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Strongly Interacting Matter Phase Diagram in the presence of Magnetic Fields in an Extended Effective Lagrangian Approach with Explicit Chiral Simmetry Breaking Interactions

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Extensions of the NJL model which go beyond the original 4-quark interaction, which drives the dynamical mass generation, have proven to be quite successful in describing low energy hadronic phenomenology. The inclusion of 8-quark interaction terms solved a metastability problem of the effective potential
introduced by the inclusion of the 6-quark ‘t Hooft determinant term in the 3-flavor version of the model (needed to eliminate the unwanted U(1) axial symmetry) [1]. This model, that has proven to be quite powerful and feature-rich, has been expanded to include all the spin-0 terms, without and with chiral symmetry breaking, which are of the same order as the ‘t Hooft flavor determinant in a 1/Nc expansion resulting in an unprecedented success in reproducing
the low lying scalar and pseudoscalar meson spectra [2].

The influence of magnetic fields in the Phase Diagram has been under intense scrutiny due to their relevance for instance in the context of Heavy Ion Collisions, compact stars and early Universe phases. Here we will present recent results pertaining the Phase Diagram under the influence of Magnetic Fields within the framework of our extended model.

[1] B. Hiller, J. Moreira, A. A. Osipov, and A. H. Blin, Phys. Rev. D 81, 116005

[2]J. Moreira, J. Morais, B. Hiller, A. A. Osipov, and A. H. Blin, Phys. Rev. D 91, 116003

Authors: MOREIRA, Joao; MORAIS, Jorge (FCTUC / CFisUC); Prof. HILLER, Brigitte (Centro de Física da Universidade Coimbra); OSIPOV, Alexander A. (JINR); Prof. BLIN, A. H. (Centro de Física da Universidade de Coimbra)

Presenter: MOREIRA, Joao

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