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Numerical study of relaxation dynamics in photoexcited states of one-dimensional Mott insulators¹ HIROAKI MATSUEDA, National College of Technology, TAKAMI TOHYAMA, Yukawa Institute for Theoretical Physics, Kyoto University, SADAMICHI MAEKAWA, Institute for Materials Physics, Tohoku University — We examine relaxation dynamics of one-dimensional Mott insulators after photoirradiation. This study is motivated by ultrafast metal-insulator switching seen in Sr₂CuO₃, halogen-bridged Ni compounds, and organic materials. In order to examine energy dissipation due to relaxation processes, we take account of strongly correlated electrons as well as environmental degrees of freedom by introducing the Hubbard–Holstein model. Then, we perform density matrix renormalization group calculations. We find quite large number of phonons excited just after irradiation even for very small electron-phonon coupling. We will discuss the nature of the phonon relaxation characteristic of strongly correlated systems, and how the relaxation is associated with other internal degrees of freedom of correlated electrons.

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Prefer Oral Session
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