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Ordering in weakly coupled random singlet spin chains MATTHIAS THEDE, Laboratory for Solid State Physics, ETH Zurich, Zurich, Switzerland, F. XIAO, Department of Physics, Clark University, 950 Main St., Worcester, MA 01610, USA, CH. BAINES, Laboratory for Muon Spin Spectroscopy, Paul Scherrer Insitut, Villigen-PSI, Switzerland, C. LANDEE, Department of Physics, Clark University, 950 Main St., Worcester, MA 01610, USA, E. MORENZONI, Laboratory for Muon Spin Spectroscopy, Paul Scherrer Insitut, Villigen-PSI, Switzerland, A. ZHELUDEV, Laboratory for Solid State Physics, ETH Zurich, Zurich, Switzerland — We study the effect of bond randomness on long range magnetic ordering in quasi-one-dimensional antiferromagnets, where the introduction of arbitrary weak bond randomness gives rise to the so-called random singlet phase. We investigated weakly coupled spin chain systems by local (muon spin rotation/relaxation) and bulk measurements (susceptibility and specific heat). The material $Cu(py)_2(Cl_{1-x}Br_x)_x$ is an organic tunable spin chain which has an average intrachain coupling constant between J = 2.3 meV (x=0) and J = 4.5 meV (x = 1). The disorder free end materials order magnetically at $T_N = 1.15$ K (x=0) and $T_N =$ 0.72 K (y=0), respectively. Bond disorder strongly affects the magnetically ordered phase. In apparent contradiction with chain mean field theory [1] bond randomness strongly suppresses both the ordered moment and the ordering temperature T_N [2]. We will also report about similiar results in $BaCu_2(Si_1 - xGe_x)_2O_7$.

A. Joshi et. al, Phys. Rev. B 67, 174403 (2003).
M. Thede, et. al, arXiv:1208.6479

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