

Integrated Photonics

Figures and Images for Instructors

Module 1

Photonic Integrated Circuits Materials and Fabrication Technologies

Optics and Photonics Series



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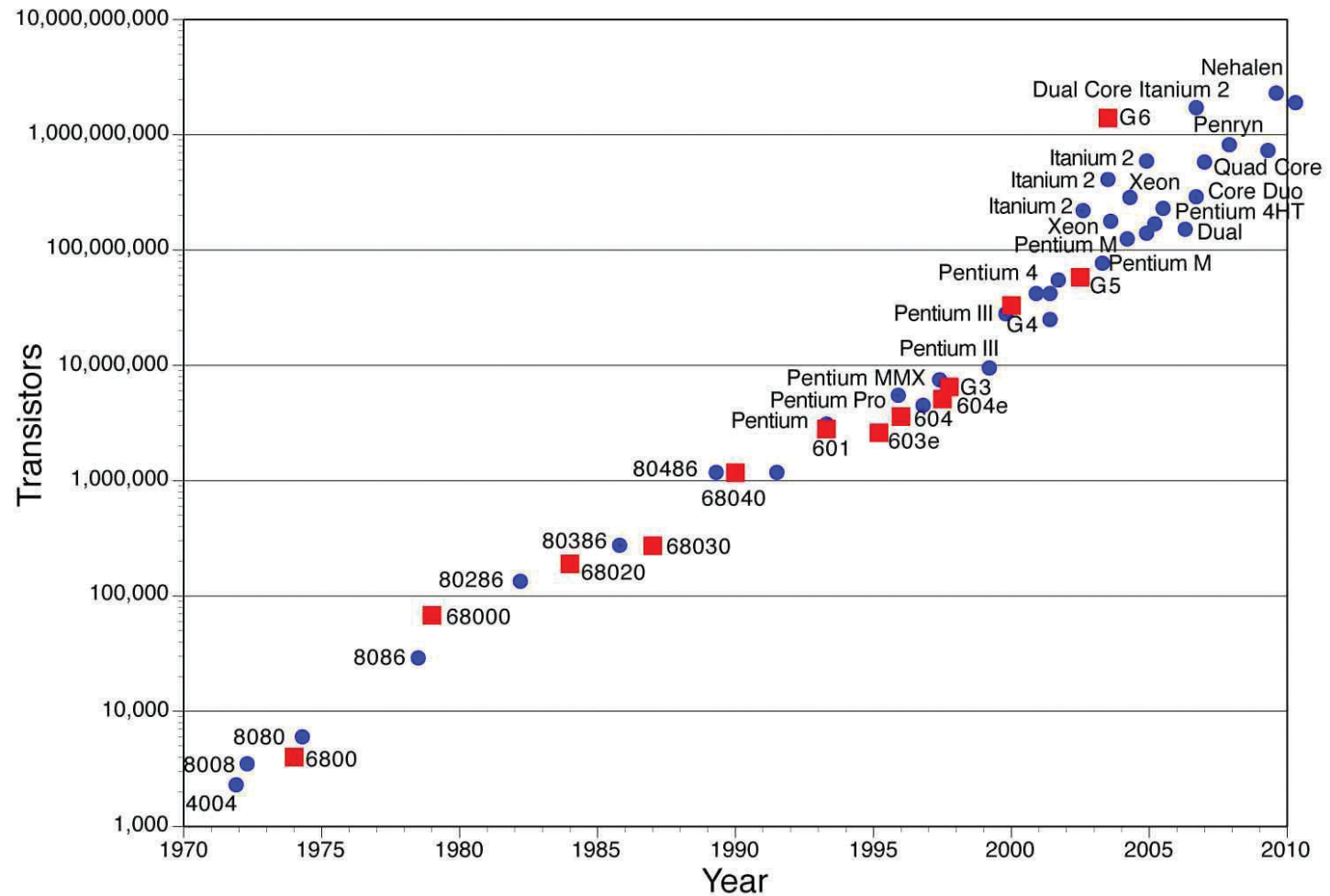


Figure 1-1 *Illustration of Moore's law, which predicts that the number of transistors in a microprocessor chip doubles every two years*

