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Brueckner-Hartree-Fock calculations in the Density Matrix Expansion approach¹ YINU ZHANG, 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 to the Hartree-Fock energy obtained from long-range chiral effective field theory two- and three-nucleon interactions. The Hartree-Fock approach cannot contain the full many-body correlations. Brueckner-Hartree-Fock 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 χ EFT interactions and zero-range contact interactions to model BHF correlations.

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