

- **Phase transitions and single-particle dynamics of Hubbard models on honeycomb lattice**

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The Hubbard model and extended Hubbard model can be seen as the prototype models of the single layer graphene sheet placed in high kappa environment with screened Coulomb interaction. By using dynamical cluster approximation method, we numerically found that the Fermi liquid is stable in the presence of short-ranged Coulomb interaction and the Fermi velocity stays invariant as the tight-binding model value of the honeycomb lattice. As the on-site and nearest neighbor Coulomb repulsion increases, phase transitions between semi-metal, spin density wave and charge density wave states would take place. Phase diagrams for these phase transitions are also presented in our study.