Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Hybrid Phonoriton in Organic-Semiconductor Materials[1] DAVID FACEMYER, QUE HUONG NGUYEN, Marshall University — In this work electronic structures and optical properties of organic-inorganic phonoriton, a new elementary excitation existing in heterostructures combining both organic and semiconductor materials, are studied. In those systems, Wannier-Frenkel hybrid exciton has unique and interesting properties that can improve the efficiency of optical materials. When an organic-semiconductor combined heterostructure is illuminated by high-intensity electromagnetic radiation with the frequency of the photons at or near the resonance frequency of the Wannier-Frenkel exciton, we obtain a macroscopically occupied system of hybrid polaritons that further interacts with phonons which will in turn generate the hybrid phonoriton. Electronic structure, energy and dispersion relation of phonoritons are theoretically determined. By analyzing the interactions between the hybrid exciton, photons and phonons, the conditions for phonoriton formation are discussed.

[1]The support from NASA EPSCoR Seed Grant award 211012 is acknowledged.

Que Huong Nguyen
Marshall University

Date submitted: 18 Nov 2011 Electronic form version 1.4