

Majorana Fermions in High Energy and Solid State Physics

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It is known that a Dirac-type matrix equation governs surface excitations in the superconductor-topological insulator system and Majorana zero-energy modes (MZM) arise as solutions of such an equation in the presence of vortices. Among other setups to realize MZMs, one can mention a p-wave superconductor with a non-relativistic kinetic term and a vortex order parameter. On the other hand, it is known that Majorana's original work was not restricted only to zero-energy modes, which are static solutions of the Majorana equation. His approach was quite general and he introduced a whole field, called Majorana Fermions. We review these concepts and their importance both in the high energy physics and the solid state physics context.

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