GROUND STATES OF THE SPIN-ONE-HALF FALICOV-KIMBALL MODEL WITH HUND COUPLING IN TWO DIMENSIONS

H. Čenčariková, P. Farkašovský, N. Tomašovičová and M. Žonda
Institute of Experimental Physics, Slovak Academy of Sciences
Watsonová 47, 040 01 Košice, Slovakia

The spin-one-half Falicov-Kimball model with spin-dependent on-site interaction between localized (f) and itinerant (d) electrons is studied by small-cluster exact-diagonalization calculations and a well-controlled approximative method in two dimensions. The results obtained are used to categorize the ground-state configurations according to common features (charge and spin ordering) for all f and d electron concentrations (n_f and n_d) on finite square lattices. It is shown that only a few configuration types form the basic structure of the charge phase diagram in the $n_f - n_d$ plane. In particular, the largest regions of stability correspond to the phase segregated configurations, the axial striped configurations and configurations that can be considered as mixtures of chessboard configurations and the full (empty) lattice. Since the magnetic phase diagram is much richer than the charge phase diagram, the magnetic superstructures are examined only at selected values of f and d electron concentrations.

Subject category :

1. Strongly Correlated Electrons and High Temperature Superconductivity

Presentation mode :
poster

Corresponding author :
H. Čenčariková

Address for correspondence :
Watsonova 47
041 01 Košice
Slovakia

Email address :
hcencar@saske.sk