

Properties of bound pairs in layered Hubbard model

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Hubbard model has been applied to explain the properties of surprisingly many types of materials: insulators, conductors, ferromagnets, antiferromagnets, high-temperature superconductors or heavy-fermion superconductors. It is formally simple but exhibits very rich behavior requiring sophisticated and usually approximate methods. The exact results are thus very valuable but few and concern mostly one-dimensional (1D) lattice. I present exact solution of two-electron case on 2D square lattice with extension to few such 2D layers leading eventually to 3D case. I calculate effective masses of pairs of different symmetries and discuss their relevance to possible superconducting many-body state.