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Nuclear matter from a self-consistent Green's function approach

The combination of ab initio many-body approaches and chiral interactions derived from the underlying quantum theory, QCD, has provided for the past two decades a promising framework to obtain a realistic description of infinite nuclear matter. This analysis is fundamental to shed light on many aspects of nuclear systems, from the limits of nuclear existence to the astrophysical processes in neutron-star mergers. To address these questions, we have recently extended the scope of self-consistent Green's function theory to include three-body forces. I will present studies of the microscopic and bulk properties of symmetric nuclear and pure neutron matter, both at zero and finite temperature. The results show how the inclusion of three-body forces is crucial to predict the empirical properties of symmetric nuclear matter. These also contribute to stiffen the neutron matter equation of state, which is important for neutron stars.

Mercredi 25 mai 2016, 11h30

IPN, Bât. 100, Salle A 201