

Peculiar behaviour of thermodynamic properties in the Falicov-Kimball model for small U couplings

J. Krawczyk¹ and R. Lemanski¹

¹*Institute of Low Temperature and Structure Research
Polish Academy of Science, Wroclaw, Poland*

We analyse a behaviour of the order parameter between the large and small U limit. In the large U limit, the Falicov-Kimball model maps onto the effective Ising model with the order parameter of the Curie-Weiss form[1]. However, in the small U limit the order parameter takes on unusual shape with a sharp reduction near $T \approx T_C/2$ [2,3]. Then we calculate the specific heat for different values of U. We investigate a crossover between these two limits using dynamical mean field theory(DMFT) formalism, which provides the exact solution in the limit of large spatial dimensions. We find the behaviour of the order parameter and specific heat as a function of temperature to be quite unusual.

References:

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