

Abstract Submitted
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Self-consistent solution of the Hubbard model on a 4x4 cluster with the parquet formalism¹ HERBERT FOTSO, SHUXIANG YANG, JUN LIU, MARK JARRELL, Louisiana State University, EDUARDO D'AZEVEDO, THOMAS MAIER, Oak Ridge National Laboratory, KAREN TOMKO, Ohio Supercomputer Center, RICHARD SCALETTAR, University of California - Davis, THOMAS PRUSCHKE, Universität Göttingen, LOUISIANA STATE UNIVERSITY TEAM, OAK RIDGE NATIONAL LABORATORY TEAM, OHIO SUPERCOMPUTER CENTER TEAM, UNIVERSITY OF CALIFORNIA - DAVIS TEAM, UNIVERSITÄT GÖTTINGEN TEAM — A self-consistent solution of the Hubbard model is performed on a 4x4 cluster at both the one and the two-particle level. We combine the Parquet and the Bethe-Salpeter equations into one non-linear equation to take advantage of optimized linear solvers such as GMRES and BICG-Stab. We calculate some relevant quantities and compare them to the results obtained from Determinant Quantum Monte Carlo (DQMC), self-consistent second order approximation and FLuctuation EXchange (FLEX) approximation. We find that the parquet approximation, where the fully irreducible vertex is approximated by the bare vertex, shows satisfactory agreement with DQMC and a significant improvement from FLEX or self-consistent second order approximation.

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