Asymmetric Nuclear Matter from Brueckner-Hatree-Fock Approximation Using Exact Pauli Operator and Angle Average Pauli Operator.

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Abstract

In our work the equation of state (EOS) of asymmetric nuclear matter is determined in the framework of the Brueckner-Hartree-Fock (BHF) approach for two body force, The nuclear EOS, which is the energy per particle of nuclear matter as a function of nucleonic density ρ, it can be used to obtain the bulk properties of nuclear matter such as the nuclear incompressibility, the energy density and the pressure needed for neutron star calculations. We used the most accurate realistic nucleon-nucleon interactions (CD Bonn, Nijm II and V18). The calculations are based on the self-consistent Brueckner-Hartree-Fock (BHF) approach. The Brueckner-Hartree-Fock calculations performed for nuclear matter with an exact treatment of the Pauli exclusion operator and the angle average approximations in the Bethe-Golstone equation. We found that the exact ii Pauli operator brought about negligible contributions to the nuclear matter binding energy per nucleon. The results confirm that the empirical saturation point is still missed, and therefore that three-body forces are needed in the nuclear monotonically.