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Enhancement of charge and spin orders in a photoexcited one-dimensional strongly correlated system HANTAO LU, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, 606-8502, Japan, SHIGETOSHI SOTA, Computational Materials Science Research Team, RIKEN AICS, Kobe, Hyogo 650-0047, Japan, HIROAKI MATSUEDA, Sendai National College of Technology, Sendai, 989-3128, Japan, JANEZ BONCA, J. Stefan Institute, SI-1000 Ljubljana, Slovenia, TAKAMI TOHYAMA, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, 606-8502, Japan — By using the time-dependent Lanczos method, the nonequilibrium pro- cess of the half-filled one-dimensional extended Hubbard model, driven by a transient laser pulse, is investigated. In the case of large on-site Coulomb interactions, there are two phases separated by a first order quantum phase transition, i.e., spin-density-wave (SDW) and charge-density-wave (CDW) phases, which are characterized by algebraic decay of spin cor- relations and a long-range (staggered) charge order, respectively. When the system is subjected to the irradiation of a laser pulse, from the SDW side near the phase boundary, with proper laser frequency and strength, a sustainable charge order enhancement can be realized while local spin correlations remain. Analogously, from the CDW side, the suppression of long-range charge order is accompanied with a local spin correlation enhancement. We analyze the conditions and investigate possible mecha- nisms of the emerging order enhancements. In off-resonance region, more extended recovery of spin correlations which may come from nonlinear effect is also observed.

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