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**Electron pairing instabilities in 8-site Betts lattice: exact result<sup>1</sup>**

KUN FANG, GAYANATH FERNANDO, University of Connecticut, ARMEN KOCHARIAN, California State University, Los Angeles — We use numerical methods (exact diagonalization and Lanczos method) to study single-orbital and multi-orbital Hubbard models (off half filling). The whole lattice is divided into identical 8-site square clusters immersed in a thermal bath. The electron pairing instabilities, order parameters and quantum critical points are evaluated by monitoring the charge and spin gaps in a wide range of parameters including the on-site interaction  $U$ . Calculations show level crossing behaviors at zero and finite temperature. The corresponding pairing instabilities are remarkably similar to electronic inhomogeneities observed in correlated systems such as the high temperature superconductors and Fe pnictides. The next nearest hopping is also introduced. We find that it can shift quantum crossover point and gap magnitude, but for reasonable hopping amplitudes, it will not eliminate characteristics of electron pairing instabilities.

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