1016-78-215   **Ildar R Gabitov*** (`gabitov@math.arizona.edu`), Department of Mathematics, University of Arizona, 617 N. Santa Rita, Tucson, AZ 85721, and **Andrei I. Maimistov**, Kashirskoe Shosse 31, Moscow, Russia. *Double resonance in nonlinear nanostructured materials: negative refraction and solitary waves.*

We will consider the resonance interaction of both electric and magnetic fields with nanostructures embedded in a nonlinear optical medium. Envelope equations as well as a mathematical model of extremely short pulse dynamics (when an envelope approximation is no longer valid) will be presented. We will demonstrate the existence of solitary waves and analyze their dynamics. We will also demonstrate that doping such materials with active atoms, quantum dots, or carbon nanotubes offers control mechanisms for the negative refraction properties of nanostructured materials. We will also discuss nonlinear phenomena which occurs at the interface between materials with negative and normal refraction. (Received February 13, 2006)

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