

Integrated optics devices for optical communications

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Integrated optics may provide future lightwave communication systems with such sophisticated options as single-mode wavelength multiplexing circuits or electrooptic switching networks. Several interesting examples of device research toward this goal are based on directional coupler structures prepared by Ti-diffusion in the electrooptic material LiNbO_3 , and split electrode arrangements providing alternating phase mismatch along the coupler length ($\Delta\beta$ coupler). One variety of this device is a switch and amplitude modulator that includes 6 sections of alternating $\Delta\beta$ and can operate at data rates in excess of 100 Mbit/s with drive voltages as low as 3 volts. A second device example includes the incorporation of intersecting dispersion characteristics in a $\Delta\beta$ coupler, resulting in a tunable coupler filter. This device has a measured filter bandwidth of 20 nm and is electrically tunable at a rate of 11 nm/v.

Other multiplexing possibilities to be discussed include the use of corrugated waveguide filters, and a non-integrated multiplexer consisting of a GRIN-rod lens and a blazed grating. The latter is capable of multiplexing four optical channels of different wavelength, with a channel separation of 30 nm and cross talk better than ~ 30 dB.

光通信用的集成光学器件

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集成光学可为未来的光波通信系统提供单模波长多路传输线回路或电光开关网络一类先进的器件。某些属于这方面的器件研究的有趣例子是以定向耦合器结构为基础的，办法是将Ti扩散进入电光材料 LiNbO_3 中并采用分裂式电极排列以造成耦合长度上交替的相位失配 ($\Delta\beta$ 耦合器)。在这类器件中有一种开关和幅度调制器，包括6段交替 $\Delta\beta$ ，数据速率超过100兆位/秒，驱动电压低至3伏。第二种器件例子利用了 $\Delta\beta$ 耦合器相交的色散特性，构成一只可调耦合滤波器。这些器件已测得具有20毫微米的滤波器带宽，电调谐速率可达11毫微米/伏。

其他有待讨论的多路传输方案包括波纹形波导滤波器的应用及由一只GRIN-棒型透镜和一只炫耀光栅组成的非集成多路传输器。后者能够对四条不同波长光通路进行多路传输，通路间隔为30毫微米，串话率优于 ~ 30 分贝。