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Diagram theory for the twofold-degenerate Anderson impurity model

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Abstract

We develop a diagram technique for investigating the twofold-degenerate Anderson impurity model in the normal state with the strong electronic correlations of d electrons of the impurity ion taken into account. We discuss the properties of the Slater-Kanamori model of d electrons. After finding the eigenfunctions and eigenvalues of all 16 local states, we determine the local one-particle propagator. We construct the perturbation theory around the atomic limit of the impurity ion and obtain a Dyson-type equation establishing the relation between the impurity electron propagator and the normal correlation function. As a result of summing infinite series of ladder diagrams, we obtain an approximation for the correlation function.