



A TWO-DIMENSIONAL EFFECTIVE YUKAWA MODEL
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Abstract

In this work we derive an effective model to describe dynamical effects of the Yukawa interaction among Dirac electrons in the plane. Such short-range interaction is obtained by introducing a mass term for the intermediate particle, which may be either scalar or an Abelian gauge field, both of them in (3+1) dimensions. Thereafter, we consider that the fermionic matter field propagates only in (2+1) dimensions, whereas the bosonic field is free to propagate out of the plane. Within these assumptions, we apply a mechanism for dimensional reduction, which yields an effective model in (2+1) dimensions. In the scalar case, the effective model reproduces the usual Yukawa interaction in the static limit.

Key words: Yukawa interaction, dimensional reduction, effective model.