STRONG COUPLING APPROACH IN DYNAMICAL MEAN-FIELD THEORY FOR STRONGLY CORRELATED ELECTRON SYSTEMS

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S u m m a r y

We review two analytic approaches in the Dynamical Mean-Field Theory (DMFT) based on a perturbation theory expansion over the electron hopping to and from the self-consistent environment. In the first approach, the effective single impurity Anderson model (SIAM) is formulated in terms of the auxiliary Fermi-fields and the projection (irreducible Green's function) technique is used for its solution. A system of DMFT equations is obtained that includes a number of the known approximations as simple specific cases (Hubbard-III, AA, MAA, ...). The second approach is based on the diagrammatic technique (Wick's theorem) for Hubbard operators that allows one to construct a thermodynamically consistent theory when SIAM exactly splits into four components (subspaces): two Fermi liquids and two non-Fermi liquids. The results for the density of states, concentration dependences of the band energies, chemical potential, and magnetic order parameters are presented for different self-consistent approximations (AA, strong coupling Hartree–Fock, etc.).