# Photonic crystal passive devices for photonic integrated circuits

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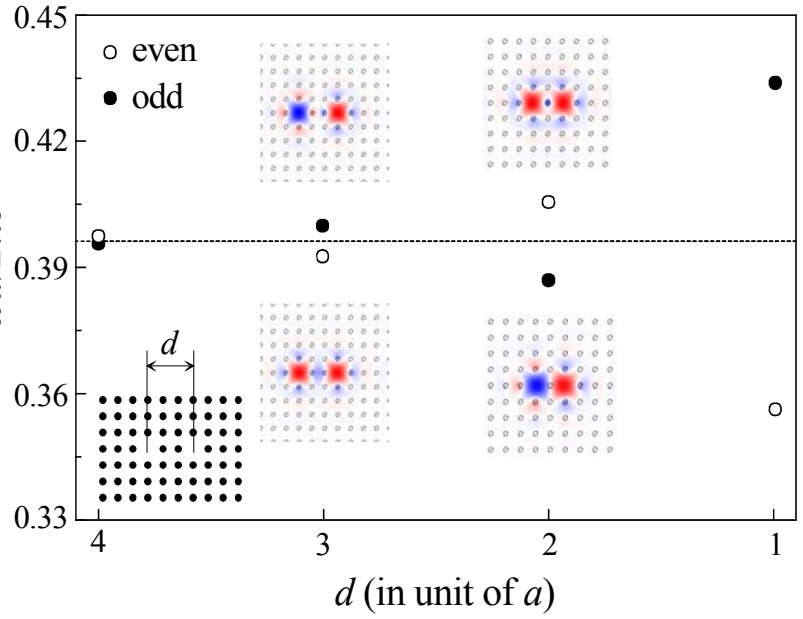
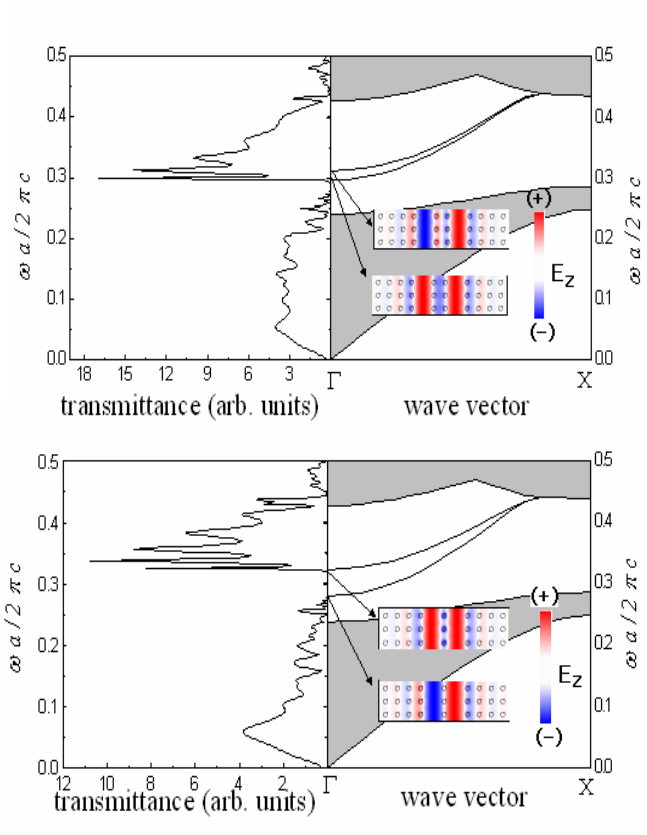
# Coupling characteristics of point/line defects

The parity of coupled localized modes in photonic crystals is not conserved.



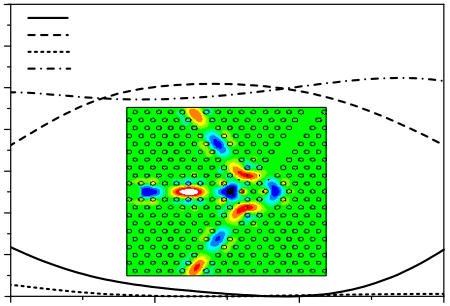

C.-S. Kee, et al., *Phys. Rev. B* 67, 073103 (2003)




