

Exploring Dense QCD through Hamiltonian Lattice Simulations in (1+1) Dimensions

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We study one-flavor SU(2) and SU(3) lattice QCD in (1+1) dimensions at zero temperature and finite density using matrix product states and the density matrix renormalization group.

We compute physical observables such as the equation of state, chiral condensate, and quark distribution function as functions of the baryon number density.

As a physical implication, we discuss the inhomogeneous phase at nonzero baryon density, where the chiral condensate is inhomogeneous, and baryons form a crystal.

We also discuss how the dynamical degrees of freedom change from hadrons to quarks through the formation of quark Fermi seas.

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