

# Torsion through time-loops on bidimensional Dirac materials

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After a brief review of how to describe the  $\pi$  electrons of Dirac materials and topological defects, such as disclinations and dislocations, we propose a scenario where the effects of dislocations, in bidimensional Dirac materials, can be described, at low energies, by a vertex proportional to the totally antisymmetric component of the torsion generated by such dislocations. It is suggested that the two-dimensional geometric obstructions, already known in the literature, can be avoided by including time in the description of  $\pi$  electrons. In particular, the emphasis is placed on exotic time-loops, which could be obtained from the hole-particle pair excitations. If torsion/dislocation is present, a net flow of particles-antiparticles (holes) can be inferred and, possibly, be measured.

## Secondary track (number)

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