INTRODUCTION TO GUIDED-OPTICAL-WAVE THEORY AND TECHNIQUES

By

H. Kogelnik
Bell Telephone Laboratories
Holmdel, New Jersey 07733

Abstract

This talk will try to give an introduction to and an overview of the principles and techniques basic to optical guided-wave devices and the ideas of integrated optics. An effort will be made to emphasize the parallels to microwave theory and techniques. The principal characteristics of dielectric waveguides will be discussed along with fabrication requirements and techniques. Current work on couplers and modulators will be described as an illustration of the potential of optical miniature circuits and devices.

INTEGRATED OPTICAL DEVICES

By

E.G.H. Lean
IBM Thomas J. Watson Research Center
Yorktown Heights, New York 10598

Abstract

The current state of the art in integrated optical devices based on optical guided waves in thin films will be reviewed. The sources, the couplers, the passive elements and the modulators, which are basic components for integrated optics will be discussed.

MILITARY APPLICATIONS OF INTEGRATED OPTICS AND FIBER OPTICS

R. A. Andrews

Naval Research Laboratory, Washington, D.C. 20375

Abstract

A general discussion of military applications of integrated optics and fiber optics will be presented. Specific applications to be discussed are (1) a multiterminal multiplexed data highway for aircraft and shipboard use, (2) optical fibers as tethers, (3) a 10.6μ heterodyne detector, and (4) integrated optical phased arrays.

INTEGRATED OPTICS FOR 10 MICRON WAVELENGTHS

By

D.B. Anderson
North American Rockwell
Anaheim, California 92803

Abstract

Efforts to develop the integrated optics art at North American Rockwell for the far infrared region will be summarized. The material properties and processing techniques apposite to passive waveguide and active devices in the 10 micron region will be indicated noting the similarities and differences to the comparable microwave art. Parametric frequency conversion and second harmonic experiments using waveguide phase matching techniques are delineated. Coupling techniques for beam/waveguide via end-fire approach are included.

PERIODIC STRUCTURES AND THEIR APPLICATION IN INTEGRATED OPTICS*

By

William S.C. Chang
Department of Electrical Engineering and
Laboratory for Applied Electronic Sciences
Washington University, St. Louis, Missouri

Abstract

Analysis and applications of periodic structures to optical waveguides as input-output couplers, mode converters, modulators, etc., will be given. Similarities between these optical devices to guided waves and periodic structures at microwaves will be discussed. Experimental data collected for these devices at 10.6 μm wavelength will be presented.

*Work performed in collaboration with T. Ko, K. W. Loh, M. Muller, K. Ogawa, F. J. Rosenbaum, B. Sopori, and R. Vann at Washington University and M. G. Craford, A. H. Herzog, and D. Finn at Monsanto Commercial Products Company.