Effect of Magnetic-Impurity Scattering in Disordered Two-Dimensional Square Lattices Around Half Filling

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Abstract: Weak-localization effect in the presence of magnetic impurities is studied in disordered two-dimensional tight-binding square lattices around half filling. Both the magnetic and nonmagnetic impurities are assumed to be randomly distributed on small fractions of the sites, while the nonmagnetic impurities have a strong potential yielding a unitary-limit scattering. We derive in details the expressions of diffusive π modes in the retarded-retarded (or advanced-advanced) channel, which result from the existence of particle-hole symmetry. The quantum interference correction to the density of states is calculated. While the magnetic-impurity scattering suppresses the quantum correction from π-mode cooperon, it does not affect the contribution of π-mode diffuson.

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