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Optical Investigation on the Electronic Structures of Multi-band $Ca_{2-x}Sr_xRuO_4$ S. J. MOON, J. S. LEE, T. W. NOH, ReCOE & School of Physics, Seoul National University, Korea, S. NAKATSUJI, Y. MAENO, Department of Physics, Kyoto University, Japan — We investigated the polarization dependent optical spectra of the quasi-two-dimensional multi-band $Ca_{2-x}Sr_xRuO_4$ ($0.0<x\leq2.0$) system. Recently, it becomes an important issue to understand how the electronic structure evolves from a multi-band metal Sr_2RuO_4 to a Mott-insulator Ca_2RuO_4 in the $Ca_{2-x}Sr_xRuO_4$ system, especially whether the orbital selective Mott-transition occurs at x=0.5 or not. In the in-plane optical spectra, we observed an intriguing behavior in the electrodynamics, i.e., the decrease of the mass enhancement accompanying the reduction of the plasma frequency. We found that such result could not be attributed to the Mott-gap opening. Instead, with the detailed understanding of the c-axis optical spectra, we suggested that the critical behaviors near $x=x_c$ should be closely related with the renormalization of the d_{xy} band, which is strongly affected by the tilting of the RuO_6 octahedra.

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