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Infinite mass boundary conditions for Dirac operators.

Abstract:

We study a self-adjoint realization of a massless Dirac operator on a bounded connected domain $\Omega \subset \mathbb{R}^2$ which is frequently used to model graphene. In particular, we show that this operator is the limit, as $M \rightarrow \infty$, of a Dirac operator defined on the whole plane, with a mass term of size M supported outside Ω .