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Controlling Luttinger Liquid Physics in Spin Ladders under Magnetic Field C. BERTHIER, M. KLANJŠEK, M. HORVATIĆ, GHMFL, CNRS, F-38042 Grenoble Cedex 09, France, H. MAYAFFRE, LSP, Univ. J. Fourier & UMR5588 CNRS, F-38402 Saint Martin d Hères, France, B. CHIARI, O. PIOVESANA, Dip. di Chimica, Univ. di Perugia, I-06100 Perugia, Italy, P. BOUILLOT, T. GIAMARCHI, DPMC-MaNEP, Univ. of Geneva, CH-1211 Geneva, Switzerland, C. KOLLATH, CPTH, Ecole Polytechnique, CNRS, F-91128 Palaiseau Cedex, France, E. ORIGNAC, LPENSL CNRS UMR 5672, F-69364 Lyon Cedex 07, France, R. CITRO, Dip. di Fisica , Univ. di Salerno, I-84081 Baronissi (Sa), Italy — We present a ^{14}N nuclear magnetic resonance study of a single crystal of $CuBr_4(C_5H_{12}N)_2$ (BPCB) consisting of weakly coupled spin-1/2 Heisenberg antiferromagnetic ladders. Treating ladders in the gapless phase as Luttinger liquids, we are able to fully account for (i) the magnetic field dependence of the nuclear spin-lattice relaxation rate T_1^{-1} at 250 mK and for (ii) the phase transition to a 3D ordered phase occuring below 110 mK due to weak inter-ladder exchange coupling. BPCB is thus an excellent model system where the possibility to control Luttinger liquid parameters in a continuous manner is demonstrated and Luttinger liquid model tested in detail over the whole fermion band.
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