Cluster Embedding Schemes

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Despite the recent developments in simulating correlated quantum systems a rigorous solution of interacting quantum systems is only rarely possible. A common approximation scheme consists in treating a small part of the system, called the cluster, in a rigorous manner, while performing approximations to the rest, namely the bath. In this presentation I provide an overview over various cluster embedding schemes and provide a detailed description of the self consistent cluster embedding (SCCE) developed at HQS.

To this end I start with an introduction to the cluster perturbation theory (CPT), the dynamical mean field theory(DMFT) including its cluster extension (CDMFT). I then provide a short introduction to inverse mean field theories (iMF) and finally combine the idea of iMF and cluster embedding to our SCCE method.