HAW14-2014-000461

Abstract for an Invited Paper
for the HAW14 Meeting of
the American Physical Society

Quantum Monte Carlo calculations of neutron and nuclear matter

STEFANO GANDOLFI, Los Alamos National Laboratory

Recent advances in experiments of the symmetry energy of nuclear matter and in neutron star observations yield important new insights on the equation of state of neutron matter at nuclear densities. In this regime the EOS of neutron matter plays a critical role in determining the mass-radius relationship for neutron stars. We show how microscopic calculations of neutron matter, based on realistic two- and three-nucleon forces, make clear predictions for the relation between the isospin-asymmetry energy of nuclear matter and its density dependence, and the maximum mass and radius for a neutron star. We will also discuss the recent extension of the Auxiliary Field Diffusion Monte Carlo method to study the equation of state of nuclear matter using two-body nucleon interactions. The equation of state of isospin-asymmetric nuclear matter will also be discussed.