Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

Generalized Auxiliary Field Monte Carlo method: a new efficient variational method for CBF theory[1] MOHAMED BOUADANI, Arizona State University — A principle goal in nuclear theory is the development of computational methods to calculate hadronic systems properties. Correlated basis function theory, CBF, is believed to offer an accurate wave-function. Two approaches that have made important contributions are the diagrammatic viewpoint that try to compute in a self consistent way to all orders the dominant leading order diagrams such as the Fermi hypernetted Chain/ Single Operator Chain and Coupled Cluster theory, and, on the other hand, there are methods like Green function Monte Carlo, that aim to compute expectations of observables by stochastically evaluating the integrals via Monte Carlo method. Each of these approaches suffer important limitations that make further advances very difficult. To circumvent the principle obstacle, being that these correlations are state dependent and thus making any evaluation of such complex wave-function impractical for large systems, a new method designated as the Generalized Auxiliary Fields Variational Monte Carlo, GAFVMC method has been successively implemented for the stochastic sampling of the CBF-type wave-functions with v_6 type operators. Some encouraging results will be given.

[1]Supported by NSF.

Mohamed Bouadani
Arizona State University

Date submitted: 01 Jul 2008 Electronic form version 1.4