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Dynamical DMRG study of non-linear optical response in one-dimensional dimerized Hubbard model with nearest neighbor Coulomb interaction and alternating on-site potential SHIGETOSHI SOTA, TAKAMI TOHYAMA, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan, SERGUEI BRAZOVSKII, LPTMS-CNRS, University Paris-Sud, Orsay, France — The optical response of organic compounds has been attracting much attention. The one of the reasons is the huge non-linear and ultrafast optical response [K. Yamamoto *et. al.*, J. Phys. Soc. Jpn. **77**, 074709(2008)]. In order to investigate such optical properties, we carry out dynamical DMRG calculations to obtain optical responses in the 1/4-filled one-dimensional Hubbard model including the nearest neighbor Coulomb interaction and the alternating electron hopping. The charge gap [S. Nishimoto, M. Takahashi, and Y. Ohta, J. Phys. Soc. Jpn. **69**, 1594(2000)] and the bound state [H. Benthien and E. Jeckelmann, Eur. Phys. J. B **44**, 287(2005)] in this model have been discussed based on DMRG calculations. In the present study, we introduce an alternating on-site potential giving the polarization in the system into the dimerized Hubbard model, which breaks the reflection symmetry of the system. In this talk, we discuss the obtained linear and the 2nd order non-linear optical susceptibility in order to make a prediction for non-linear optical experiments in the future.

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