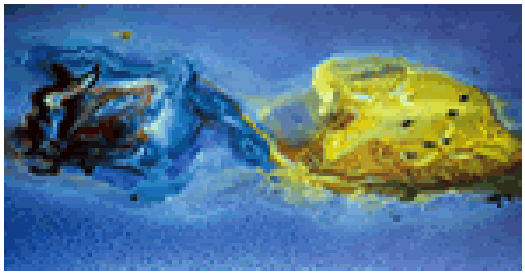

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Lattice QCD2 effective action with Bogoliubov transformations

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In the Wilson's lattice formulation of QCD, a fermionic Fock space can be explicitly constructed at each time slice using canonical creation and annihilation operators. The partition function $\mathcal{Z}$ is then represented as the trace of the transfer matrix, which maps the Fock space at time t in the one at time $t+1$. The usual functional representation of $\mathcal{Z}$ as a path integral of $\exp(-S)$ can be recovered in a standard way. However, applying a Bogoliubov transformation on the canonical operators *before* passing to the functional formalism, we can isolate a vacuum contribution in the resulting action which depends only on the parameters of the transformation and fixes them via a variational principle. This term corresponds to the LO (saddle point) approximation in a large number of colours N_c expansion. Then, inserting in the trace defining $\mathcal{Z}$ an operator projecting on the colourless mesons subspace at each time slice and making the physical assumption that the true partition function is well approximate by the projected one, we can also write an effective quadratic action for colourless mesons, which is a NLO term in N_c. We tested the method in the celebrated 't Hooft model, namely QCD in two spacetime dimensions for large number of colours, in Coulomb gauge. The method can be extended to a model at finite temperature and chemical potential.

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