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# Three-body force effect on the properties of neutron-rich nuclear matter

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We present an upgraded review of our microscopic investigation on the single-particle properties and the EOS of isospin asymmetric nuclear matter within the framework of the Brueckner theory extended to include a microscopic three-body force. We pay special attention to the discussion of the three-body force effect and the comparison of our results with the predictions by other ab initio approaches. Three-body force is shown to be necessary for reproducing the empirical saturation properties of symmetric nuclear matter within nonrelativistic microscopic frameworks, and also for extending the hole-line expansion to a wide density range. The three-body force effect on nuclear symmetry energy is repulsive, and it leads to a significant stiffening of the density dependence of symmetry energy at supra-saturation densities. Within the Brueckner approach, the three-body force affects the nucleon s.p. potentials primarily via its rearrangement contribution which is strongly repulsive and momentum-dependent at high densities and high momenta. Both the rearrangement contribution induced by the three-body force and the effect of ground state correlations are crucial for predicting reliably the single-particle properties within the Brueckner framework.

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