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Dirac points as topological defects in energy bands

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Topological semi-metals are materials in which the energy dispersion relation features singular contact points between the conduction and valence bands. Examples are graphene or nodal quasiparticles in d-wave superconductors in two-dimension and Weyl semi-metals in three dimension. The low-energy excitations in these systems are described by an emergent massless Dirac equation, reminiscent of relativistic quantum mechanics. In this talk, we will review the physics of these topological defects in reciprocal space and in particular on the way they can appear and disappear when some external parameter is tuned. In particular, we will discuss the notion of a topological charge associated to these defects (winding number and winding vector). Various experimental systems have studied the emergence/merging of these topological defects.

Choix de session parallèle

3.3 Propriétés remarquables des matériaux topologiques : de la théorie à la réalisation expérimentale

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