Charge-ordered phases in the extended Hubbard model

K.J. Kapcia[1]

[1] *Institute of Physics, Polish Academy of Sciences, Warsaw, Poland*

Various charge ordered states are relevant to a broad range of materials, e.g. manganites, cuprates, magnetite, doped transition metal compounds ($Ti_{4x}V_xO_7$, WO_{3-x}), heavy-fermion systems and organic compounds. The extended Hubbard model is one of the simplest models that captures the interplay between strong correlations and charge-ordering effects [1-3]. The model can describe the insulator-metal transition between phases with long-range charge-order [1]. We present studies of the model with both (i) on-site interaction U and (ii) intersite density-density interactions between nearest-neighbors W_1 and next-nearest-neighbors W_2 beyond the standard two-sublattice assumption [2,3]. In particular, we investigate the effects of next-nearest-neighbor interactions on phase diagrams of the model in different limits and we show that charge-stripes can occur for repulsive $W_2 > 0$ for both signs of W_1 [2].

References:

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