

Supersymmetric extensions of Nambu-Jona-Lasinio model

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We discuss the dynamical mass generation resulting from supersymmetric extensions of the classical Nambu-Jona-Lasinio model namely from interaction terms with four chiral superfields. The kind of interactions maybe considered a supersymmetric generalization of the four-fermion interactions of the classic Nambu-Jona-Lasinio model. We illustrate the dynamical generation of superfield Dirac mass including a supersymmetry breaking part through the analysis of the superfield gap equation derived using the super-graph technique. A dynamical symmetry breaking generally goes along with the dynamical mass generation, for which a bi-superfield condensate is responsible. We also discuss the nature of the bi-superfield condensate and its role of the effective Higgs superfield picture. We show also that a holomorphic quark superfield interaction term can successful account for the electroweak symmetry breaking with Higgs superfields as composites.

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