Contribution ID : **9** Type : **Poster Presentation**

Thermodynamic Properties of Magnetized Quark Matter

Tuesday, 25 November 2025 16:55 (0:05)

Content

The inverse magnetic catalysis (IMC) of chiral symmetry breaking in Quantum Chromodynamics (QCD), as predicted by Lattice QCD simulations, can be successfully reproduced within the Nambu–Jona-Lasinio (NJL) model when the coupling constant decreases with the magnetic field strength B and temperature T. In order to mathematically model this phenomenon, a thermomagnetic dependence of the coupling is proposed, describing the interaction strength as a function of eB. Based on this adjusted coupling, the NJL model predictions are analyzed for various thermodynamic quantities of magnetized quark matter, such as the interaction measure, specific heat, speed of sound, and magnetization.

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Session Classification : Poster Session