Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Higher order corrections to effective low-energy theories for strongly correlated electron systems SASHA CHERNYSHEV, UC Irvine, DIMITRIOS GALANAKIS, PHILIP PHILLIPS, UIUC, ALEX ROZHKOV, UC Irvine, A.-M.S. TREMBLAY, Sherbrooke — There is a significant recent interest in higher-order corrections to effective low-energy theories for a broad range of strongly-correlated electronic problems. We use the Hubbard model as an example to show how, to fourth order in hopping t, well-known perturbative approaches lead to the same effective theory, namely the t-J model with ring exchange and various correlated hoppings. Several new issues appear in deriving higher-order low-energy effective theories. One may find amusing that the low-energy Hamiltonians obtained from different methods appear to be *different* in each case. However, we show that they are all connected by an additional unitary transformation that leaves the block-diagonal form invariant. We also emphasize the importance of transforming all the operators along with the Hamiltonian and demonstrate the equivalence of their transformed structure within the different approaches.

Sasha Chernyshev
UC Irvine

Date submitted: 21 Mar 2013 Electronic form version 1.4