DIAGRAMMATIC THEORY FOR TWOFOLD DEGENERATE ANDERSON IMPURITY MODEL

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The theory of strongly correlated electron systems plays a central role in contemporary condensed matter physics. The essence of the problem is the competition between the localization tendency originated by the Coulomb repulsion of *d* electrons and itinerancy tendency arising as a result of hybridization of electron orbitals.

The orbital degeneracy can be completely eliminated in solid substances but in many of them, for example, new superconductors based on *Fe* and AnC_{60} materials orbital degeneracy is not completely eliminated and orbital effects are important. For instance, orbital degeneracy plays essential role in the Mott metal-insulator transition. Here the effects of Hund's rule coupling in our orbitally degenerated model are studied with diagrammatic approach.

We study the influence of the intra-atomic Coulomb interactions of the two electrons with opposite spins situated on the same or different orbitals and intra-atomic exchange is analyzed.

We discuss the properties of the Slater-Kanamori model [1-3] of d-impurity electrons. After finding the eigenfunctions and eigenvalues of all 16 local states, we determine the local one-particle propagator.

We have formulated the diagram theory for the two orbital degenerate Anderson impurity model by generalizing the perturbating theory formulated for strongly correlated non degenerated electronic systems. Perturbation theory was formulated around atomic limit of impurity localized electrons.

We determined the correlation functions as a sum of strongly connected irreducible diagrams and have formulated Dyson type equation for the full propagators of conduction and impurity electrons. Special diagrammatic approximation was discussed and summation of diagram has been considered.

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