Abstracts

Theory and Applications of Coupled Optical Waveguides Involving Anisotropic or Gyrotropic Materials

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Coupled optical waveguides consisting of two isotropic dielectric slab waveguides coupled through anisotropic or gyrotropic materials inserted between them, are treated theoretically in detail. The properties of reciprocal and nonreciprocal TE-TM mode conversion and a nonreciprocal phase shift for TM modes are shown. As an example of application of this type of coupled waveguide, a nonreciprocal optical integrated circuit (IC) mode converter is proposed. It is shown that a circulator and an isolator which require neither mode separators nor mode filters can be constructed by utilizing the proposed nonreciprocal mode converter. The numerical design examples are also given.

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