Neutron Matter Equation of State from Nucleon Effective Field Theory on the Lattice

DEAN LEE, North Carolina State University

We study neutron matter by combining pionless effective field theory with non-perturbative lattice methods. The neutron contact interaction is determined by zero temperature scattering data. We simulate neutron matter on the lattice at temperatures 4 and 8 MeV and densities below one-fifth normal nuclear matter density. Our results at different lattice spacings agree with one another and match bubble chain calculations at low densities. The equation of state of pure neutron matter obtained from our simulations agrees quantitatively with variational calculations based on realistic potentials.