C.-S. Kee, et al., IEEE *J. Quantum Electronics,* (in pr

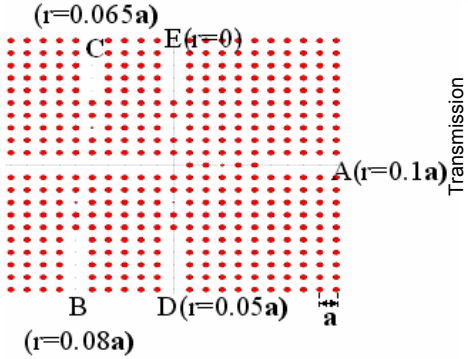
# Photonic crystal passive devices

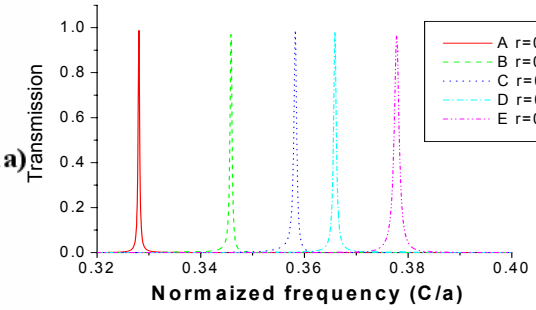
## Design of photonic crystal-based passive devices



Ideal 3dB PC splitter/combiner proposed and designed

**S. Kim, et al., *Optics Lett.* 30, 257 (2005)**

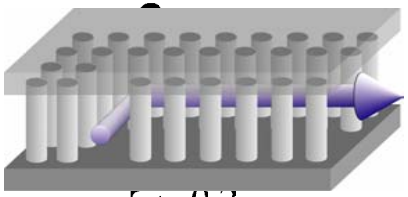


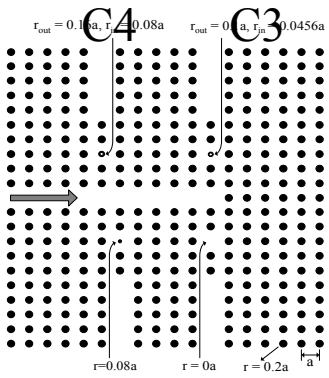

Highly efficient PC-based multi-channel drop filter proposed and designed

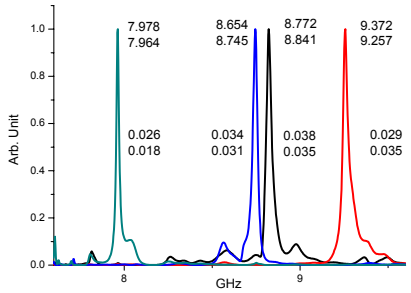
**S. Kim, et al., *Optics Express*, 12, 5518 (2004)**

## Photonic crystal waveguides and devices in microwave



2D PCW consisting of alumina rods and two metal plates



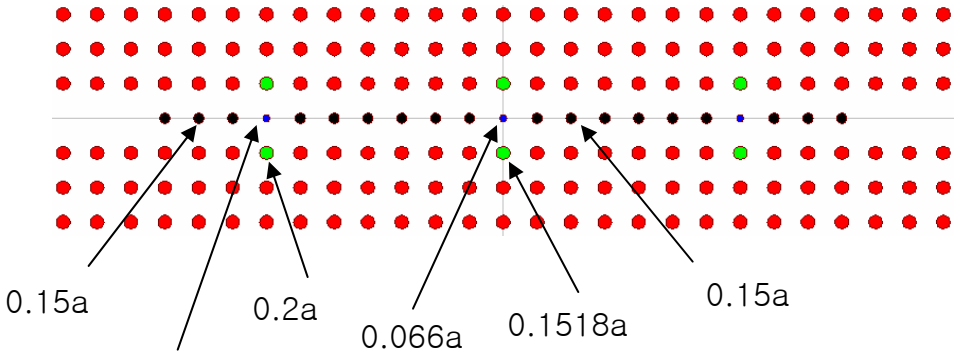




PC-based four-channel drop filter implemented in microwave

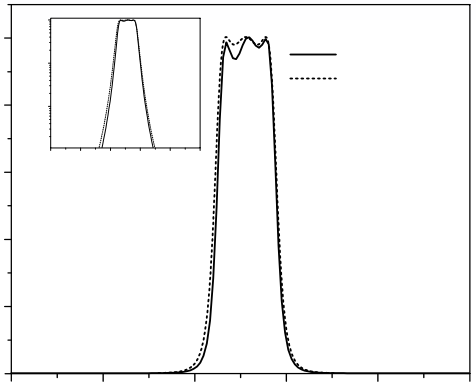
**Y. Roh, et al., *Appl. Phys. Lett.* (submitted)**

