Turkish Journal

of

Physics

Keywords
Authors

phys@tubitak.gov.tr

Scientific Journals Home Page

Turkish Journal of Physics

Optical Pulse distortion in Fibonacci-class Multilayer Stacks

A. ROSTAMI, S. MATLOUB
Photonics and Nanocrystals Research Lab., Faculty of
Electrical and Computer Engineering,
Tabriz University, Tabriz 51664, IRAN
e-mail: rostami@tabrizu.ac.ir

Abstract: Optical pulse distortion and propagation through quasi-periodic structures generally and especially for Fibonacci-class, is investigated analytically and simulated numerically. In this analysis, the transfer matrix method (TMM) for distortion evaluation is used. The simulated results for Fibonacci-class quasi-periodic structures and pure periodic multilayer stacks are compared. We show that the Fibonacci-class quasi-periodic structure has a large dispersion coefficient with respect to a similar case in the periodic structure. So, quasi-periodic structures will destroy the incident pulse shape for smaller stack length than a periodic case in a similar situation. Finally, using output power, the distortion limit can be estimated and the maximum number of layers with acceptable distortion can be determined. Also, we have calculated the second order (D) and third order (B) dispersion coefficients for Fibonacci-class quasi-periodic structures around 1.55 μ m for dispersion compensation purposes.

Key Words: Pulse distortion, dispersion, quasi-periodic structures, and Fibonacci-class.

Turk. J. Phys., **30**, (2006), 21-34.
Full text: pdf
Other articles published in the same issue: Turk. J. Phys.,vol.30,iss.1.