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Temperature and Strong Magnetic Field Effects in Dense Matter

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We study consistently the effects of magnetic field on hot and dense matter. In particular, we look for differences that arise due to assumptions that reproduce the conditions produced in particle collisions or astrophysical scenarios, such as in the core of fully evolved neutron stars. We assume the magnetic field to be either constant or follow a profile extracted from general relativity calculations of magnetars and make use of two realistic models that can consistently describe chiral symmetry restoration and deconfinement to quark matter, the CMF and the PNJL models. We find that net isospin, strangeness, and weak chemical equilibrium with leptons can considerably change the effects of temperature and magnetic fields on particle content and deconfinement in dense matter. This could be important for detecting quark matter e.g. in neutron star mergers.

[1] Submitted to Phys. Rev. D, e-Print::2304.02454 [nucl-th]
[2] Phys. Rev. D 102 (2020) 7, 076016, e-Print: 2004.03039 [nucl-th]

Category

Theory

Collaboration (if applicable)

MUSES

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