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Quantum Monte Carlo Lattice Simulation of Thermal Properties of Low-Density Neutron Matter¹ TAKASHI ABE, Tokyo Institute of Technology, RYOICHI SEKI, California State University, Northridge and California Institute of Technology — Thermal properties of low-density neutron matter are investigated by nuclear many-body simulation on three-dimensional cubic lattice. Determinantal quantum Monte Carlo calculations are carried out for the Hamiltonian with a coupling constant of the neutron-neutron interaction determined from effective field theory. Method of finite-size scaling is applied to extract thermodynamical information. Phase diagram shows that low-density neutron matter undergoes a phase transition from a superfluid state to normal, as the temperature or the density increases. The results are also compared with the existing mean-field and related calculations.

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Takashi Abe
Tokyo Institute of Technology

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