# Photonic crystal passive devices

## Higher-order resonant filter



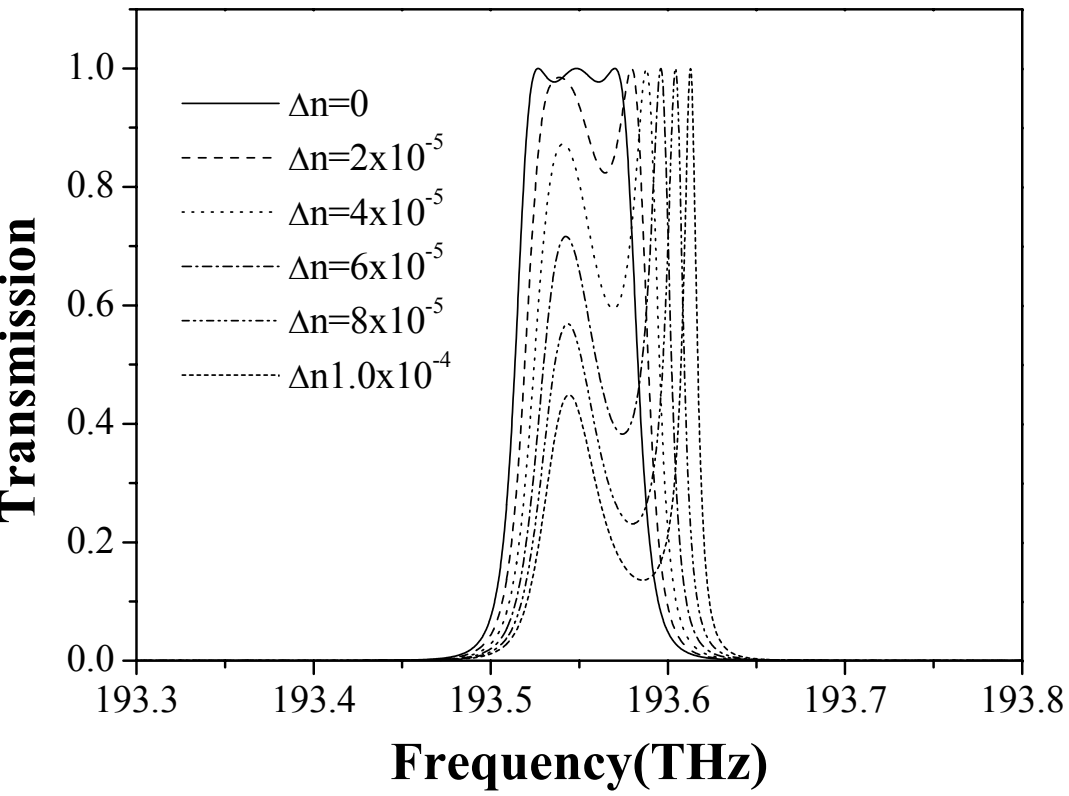

**For a = 500 nm, center frequency is 1550 nm**

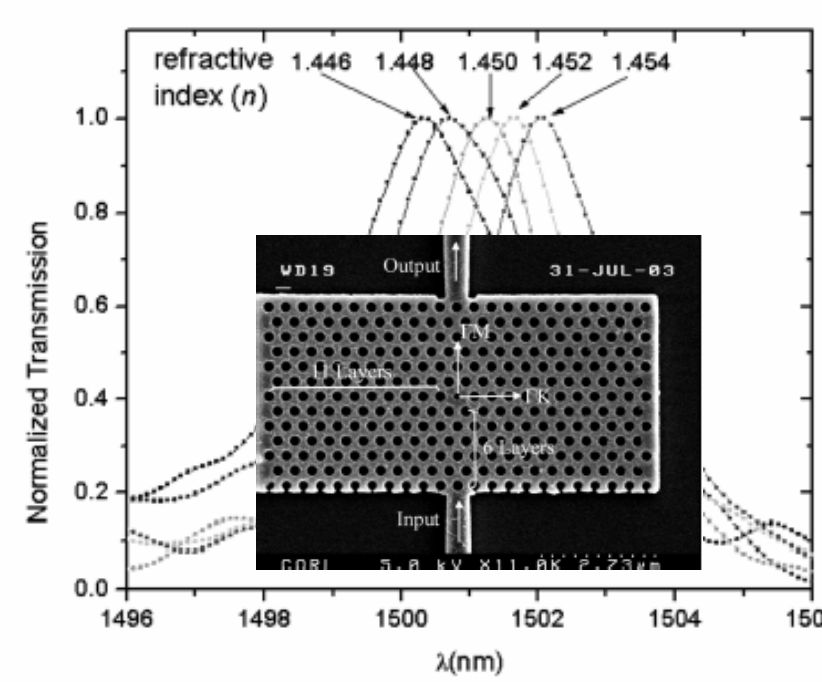


**Center frequency of 193.55THz, flat bandwidth of 50GHz, ripple less than 0.3dB**

D. Park, et al., *J. Lightwave Technol.* 23, 1923 (2005)

# Compact sensor based on photonic crystals




E. Chow *et al*, Optics Letters, vol. 29, no. 10, 2004

–Strong dependence of the filter characteristics is useful in sensor application.

# Collaborators

- Prof. Ikmo Park and Prof. Hanjo Lim, Ajou Univ.
  - Photonic crystal based device design
- Prof. Heonsu Jeon, Seoul National Univ.
  - Realization of photonic crystal devices