

## DOUBLE BENDS AND Y-SHAPED SPLITTER DESIGN FOR INTEGRATED OPTICS

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**Abstract**—We present new designs of waveguide components in photonic crystal structures used for routing light exhibiting high transmission. In particular, we focus on the design of a brick that will form the PhCs network, i.e., a double bends and Y-shaped splitter. Photonic crystals are considered a good way for realizing compact optical bends and splitters. The PhC consists of a triangular array of holes etched into InP/GaInAsP/InP heterostructure. Propagation characteristics of the proposed devices are analyzed utilizing two-dimensional finite difference time domain (FDTD) method. The FDTD simulations confirm their unprecedented efficiency and robustness with respect to wavelength and structural perturbations. The PhCs transmission properties are then presented and discussed. Numerical results show that a total transmission of about 75% at output ports is obtained.

### 1. INTRODUCTION

Photonic crystals (PhCs) are of great interest in both physics and engineering communities. These PhCs consist of an ensemble of periodic optical scatterers which, through their coherent interaction, induce a photonic band structure and eventually a band gap for certain optical frequencies. Photonic crystals offer numerous potential applications and promise to greatly enhance the control over the flow of light and, consequently, to initiate important technological developments in the fields of semiconductor lasers, LED-based lighting

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