Contribution ID: **136** Type: **Parallel**

Disconnected Loop Subtraction Methods in Lattice QCD

Friday, 21 June 2019 14:00 (20 minutes)

To compute disconnected quark loop operators, stochastic noise methods are generally used. In order to strengthen the physical signal projected out from these noisy methods, various subtraction techniques may be employed. We use the GMRES-DR and MINRES-DR algorithms to solve for the linear equations of the non Hermitian Wilson and Hermitian Wilson matrices, while simultaneously calculating low lying eigenmodes. This deflation helps to increase the rate of convergence of the linear equations as well as decreases noise introduced via stochastic methods. We demonstrate a subtraction method that combines deflation of the low lying eigenmodes of the Hermitian Wilson matrix and polynomial approximations to produce an extremely powerful noise suppression technique, termed Hermitian Forced Polynomial Subtraction (HFPOLY). The effectiveness of this algorithm is demonstrated on ensembles in the quenched approximation, as well as with dynamical ensembles generated by the MILC Collaboration, where the HISQ action was employed. We observe strong low eigenmode dominance of the Hermitian Wilson matrix at vanishing quark mass in the variance of the vector and scalar operators in the quenched approximation, and similar reduction in the variance is observed using the dynamical ensembles.

Authors: Dr BARAL, Suman (Baylor University); WHYTE, Travis (Baylor University); Dr WILCOX, Walter (Baylor University); Dr MORGAN, Ron (Baylor University)

Presenter: WHYTE, Travis (Baylor University)

Session Classification: Algorithms and Machines

Track Classification: Algorithms and Machines