

Theoretical Study of Electronic States in $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$

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The discovery of unconventional superconductivity in Sr_2RuO_4 ¹ evokes considerable interest about the electronic properties of ruthenates. One of the related compounds, $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$, has rich ground states and the origin of these ground states has not been clarified yet.² Most surprisingly, a heavy-mass Fermi liquid behavior is observed at $x=0.5$.³

In this presentation, we investigate electronic states in $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$ by using the Gutzwiller approximation of the three-orbital Hubbard model. We obtain the renormalization factor for each Ru t_{2g} -orbital as a function of the on-site Coulomb interactions and discuss the relation with the experimental result.⁴ We also address the possibility of an orbital-selective Mott transition.^{5,6}

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