Effect of photonic band gap on the propagation of reflected pulse from a slab doped with two-level and three-level atoms

S Roshan Entezar and M Nikkhou
Department of Physics, University of Tabriz, Tabriz
E-mail: s-roshan@tabrizu.ac.ir

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Abstract
In this paper the effect of photonic band gap on the group velocity of reflected pulse from a dielectric slab doped with two-level or three-level atoms has been investigated. It is assumed that the slab is sandwiched between a uniform medium (like vacuum) and a one-dimensional photonic crystal. It is shown that the reflected pulse from the slab doped with two-level (three-level) atoms will be superluminal (subluminal) if the carrier frequency of the incident Gaussian pulse is in the photonic band gap. In contrast, for the incident pulse with the carrier frequency at the edge of photonic band gap, the reflected pulse from the slab doped with two-level (three-level) atoms is subluminal (superluminal).

Keywords: photonic band gap, subluminal, superluminal, reflected pulse

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