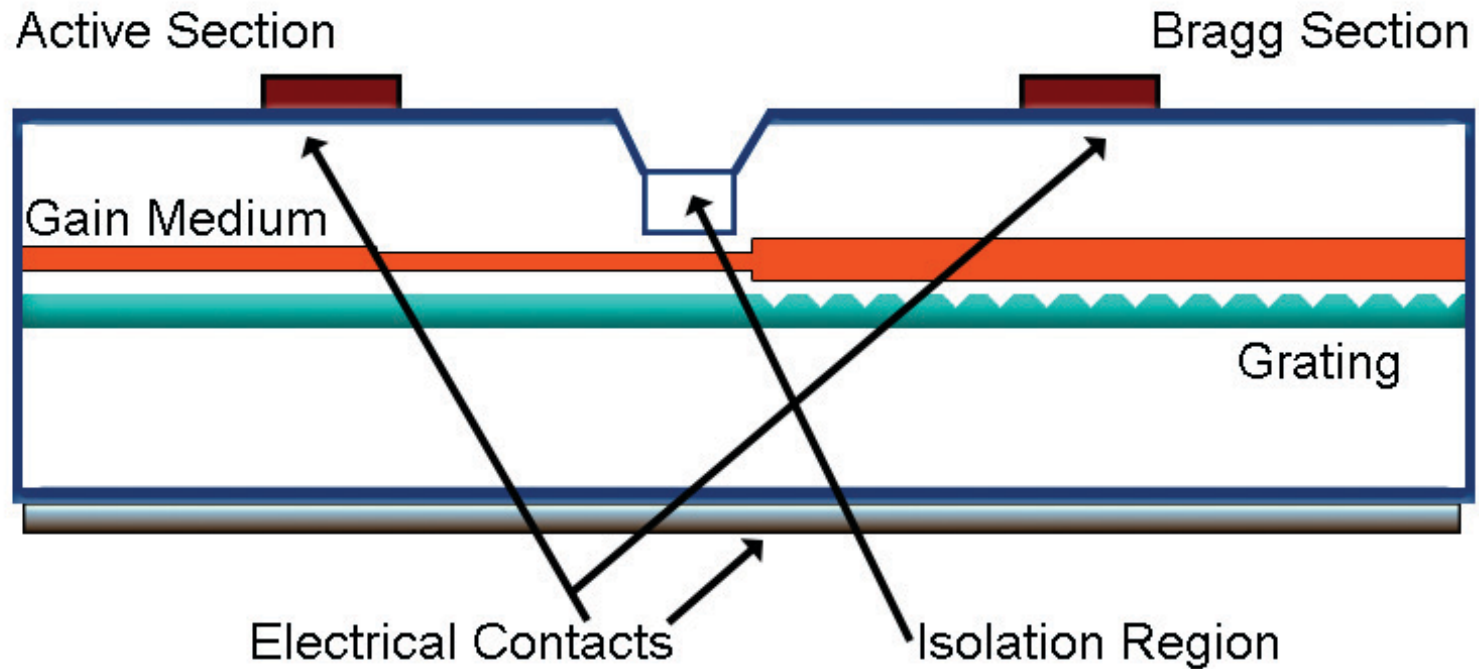


Figure 1-2 *Illustration of distributed Bragg reflector semiconductor laser. The active section and the grating sections serving as mirrors are integrated in the same structure.*

