIAN MÜHLBAUER, TATIANA YANKOVA, VASILY GLAZKOV, ANDREY ZHELUDEV, ETH Zürich, Schafmattstr. 16, 8093 Zürich, Switzerland —  $\text{Sul-Cu}_2\text{Cl}_4$  is a representative of the spin  $S=1/2$  4-leg ladders. Due to weak inter-ladder interactions it shows almost perfect 1D character. The singlet ground state is separated from the excited triplet state by a gap of  $\Delta=0.52\text{meV}$  which can be closed by a critical field of  $H_c=3.7\text{T}$ . At  $H_c$  the disordered spin liquid undergoes a phase transition to chiral helimagnetic order. By replacing nonmagnetic chlorine atoms by nonmagnetic bromine atoms random bond disorder is introduced in  $\text{Sul-Cu}_2(\text{Cl}_{1-x}\text{Br}_x)_4$ . Measurements of the magnetization and the specific heat show a drastically changed behavior in an applied field even at low bromine concentrations. At  $T>0$  the material exhibits an intermediate phase between the spin liquid phase and the helimagnetic ordered phase for  $x=0.01$ , while the phase transition to the helimagnetic order is suppressed already for  $x=0.025$ . Nevertheless, the critical field  $H_c$  to overcome the excitation gap is independent from the impurity concentration.

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