Applied Physics & OSA

Optics Seminar

Ultra-Compact Integrated Wavelength Demultiplexers and Spectrometers using Photonic Crystal Structures

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Abstract:

The development of ultra-compact and sensitive integrated photonic structures for optical signal processing and sensing has been of great recent interest for multiple applications including optical communications, networking, signal processing, bio and environmental sensing, and chemical and bio-agent threat detection. I will discuss the possibility of forming ultra-compact wavelength demultiplexers and spectrometers enabled by dispersion engineering in photonic crystal structures. The key aspect of these structures is the simultaneous presence of three unique dispersive properties of photonic crystals, namely the superprism effect, negative diffraction effect, and negative refraction effect, to minimize the overall size of the structure without sacrificing the performance. I will present a simple but efficient model for design and analysis of wave propagation in these dispersive structures and show its use in designing wavelength demultiplexers and spectrometers.

Brief Biography:

Ali Adibi is an associate professor in the School of Electrical and Computer Engineering and the director for center for Advanced Processing-tools for Electromagnetic/acoustics Xtals (APEX) at the Georgia Institute of Technology. He received his B.S.E.E. from Shiraz University (Iran) in 1990, and received his M.S.E.E. and Ph.D. degrees from the Georgia Institute of Technology (1994) and the California Institute of Technology (1999), respectively. His research interests include holographic data storage; holographic optical elements for optical communications; 3D optical pattern recognition; photonic crystals for chip-scale WDM and biosensors; spectrometers for bio and environmental sensing; high resolution optical imagin and ultra-fast optical interconnects.

Wednesday, December 5th, 2007.

4:00pm-5:00pm.

Watson 104

Refreshments will be available in the Watson Lobby at 3:45pm