

Ferromagnetism in an Itinerant Electron Cluster

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(Received: 2004-12-15; Revised:)

Abstract: In the present paper, we study the existence of metallic ferromagnetism in a cluster of nanometer scale, which is described by the Hubbard model defined on a complete graph. Therefore, the system is highly frustrated with respect to electron hopping. By solving the model exactly, we show that its ground state is fully spin-polarized at half-filling, even if the Coulomb interaction is finite. This conclusion is in sharp contrast to the well-known result for the Hubbard model on a bipartite lattice. As a result, our exact solution strongly suggests that frustration may play an important role in causing metallic ferromagnetism.

PACS: 71.10.Fd, 75.75.+a, 71.27.+a

Key words: metallic ferromagnetism, strongly-correlated electron systems, exact solution

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