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Magnetic Response of Weakly Coupled Ladders: A Model for Stripes in the Cuprates FABIAN ESSLER, Oxford University, ROBERT KONIK, Brookhaven National Laboratory — We study the spin response of pairs of weakly coupled Hubbard ladders, comparing the results to a recent neutron scattering experiment on stripe-ordered $L_{1.875}B_{0.125}CuO_4$ (J. Tranquada et al., Nature 429 (2004) 534.) We assume the doping is segregated: for every pair of ladders, we treat one as half-filled, the other as a 3/8-filled Hubbard ladder. The magnetic response of the half-filled ladder is treated straightforwardly using a single mode approximation. In contrast, the spin response of the doped ladder is computed using the RG-equivalent, low-energy effective field theory, the SO(6) Gross-Neveu model. The combined response of the coupled ladder pairs is then calculated under a RPA approximation. Good agreement is found to the aforementioned experimental observations at all relevant energy scales. In addition, we find that the spin response of the ladder system below the transition to full magnetic order resembles neutron scattering studies of slightly overdoped $L_{1.82}Sr_{0.18}CuO_4$.

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