pansion of the mass operator have been taken into account in the present calculation. The dependence of the off-shell mass operator upon the momentum k and upon the nucleon frequency ω has been discussed. It is shown that the TBF effect on the values of $M_1(k,\omega)$ for a fixed momentum is only important at high densities or at frequencies far away from its on-shell energy at k_F. At large densities well above the saturation density, inclusion of the TBF may enhance the repulsion of V_2 at a large momentum above the corresponding Fermi momentum. The off-shell values of M_1 at fixed momenta has been compared with its on-shell values. For a fixed frequency, the k dependence of M_1 is investigated, and it turns out to be necessary to take into account the TBF effect for getting a more exact k dependence of the mean field $M_1(k,\omega)$ felt by a nucleon with both low momentum and large frequency. The TBF effect on the nucleon spectral function has been calculated and the results are given in Fig. 1 where the spectral function is plotted versus ω at density of 0.34 fm^{-3}. The upper part of the figure displays the spectral distribution for a momentum below the Fermi momentum; the lower part of the figure shows the spectral distribution for a momentum above k_F. At density of $\rho=0.34$ fm^{-3} well above the saturation density, the TBF effect shifts the peak location in the spectral function to slightly higher energy and reduces slightly the peak value at low momentum below the Fermi momentum k_F. The TBF effect on the nucleon spectral function turns out to be neglected at the saturation density $\rho=0.17$ fm^{-3}. It becomes sizable only at high densities well above the saturation density.

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1 - 3 Three-body Force Effect on Nucleon Momentum Distributions in Asymmetric Nuclear Matter within Framework of Extended BHF Approach

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In nuclear medium, nuclear many-body correlations, especially the short-range correlations, may lead to the depletion of the nucleon momentum distribution below the Fermi momentum and the population above the Fermi momentum in nuclear matter[1]. The depletion of the Fermi sea is expected to be closely related to the hard core and the tensor component of the nucleon-nucleon (NN) interaction[2]. It plays an important role in testing the validity of the physical picture of independent particle motion in the mean field theory or the standard shell model and serves as a measure of the strength of the dynamical NN correlations induced by the NN interaction in a nuclear many-body system[3]. The study of the nucleon momentum distribution in nuclear matter may provide desirable information on the depletion of the deeply bound states inside finite nuclei and is expected to be important for understanding the structure of finite nuclei.

In the present work[4], we have calculated the TBF effect on the proton and neutron momentum distributions in asymmetric nuclear matter within the framework of the extended Brueckner-Hartree-Fock approach by adopting the AV18 two-body interaction supplemented with a microscopic three-body force (TBF). In symmetric nuclear matter, the obtained depletion of the hole states deep inside the Fermi sea is roughly 15% at the empirical saturation density. In asymmetric nuclear matter, the neutron and proton momentum distributions turn out to become different and may split with respect to their common distribution in symmetric nuclear matter. Increasing the isospin asymmetry β tends to enhance the depletion of the proton Fermi sea while it reduces the depletion of the neutron Fermi sea, which is in good agreement with the recent prediction in Ref. [5] within the framework of the Green function method. Our result implies that at a higher asymmetry the effect of the tensor correlations induced by the NN interaction may become stronger on protons while it gets weaker on neutrons. Fig. 1 displays the proton and neutron momentum distributions at zero momentum $k=0$ as functions of the isospin-asymmetry β in the two cases with (solid curves) and without (dashed curves) including the TBF. At zero momentum, the neutron occupation probability increases while the proton occupation decreases almost linearly as a function of asymmetry. At low densities around and below the nuclear saturation density, the TBF effect on the predicted momentum distributions is found to be negligibly weak. At high densities well above the saturation density, the TBF is expected to induce strong enough extra short-range correlations and its effect turns out to become noticeable. In dense asymmetric nuclear matter, inclusion of the TBF effect may lead to an overall enhancement of both the depletion of the neutron and proton Fermi seas for all the asymmetries considered. Although the TBF affects sizably the neutron and proton momentum distributions at high densities well above the saturation density, its effect on the isodepletion of the nuclear Fermi sea (i. e. , the difference of the neutron and proton occupation probabilities) in asymmetric nuclear matter is shown to be quite small in the density region up to two times saturation density.

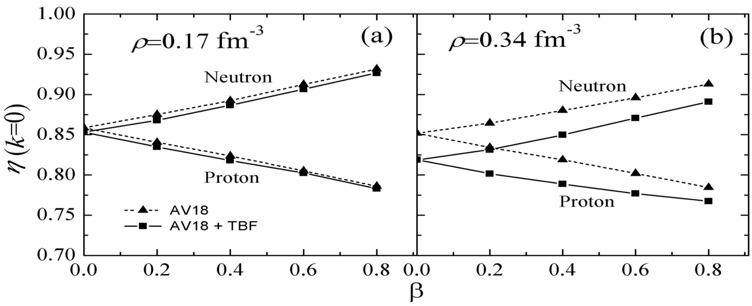

Fig. 1 Neutron and proton momentum distributions at zero momentum in asymmetric nuclear matter vs isospin asymmetry. The results are obtained for the two cases of including the TBF (solid curves) and excluding the TBF (dashed curves).

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1 - 4 Isospin Effects on Subthreshold Kaon Production in Heavy Ion Collisions

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Kaon producted in relativistic heavy-ion collisions has been investigated as a useful tool to constrain the high-density information of isospin symmetric nuclear equation of state (EoS) both experimentally and theoretically. Kaons (K^0 and K^+) as a probe of EoS are produced in the high-density domain without subsequent reabsorption in nuclear medium. The K^0/K^+ ratio was proposed as a sensitive probe to extract the high-density behavior of the nuclear symmetry energy (isospin asymmetric part of EoS)[1], which is poorly known up to now but has an important application in astrophysics, such as the structure of neutron star, the cooling of protoneutron stars, the nucleo synthes is during supernova explosion of massive stars etc. Kaon dynamics in heavy-ion collisions is investigated with an isospin and momentum dependent transport model (Lanzhou quantum molecular dynamics (LQMD)), in which strangeness production is contributed from channels of baryon-baryon and pion-baryon collisions[2,3]. The momentum dependence of the symmetry potential was also implemented in the model, which results in an isospin splitting of proton and neutron effective mass in nuclear medium[4].

In the LQMD model, the time evolutions of the baryons (nucleons and resonances), hyperons and mesons in reaction system under a self-consistently generated mean-field are governed by Hamilton's equa-