Abstract Submitted
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Phase Separation and Charge-Ordered Phases of the d = 3 Falicov-Kimball Model at T>0: Temperature-Density-Chemical Potential Global Phase Diagram from RG Theory[1] A. NIHAT BERKER, Sabanci University and MIT, OZAN S. SARIYER, Koc University and U of North Carolina, MICHAEL HINCZEWSKI, U of Maryland and F Gursey Res Inst — The global phase diagram of the spinless FK model in d=3 is obtained by renormalization-group theory, exhibiting 5 distinct phases. Four of these phases are charge-ordered (CO) phases, in which the system forms two sublattices with different electron densities. The CO phases occur near half filling of the conduction electrons, for the entire range of localized electron densities. Phase boundaries are second order, except for the intermediate and large interaction regimes, where a first-order phase boundary occurs in the central region of the phase diagram, resulting in phase coexistence near half filling of both localized and conduction electrons. These two-phase or three-phase coexistence regions are between different charge ordered phases, between charge-ordered and disordered phases, and between dense and dilute disordered phases. The second-order phase boundaries terminate on the first-order transitions via critical endpoints and double critical endpoints. The first-order phase boundary is delimited by critical points. The phase diagram cross-sections with respect to the chemical potentials and densities of the localized and conduction electrons, at all representative interaction strengths, hopping strengths, temperatures, are calculated and exhibit 10 distinct topologies.

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A. Nihat Berker
Sabanci University and MIT

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