

The 177th HENPIC seminar by Ms. Fanyi Zhao

Title: Quantum Simulation for Phase Transitions

Abstract: The Nambu-Jona-Lasinio (NJL) model has been widely studied for investigating the chiral phase structure and chirality charge of strongly interacting matter. The study of the thermodynamics of field theories within the framework of Lattice Field Theory is limited by the sign problem, which prevents Monte Carlo evaluation of the functional integral at a finite chemical potential. Using the quantum imaginary time evolution (QITE) algorithm, we construct a quantum simulation for the (1+1) dimensional NJL model at finite temperatures, chemical potentials and chiral chemical potentials. We observe consistency among digital quantum simulation, exact diagonalization and analytical solution, indicating further applications of quantum computing in simulating QCD thermodynamics.

Summary