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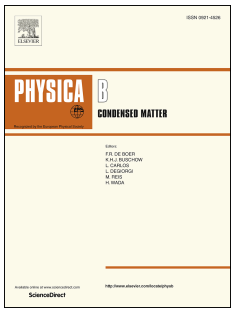

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A Novel Model of Photothermal Diffusion (PTD) for Polymer Nano-composite Semiconducting of Thin Circular Plate

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Abstract

In this article, theoretical discussions for a novel mathematical-physical Photothermal diffusion (PTD) model in the generalized thermoelasticity theory with photothermal processes and chemical action are introduced. The mean idea of this model depends on the interaction between quasi-particles (plasma waves) that depends on the kind of the used materials, the mechanical forces acting on the surface, the generalized thermo and mass diffusion (due to coupling of temperature fields with thermal waves and chemical potential) and the elastic waves. The one dimensional Laplace transforms is used to obtain the exact solution for some physical and chemical quantities for a thin circular plate of a semiconducting polymer nanocomposite such as silicon (Si). New variables are deduced and discussed. The obtained results of the physical quantities are presented analytically and illustrated graphically with some important applications.

Keywords: Photothermal; chemical potential; semiconducting polymer; thick circular plate; elastic waves.