

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Dynamical mean-field embedding of the dual fermion dynamical cluster approach for strongly correlated systems ZI YANG MENG, SANDEEP PATHAK, SHUXIANG YANG, HANNA TERLETSKA, JUANA MORENO, MARK JARRELL, Louisiana State University — We extend the recently developed dual fermion dynamical cluster approach with a further embedding of the dual fermion lattice into a larger, third length scale. The resulting approach is a complete multi-scale many-body technique for strongly correlated electron systems. It treats the short length scales explicitly by the dynamical cluster approach, intermediate length scales diagrammatically with the dual fermion technique, and the largest length scales approximately at a dynamical mean-field level. This technique iterated to self-consistency on all the three length scales. To illustrate the implementation and applicability of this method, we test it with the one and two dimensional Falicov-Kimball model. We will specifically address the convergence and critical scaling behavior of the charge-density-wave transition temperature.

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Date submitted: 29 Nov 2011

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