

Pair formation in two-electron correlated chains

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Abstract

We study two correlated electrons in a nearest-neighbour tight-binding chain, with both on-site and nearest-neighbour interaction. Both the cases of parallel and antiparallel spin are considered. In addition to the free electron band for two electrons, there are correlated bands with positive or negative energy, depending on whether the interaction parameters are repulsive or attractive. Electrons form bound states, with amplitudes that decay exponentially with separation. Conditions for such states to be filled at low temperatures are discussed.