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Tutorial

Fiber- and Waveguide-based Light Processing Devices

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Abstract

Following the development of multimode and single-mode fibers for telecommunications applications in the 1970's and planar waveguides in the 1980's, attention focused on a variety of fiber-based and waveguide-based light processing devices to complement the needs of optical transmission systems and other applications. This evolution continued in the 1990's with the appearance of a variety of Bragg grating-based devices to further refine the above capabilities.

The tutorial will focus on a broad range of these devices and provide simple physical insight and explanation for the functionality of each device. The scope will include a wide variety of couplers and splitters, both single-mode and multimode, as well as tapers, X- and Y-junctions, mode transformers, polarisers, shortand long-period gratings, add/drop wavelength filters, isolators, arrayed waveguide gratings (AWG) and multimode interference splitters (MMI).

John D. Love

Prof. John Love received his bachelor and doctoral degrees in applied mathematics from Cambridge and Oxford Universities, respectively, in the 1960's. His early research career was involved with non-linear plasma physics and solitons at the University of California at San Diego followed toroidal boundary value problems at the University of Toronto. He then took up a Queen Elizabeth II Fellowship at the Australian National University in Canberra in 1973. Since then he has researched light propagation in optical fibers, planar waveguides and light processing devices, culminating in the publication of the definitive treatise "Optical Waveguide Theory" with Prof. Allan Snyder in 1983. In 1984 he was Convenor of the first Australian Conference on Optical Fiber Technology (ACOFT) that is now an established annual event now in its 34th year. Today Professor Love is more focused on teaching and is Convenor for the optics and photonics program in the College of Physical Sciences at the Australian National University.