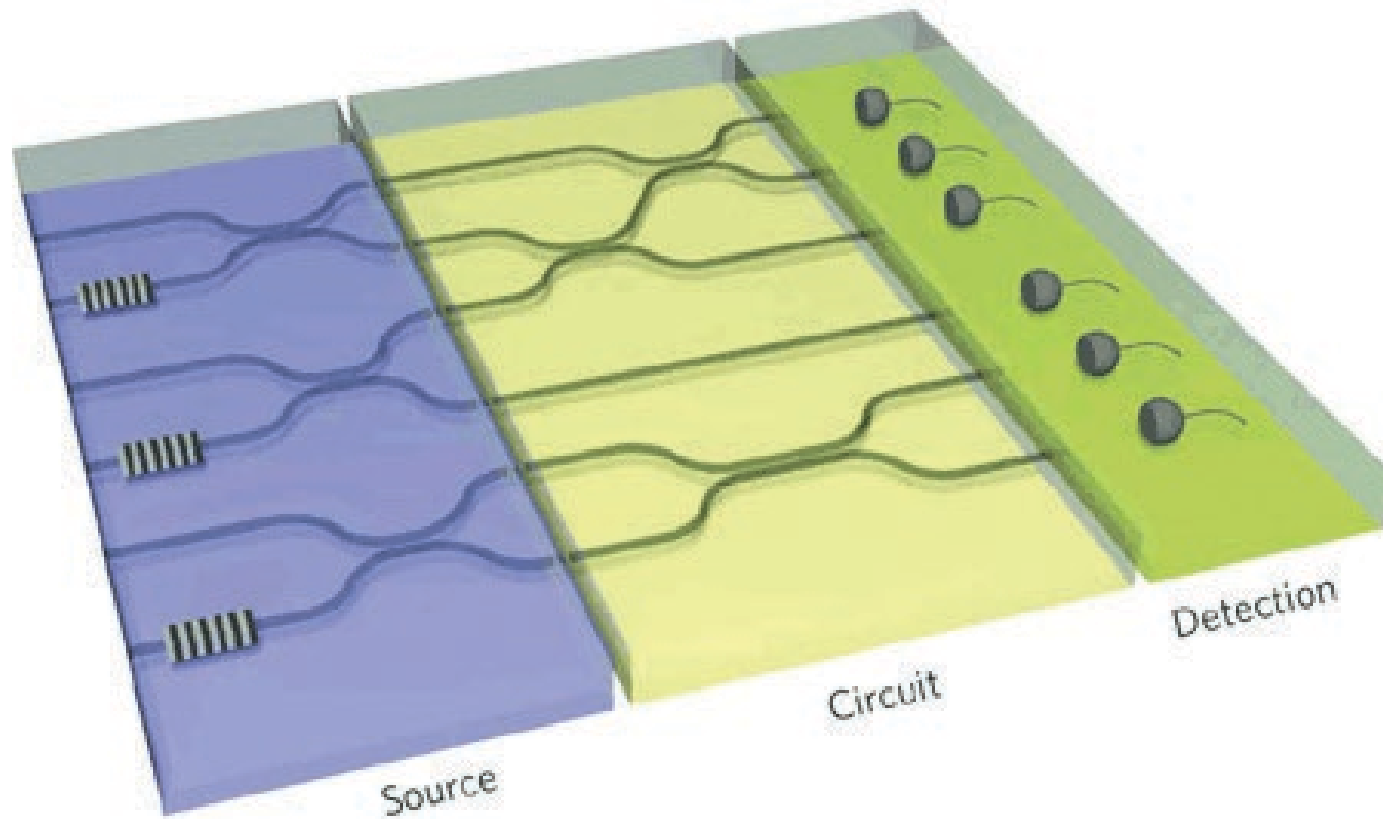


Figure 1-3 *PIC integrating optical sources, a routing circuit, and photodetectors*

