

FOL-WAVE

Construction and Study of Mode Properties of Planar Waveguide



FEATURES

- The lab allows construction of single mode and multi mode planar waveguides using ion exchange technique and also to study the optical characteristics of these waveguides.
- Opto-Mechanical components allow easy installation of optical components and alignment of experimental setup to study the optical characteristics of these waveguides
- Waveguide preparation tools such as furnace, crucible, chemicals, glassware, IR lamp, etc. provide complete solution for waveguide construction in lab.
- Specially designed waveguide-prism coupler holder allows easy mounting of prism waveguide assembly and efficient coupling of light.

SPECIFICATIONS

- Reflection/Refraction experiments are performed using quartz half cylindrical lens mounted on graduated rotational mounts.
- Allows construction and characteristics study of single and multimode planar waveguides.
- Involves opto-electronics and optical components along with opto-mechanical hardware.
- Light coupling method using prism coupling technique.

Laser

- Source Type : He-Ne Laser
- Wavelength : 632.8nm
- Light : Red Visible
- O/P Power : 2 mW
- Complete system with power supply

Waveguide

- Single mode, multi mode waveguide
- Substrate - Soda lime glass
- Ion exchange using Potassium Nitrate ion (KNO_3) bath

Prism

- Right Angle Prism : 10 X 10 X 10mm. $\pm 0.2\text{mm}$
- Surface Quality : 60/40
- Refractive Index : >1.7

- Polished Surface : Diagonal, front and back side.
- Unpolished Surface : Two side surfaces.

Collimator

- Gallium Construction
- Magnification by 10X

EXPERIMENTS

- Demonstration of laws of reflection and refraction with measurement
- Demonstration of total internal reflection and calculation of critical angle
- Demonstration of polarization of light with TE and TM modes.
- Calculation of Brewster's angle
- Determination of the mode structure of a step index planar waveguide
- Measurement of the coupling angles and mode effective indices for the TE polarization state.
- Determination of the mode structure of waveguide for TM polarization state
- Calculation of the refractive index and the thickness of the step index waveguide from the measured mode spectrum.
- Establishing the design of a single mode step index waveguide
- Determination of the mode structure of a graded index planar waveguide
- Calculation of the surface index and the thickness of the grade index waveguide from the measured mode spectrum
- Establishing the design of a single mode graded index waveguide