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Another mean field treatment in the strong coupling limit of lattice QCD

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Strong coupling lattice QCD (SC-LQCD) is a useful approach to study dense matter based on QCD. With the aid of the mean field for the chiral condensate and $1/d$ expansion, phase diagram has been obtained in the strong coupling limit and with the NLO / NNLO finite coupling effects. Recently, de Forcrand and Fromm investigated the phase diagram in the Monomer-Dimer-Polymer (MDP) algorithm in the strong coupling limit. The phase diagram in MDP is different in shape from that in the mean field result. The origin of this difference is not understood yet.

We consider the possibility to incorporate an additional mean field in SC-LQCD, which comes from bosonizing the baryonic action and corresponds to the point split q - \bar{q} expectation value. With this mean field, we obtain an NJL type effective potential with the variable wave function renormalization factor. We discuss the effect of this mean field on the phase boundary and compare the results with those in the MDP algorithm.

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talk

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