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Ultrafast dynamics in photo-induced correlated electronic states in ladder cuprates SUMIO ISHIHARA, HIROSHI HASHIMOTO, Department of Physics, Tohoku University — Ultrafast photo-induced dynamics in correlated electron systems, in particular, photon irradiation effects in half filled Mott insulators have been studied intensively from theoretical and experimental sides, and photo-induced Mott insulator to metal transition has been observed. On the other side, in recent ultrafast pump-probe experiments in ladder cuprates away from half filling, photo-irradiation weakens initial metallic state. We study ultrafast dynamics in photo-induced states in a ladder system. Real time dynamics in a ladder-type Hubbard model are analyzed by the numerical exact diagonalization method. Optical conductivity spectra and density of states show that the initial metallic state is changed into a bad metallic state by photo irradiation, in contrast to the photo-doped effect in half-filled Mott insulators. Through the calculation of the carrier pair correlation functions, we find that coherent motion of carrier pairs in initial states are reduced by pump photon irradiation. We further simulate a double pulse irradiation. Our simulations as well as the experimental results suggest an optical control of pair coherence in correlated electron system.

Sumio Ishihara
Department of Physics, Tohoku University

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