

Abstract Submitted
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Uniform and pair-Density-Wave SC states in asymmetric ladders¹

AKBAR JAEFARI, EDUARDO FRADKIN, University of Illinois at Urbana-Champaign — We consider the problem of the superconducting state in ladder fermionic systems and focus on two possible types of condensates: a uniform (“d-wave”) state and a pair-density wave state (PDW). The uniform SC state is known to occur generically in symmetric hole-doped ladders. Recently it was shown that the PDW state occurs in the Kondo-Heisenberg chain on a broad range of parameters. The Kondo-Heisenberg chain is an extreme version of an asymmetric two-leg ladder. These facts suggest that there must be a quantum phase transition between these two states as a function of the relative doping of the two legs of a ladder. We investigate the nature of this quantum phase transition in the weak coupling limit, by taking advantage of bosonization methods available for 1D systems, and investigate the mechanism of this phase transition. We speculate on the relevance of these results to 2D systems. References: S. R. White, R. M. Noack and D. J. Scalapino: Phys. Rev. Lett 73 (1994) A.E. Sikkema, I. Affleck, and S.R. White, Phys. Rev. Lett. 79, 929 (1997) E. Berg, E. Fradkin, S. A. Kivelson, Phys. Rev. Lett. 105, 146403 (2010) O. Zachar and A. M. Tsvelik, Phys. Rev. B 64, 033103 (2001)

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