Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Vertex function representation in non-uniform frequency grids KA-MING TAM, SHUXIANG YANG, JUANA MORENO, MARK JARRELL, Louisiana State University — The proper computer representation of many-body vertex functions is a central issue in computational many body methods such as the parquet formalism, a self-consistent two-particle field theory. Despite the great effort over the past two decades, its application is very limited. This is predominately due to two crucial factors - the stability of the iteration and the size of the memory allocation for the vertices. We previously demonstrated that the stability problem can be alleviated by explicitly restoring the crossing symmetry, making simulations beyond weak coupling for the Hubbard model feasible. The next step for the practical applications of the parquet formalism is to compress the memory required to represent the vertex. In this talk, we first demonstrate the problem of perturbation theory off the Matsubara frequency grids. This problem is avoided by working on the so-called decimation grids, which are non-uniform grids on Matsubara frequency. We then use this scheme in the parquet method, for solving an Anderson impurity problem. The results show substantial improvement compared to using the same number of uniform frequency grids. This may represent a crucial step towards practical applications of the parquet formalism for large clusters.

Ka-Ming Tam
Louisiana State University

Date submitted: 15 Nov 2013 Electronic form version 1.4