ON ELECTRONS IN QUANTUM CHAOS STATE IN DOPED FULLERENE CRYSTAL

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9.7 cm

The Fermi energy of free electrons in fullerene crystal doped with alkali ion (eg. A_3C_{60}) is $\sim$ 1 eV. Consequently the de Broglie wave length of those electrons is of the same order ($\sim$ 10Å) as the diameter of C_{60} fullerene ball. Thus doped fullerene crystal can be treated as three dimensional quantum billiard, where the C_{60} molecules play role of scattering centers for conducting electrons.
In this paper we present a calculation of conducting electrons properties from the point of view of quantum chaos. In particular we use the information entropy to describe degree of their localization in the space between the nodes (resulting from multiple dissipation). The entropies are calculated from electron wave functions (within the band theory in single electron approximation). We also describe the chaos level by means of – generalized to continous spectra – nearest neighbor energy spacing distribution. The results can shed some light to the superconductivity mechanism in A_3C_{60} systems.

13.4 cm

Subject category :

1. Correlated Electrons and High Temperature Superconductors

Presentation mode :
poster

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