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QCD Phase Diagram: QGP and Neutron Star Cores

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The proposed QCD Phase Diagram speculates deconfined Quark Matter at aymptotic high Temperature and Baryonic Densities. The region of QCD phase diagram characterized with low temperature and high baryonic density is been speculated to be found in the cores of neutron stars which are prone to phase transitions. The transition between the chiral and diquark condensate is being studied while reproducing some numerical results. The thermodynamic grand potential of system is minimized with respect to the order parameters m and Δ to get the form of the gap equations. Using Numerical Techniques, we analyse these gap equations to study the strong competition between chiral and diquark condensate in the 2 Flavour Superconducting Phase. The region of QCD phase diagram characterized with high temperature and low baryonic density corresponds to early stage of universe. Quark-Gluon plasma (QGP) under a statistical model is revisited. While revisiting some additional parameters having consider to compute the thermodynamic properties of the QGP. Hence the results after considering new parameters are compared with the earlier results.

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