SOLITON AND BISOLITON MODEL FOR PAIRING MECHANISM OF HIGH - TEMPERATURE SUPERCONDUCTIVITY

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Abstract

Soliton is a nonlinear solitary wave moving without energy loss and without changing its form and velocity. It has particlelike properties. The extraordinary stability of solitons is due to the mutual compensation of two phenomena, dispersion and nonlinearity. Solitons can be paired in a singlet state called bisoliton due to the interaction with local chain deformation created by them. Bisolitons are Bose particles and when their concentration is higher or lower than some critical values they can move without resistance. The bisoliton model can be applied for a pairing mechanism in cuprate superconductors due to their layered structure and the relatively small density of charge carriers. Cooper pairs breaking is a result of a paramagnetic effect and the Landau diamagnetic effect. The influence of magnetic impurities and the Meissner effect on cuprate superconductor based on the concepts of the bisoliton model are discussed.