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Two-Dimensional Photonic Crystal L-Shaped Bent Waveguide and its Application to  
Wavelength Multi/Demultiplexer

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**Abstract:** The bent waveguide is a key element for integrated optical signal processing waveguide devices. We propose a new type of two-dimensional photonic crystal L-shaped bent waveguides with additional pillars at the corner. Using the FDTD method based on the principle of multidimensional wave digital filters we simulate its transmission characteristics and show an excellent transmission of light in L-shaped bent waveguide. As an application we design compact size multi/demultiplexer composed of the L-shaped bent waveguides and directional couplers and realize multi/demultiplexer with low-insertion loss and high extinction ratio device whose size is of the order of the wavelength of light.

**Key Words:** photonic crystals, L-shaped bent wave guide, multi/demultiplexer, FDTD, multidimensional wave digital filters

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