

Real-space correlations in quantum impurity Systems

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The screening of a single magnetic impurity in a conduction band - the Kondo effect - is very well understood, as is the formation of a heavy-fermion state in a periodic array of such impurities.

Much less is known, however, about the behaviour between these two limits. Starting from the dilute limit of a single impurity, we discuss the real-space signatures of the screening process - the Kondo screening cloud - and investigate the issue of overlapping screening clouds in the two-impurity Kondo model.

We study the periodic limit within dynamical mean-field theory and generalize this approach to a periodic array of impurities. Finally, we discuss the applicability of DMFT to the general problem of an arbitrary concentration and distribution of impurities.