

Abstract Submitted
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Exact phase diagram of multi-orbital spin-fermion model for hole doped cuprates¹ OINAM NGANBA MEETEI, Cornell University, MARK FISCHER, Weizmann Institute of Science, MICHAEL LAWLER, Binghamton University, ARUN PARAMEKANTI, University of Toronto, EUN-AH KIM, Cornell University — Recent experiments revealing the ubiquitous presence of spin and charge ordered states in hole-doped cuprates have placed the study of broken symmetry states at the center of high T_c superconductivity research. Here we aim to understand the phase diagram of broken symmetry states using a simple model that captures the essence of hole doped cuprates [1]. The model consists of itinerant quantum holes on oxygen p-orbitals coupled to classical Cu spins. It is amenable to sign problem free Monte-Carlo simulation allowing us to study finite temperature properties as well as unbiased determination of ground state spin and charge configuration. As a function of system parameters, we obtain a rich phase diagram. Our analysis provides a transparent and unifying picture for various charge and spin ordered states as arising from frustration of antiferromagnetic order due to hole doping, through exact finite temperature phase diagram of the model. [1] M. H. Fischer, S. Wu, M. Lawler, A. Paramekanti, and E.-A. Kim, *New J. Phys.* 16, 093057 (2014).

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