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Absence of inhomogeneous phases in the $2 + 1$ -dim. Gross-Neveu model with chiral imbalance

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In a previous work the regulator dependence of inhomogeneous phases in the $2 + 1$ -dimensional Gross-Neveu model has been studied within the mean-field approximation. These are phases, where in addition to chiral symmetry also translational symmetry is broken. Inhomogeneous condensates are a feature shared among various strong-interaction models and not unique to the $2 + 1$ -dimensional Gross-Neveu model. In this talk, a chiral chemical potential is introduced to the GN model in addition to finite temperature and chemical potential. The effects on the homogeneous as well as on inhomogeneous phases are studied using two lattice discretizations with naive fermions. The phase diagram is presented and the existence of inhomogeneous phases is ruled out.

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