

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Nonlinear ultrafast optical response in organic molecular crystals¹ TALAT S. RAHMAN, VOLODYMYR TURKOWSKI, MICHAEL N. LEUENBERGER, Physics Department and NSTC, University of Central Florida — We analyze possible nonlinear excitonic effects in the organic molecule crystals by using a combined time-dependent DFT and many-body approach. In particular, we analyze possible effects of the time-dependent (retarded) interaction between different types of excitations, Frenkel excitons, charge transfer excitons and excimers, on the electric and the optical response of the system. We pay special attention to the case of constant electric field and ultrafast pulses, including that of four-wave mixing experiments. As a specific application we examine the optical excitations of pentacene nanocrystals and compare the results with available experimental data.[1] Our results demonstrate that the nonlinear effects can play an important role in the optical response of these systems. [1] A. Kabakchiev, “Scanning Tunneling Luminescence of Pentacene Nanocrystals”, PhD Thesis (EPFL, Lausanne, 2010).

¹Work supported in part by DOE Grants No. DOE-DE-FG02-07ER15842 and No. DOE-DE-FG02-07ER46354.

Volodymyr Turkowski
University of Central Florida

Date submitted: 11 Nov 2011

Electronic form version 1.4