# MULTIDIMENSIONAL STRUCTURE OF CHIRAL CRYSTALS IN QUARK MATTER

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We explore the multidimensional structure of spatially modulated chiral condensates in dense quark matter. While a large number of efforts have been devoted so far to investigate the inhomogeneous chiral phase, where scalar and pseudoscalar condensates are spatially inhomogeneous, most works have been restricted to one-dimension modulations. For a one-dimensional structure, the system becomes unstable at finite temperature due to the collective Nambu-Goldstone excitation, but instead a quasi-long-range order is realized, which can practically survive as in liquid crystals and should have phenomenological implications. Two- or three-dimensional structures, on the other hand, may lead to a true long-range order at any temperature, inferred from the Landau-Peierls theorem. There are some attempts to search the possibility of multidimensional structures, with the result that higher dimensional modulations of the order parameter tend to be disfavored against one-dimensional ones near the Lifshitz point and/or at vanishing temperature. However, it may be not trivial whether multidimensional chiral crystals are realized in other areas of the inhomogeneous chiral phase. We discuss here the possible realization of such crystalline chiral condensates in any area, employing the Thomas-Fermi approximation.