The 38th International Symposium on Lattice Field Theory

LATTICE 21

JULY 26-30 2021, ZOOM/GATHER@MIT

Contribution ID: **194** Type: **Oral presentation**

Restoration of chiral symmetry in cold and dense Nambu–Jona-Lasinio model with tensor renormalization group

Tuesday, 27 July 2021 22:15 (15 minutes)

We analyze the chiral phase transition of the Nambu–Jona-Lasinio model in the cold and dense region on the lattice developing the Grassmann version of the anisotropic tensor renormalization group algorithm. The model is formulated with the Kogut–Susskind fermion action. We use the chiral condensate as an order parameter to investigate the restoration of the chiral symmetry. The first-order chiral phase transition is clearly observed in the dense region at vanishing temperature with μ/T∼O(10^3) on a large volume of V=1024^4. We also present the results for the equation of state.

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Session Classification: Theoretical developments and applications beyond particle physics

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