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Properties of weakly coupled 1/2 spin ladders in a magnetic field PIERRE BOUILLOT, University of Geneva, Switzerland, CORINNA KOLLATH, CNRS, Ecole Polytechnique, France, ANDREAS LAUCHLI, Max Planck Institut, Germany, EDMOND ORIGNAC, CNRS, Ecole Normale Supérieure de Lyon, France, ROBERTA CITRO, Università di Salerno, Italy, THIERRY GIAMARCHI, University of Geneva, Switzerland — Weakly coupled 1/2-spin ladders have a very rich physics that can be observed in their (T, H) phase diagram. One of the most interesting particularity, is the possibility to explore the entirety of their Luttinger-Liquid phase by controlling the exponent through the applied magnetic field. We investigate this system that is closely related to the recent experiments on the compound $(Hpip)_2CuBr_4$. From a bosonization interpretation of zero temperature DMRG calculations, we determine the related Luttinger liquid parameters in the incommensurate phase and use them to obtain the transition temperature between the Luttinger-Liquid and the Neel phase. In the latter, we determine the order parameter at zero temperature. From temperature dependent DMRG computations, we obtain the magnetic field dependence of the specific heat and the magnetization. A very good agreement is found between our numerical results and the measurements in the coumpound $(Hpip)_2CuBr_4$ intensively explored in [Phys. Rev. Lett. 101, 137207 (2008)], [arXiv:0808.2715 (PRL in press.)] and [arXiv:0809.0440].

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