EXTENDED HUBBARD MODEL ON DIAMOND CHAIN

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Motivated due to a large number of quasi-one-dimensional organic polymers, which can be described using the Hubbard model on diamond chain, we will discuss the extended Hubbard model on diamond chain. A particular case of the extended Hubbard model on diamond chain will be considered, where the hopping terms acts on two diamond sites, and with all sites assembled by onsite Coulomb repulsion term and nearest neighbor Coulomb repulsion. In the present model we also include an external magnetic field in order to study its magnetic properties, and the chemical potential is also considered in order study particle flux with its environment. On the other hand, the decoration or iteration transformation, were widely applied to solve exactly the magnetic spin models in one-dimensional and two-dimensional lattice. This approach recently was adapted for interacting electron systems [O. Rojas and S. M. de Souza, Phys. Lett. A, 387 (2011) 1947]. Therefore using the decoration transformation for interacting electron system, we are able to solve this model exactly. The phase diagram of this model was explored at zero temperature, where we find a quite rich phase diamgram, finding several frustrated states, assuming arbitrary number of particles and under the influence of external magnetic field. The influence of frustration at low temperature for the entropy is discussed, and other thermodynamics properties also is discussed such as specific heat, magnetization and particle density.

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