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Optical signal processing in nano nonlinear Fabry-Perot resonator containing negative index material

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Abstract

This paper investigates the issue of signal processing in a bistable Fabry-Perot (FP) resonator. FP resonator includes two one-dimensional photonic crystals (1DPCs) containing periodic structure of positive and negative index material (PIM-NIM) considering as two semi-transparent reflectors in nano scale which sandwiched a nanocavity. The transmitted intensity versus input intensity curve is obtained using the transfer matrix method which incorporates the bistability characteristics in some convenient conditions and parameters. We consider the bright soliton as an input pulse with nearly constant frequency and by changing its amplitude we investigate the output pulse in quasi-pulse regime. Such devices can practically be used as nano signal processing systems where it is illustrated that light can be controlled absolutely by light.

Keywords: Nano FP Resonator; Negative Index Material; Optical Bistability; Signal Processing.

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