Abstract Submitted
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**Prospects for Brueckner-Hartree-Fock calculations in the Density Matrix Expansion approach**[1] YINU ZHANG, ALEX DYHDALO, Ohio State Univ - Columbus, SCOTT BOGNER, Michigan State University, RICHARD FURNSTAHL, Ohio State Univ - Columbus — Recently, a microscopically based nuclear energy density functional was derived by applying the Density Matrix Expansion (DME) to the Hartree-Fock energy obtained from chiral effective field theory ($\chi$EFT) two- and three-nucleon interactions[1]. The Hartree-Fock approach cannot contain the full many-body correlations. Brueckner-Hartree-Fock (BHF) theory gives an improved definition of the one-body potential U by replacing the interaction by a reaction matrix G. The central result of modern renormalization theory is that a general RG decoupling generates an infinite series of counterterms consistent with the input interaction. Then we can apply the DME at Hartree-Fock level with long-range $\chi$EFT interactions and zero-range contact interactions to model BHF correlations.

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