

Extended Topological Defects in Three-Dimensional Nematics and Majorana Quasiparticles

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Topological defects are stable singular structures that naturally emerge in ordered media. In three-dimensional nematic liquid crystals, extended defects such as disclination loops display a remarkably rich phenomenology, whose full structure and dynamical role are still not completely understood. In particular, we focus on a class of these loops and show that they can be endowed with a Majorana-like character through an algebraic correspondence based on Clifford algebras. By constructing an explicit mapping between the geometry of the loop and suitable spinorial elements, we clarify how specific configurations can be represented within this framework and in what sense they display features analogous to Majorana particles. This correspondence provides new insight into the behaviour of topological defects in three-dimensional nematics and offers a classical setting in which analogues of quantum phenomena can be identified and studied.

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