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Phase diagram of hole doped two-leg Cu-O ladders PIOTR CHUDZINSKI, MARC GABAY, Laboratoire de Physique des Solides, Bat. 510, Université Paris-Sud 11, Centre d'Orsay, 91405 Orsay Cedex, France, THIERRY GIAMARCHI, DPMC-MaNEP, University of Geneva, 24 Quai Ernest-Ansermet CH-1211 Geneva, Switzerland — In the weak coupling limit, we establish the phase diagram of a two-leg ladder with a unit cell containing both Cu and O atoms, as a function of doping. We use bosonization and design a specific RG procedure to handle the additional degrees of freedom. Significant differences are found with the single orbital case; for purely repulsive interactions, a completely massless quantum critical region is obtained at intermediate carrier concentrations(well inside the bands). For some finite value of direct hopping between oxygen atoms the ground state consists of an incommensurate pattern of orbital currents plus a spin or charge density wave (DW) structure. The experimental relevance of these findings is also discussed. We have calculated the NMR properties like Knight shift and relaxation rate at each atom inside the elementary cell. We make a prediction that different temperature dependance indicates the phase of the measured system.

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