Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Instabilities of coupled Cu_2O_5 ladders[1] FLORIAN SCHUETZ, BRAD MARSTON, Brown University, Providence, RI — The spin-ladder compound $Sr_{14-x}Ca_xCu_{24}O_{41}$ has a complex phase diagram including charge-density-wave order as well as unconventional superconductivity under high pressure. Due to its quasi-one-dimensional nature[2] fundamental questions about the high-T_c cuprates might be more easily addressed in this context. However, due to the spatial proximity of neighboring ladders inter-ladder Coulomb repulsion as well as hopping between ladders might still be important. Using the functional renormalization group[3] and an analysis of generalized susceptibilities [4], we study a model of coupled Cu_2O_5 ladders [5]. We investigate instabilities towards charge, spin, and pairing order as a function of hole doping, inter-ladder hopping, and interaction strength starting from experimentally relevant hopping parameters[6].

[1]supported by DFG (F.S.) and NSF grant no. DMR-0605619
[2]S. Lee, J. B. Marston, J. O. Fjaerestad, Phys. Rev. B **72**, 075126.
[3]M. Salmhofer and C. Honerkamp, Prog. Theor. Physics **105**, 1 (2001).
[4]D. Zanchi and H. J. Schulz, Phys. Rev. B **61**, 13609 (2000); C. J. Halboth and W. Metzner, Phys. Rev. Lett. **85**, 5162 (2000).
[5]K. Wohlfeld, A. M. Oles, and G. A. Sawatzky, Phys. Rev. B **75**, 180501(R) (2007).
[6]T. F. A. Müller, *et al.*, Phys. Rev. B **57**, R12655 (1998).

Florian Schuetz
Brown University, Providence, RI

Date submitted: 26 Nov 2007 Electronic form version 1.4