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Improving the network efficiency of the two particle parquet algorithm SAMUEL KELLAR, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA, BIBEK WAGLE, Department of Computer Science, Louisiana State University, Baton Rouge, LA, KA-MING TAM, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA, HARTMUT KAISER, Center of Computation and Technology, Louisiana State University, Baton Rouge, LA, JUANA MORENO, MARK JARRELL, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA — Strongly correlated systems require large scale simulations. Perturbative methods such as the two particle self-consistent parquet algorithm require the storage of large rank-three vertex functions. This data is transferred via an all-to-all communication which is costly since network transfer of data is orders of magnitude slower than floating point operations. The size of the messages compounds the issue by introducing large overheads. An analysis of the vertices reveals large amounts of noise. This enables significant compression and opportunities for message coalescing which reduces the network traffic resulting in a significant speedup. These ideas should be broadly applicable to other problems which involve large scale data transfer.

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