

Comprehensive Study of Electronic States Induced by Quantum Charge Fluctuations in Electron-doped High- T_c Cuprate Superconductors

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The mechanism for high- T_c cuprate superconductivity is realized by interaction between electrons and bosons. However, it has been a long-standing mystery to what extent which bosons play an important role to occur high- T_c superconductivity.

Recent resonant inelastic x-ray scattering (RIXS) experiments have been reported that charge excitations for high- T_c cuprate superconductors [1-3]. The contribution of the charge fluctuations to high- T_c cuprate superconductivity has started to pay attention for the physics of cuprate superconductivity. According to previous theoretical studies [4-7], using the layered t - J model, the electron self-energy is calculated and discussed about the effect of charge fluctuation for the electronic structure of cuprates.

In this study, we have performed an angle-resolved photoemission spectroscopy (ARPES) and inverse photoemission spectroscopy (IPES) to understand the electronic structure for the electron-doped cuprate $\text{Nd}_{1.85}\text{Ce}_{0.15}\text{CuO}_4$ in the occupied and unoccupied states, respectively. In addition to the experiments, we have performed *ab-initio* calculations to investigate the electronic structure as shown in Fig. 1. We have observed band dispersions and found some similar features corresponding to charge derived bands. In the poster presentation, we will show the experimental and theoretical results in details and discuss the effect from the charge fluctuation of cuprate superconductors.

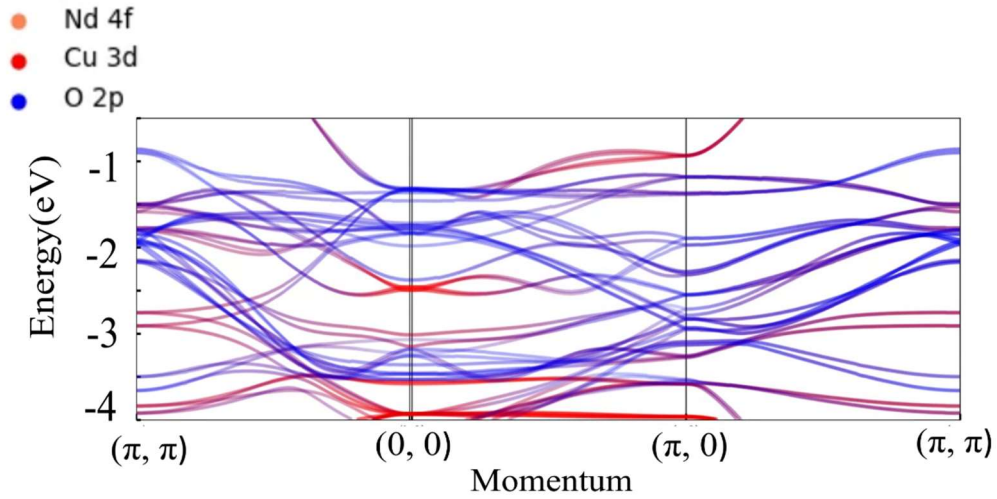


FIGURE 1. Bulk-band structure of Nd₂CuO₄ using DFT calculations. The color and intensity of the curves correspond to the weight of orbitals, Nd 4*f*, Cu 3*d*, and O 2*p*.

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