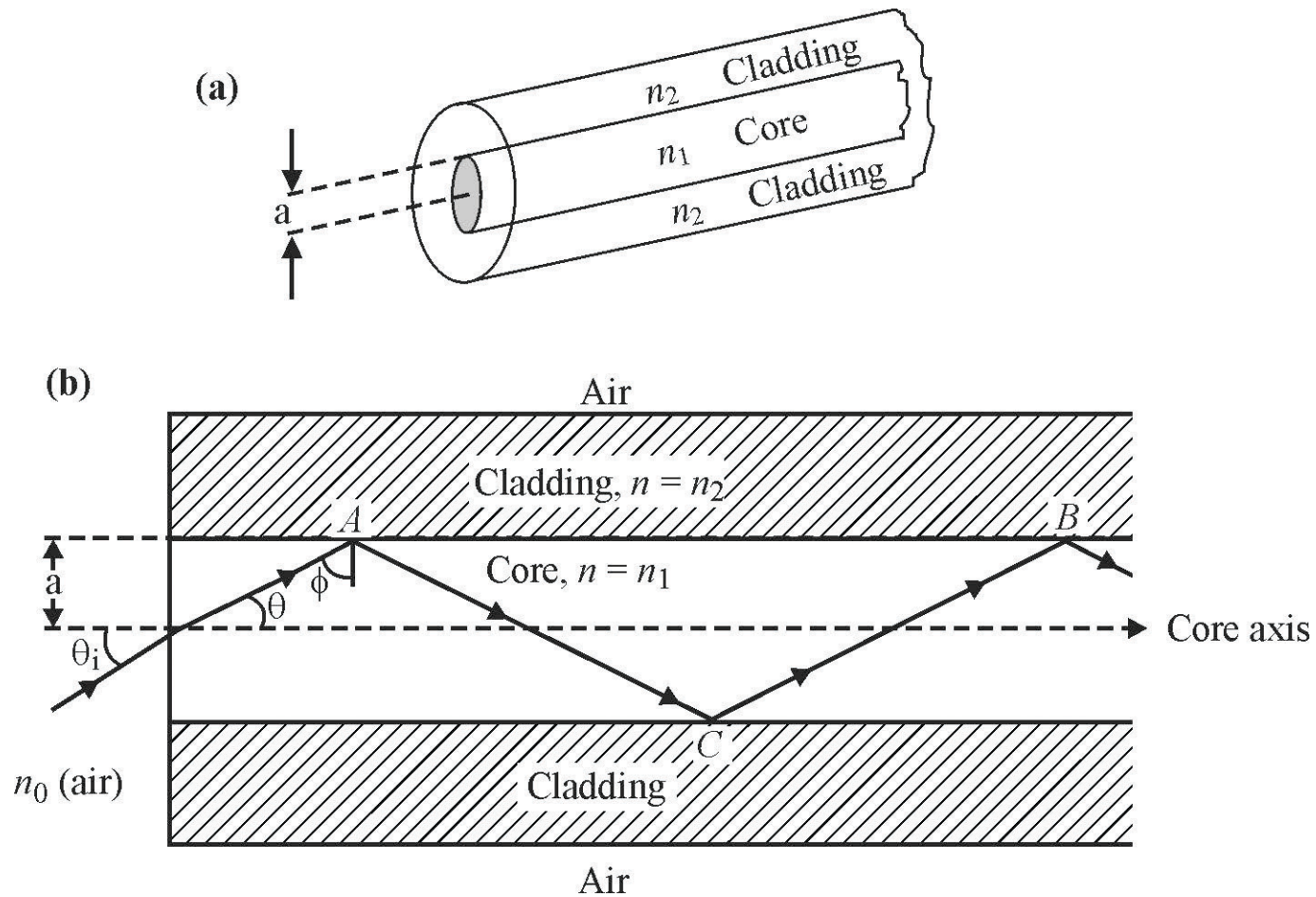


Figure 1-4 *Fiber Geometry*+

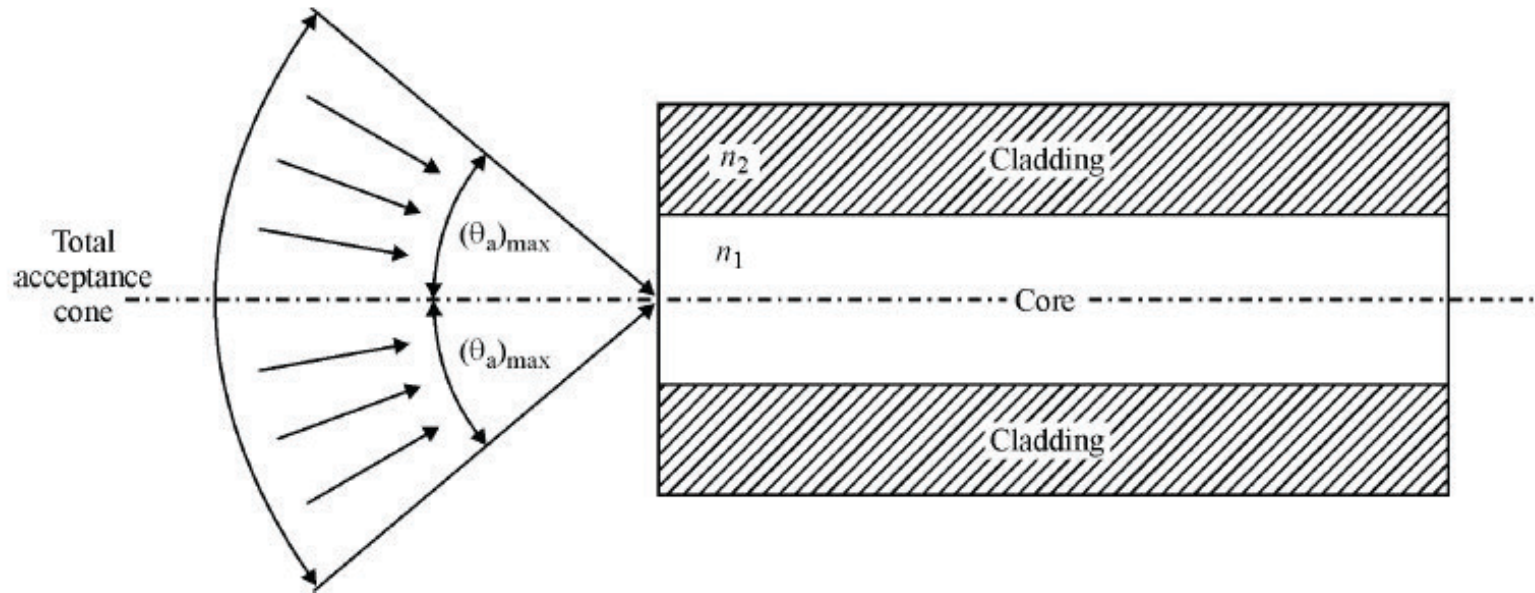


Figure 1-5 *Numerical aperture*

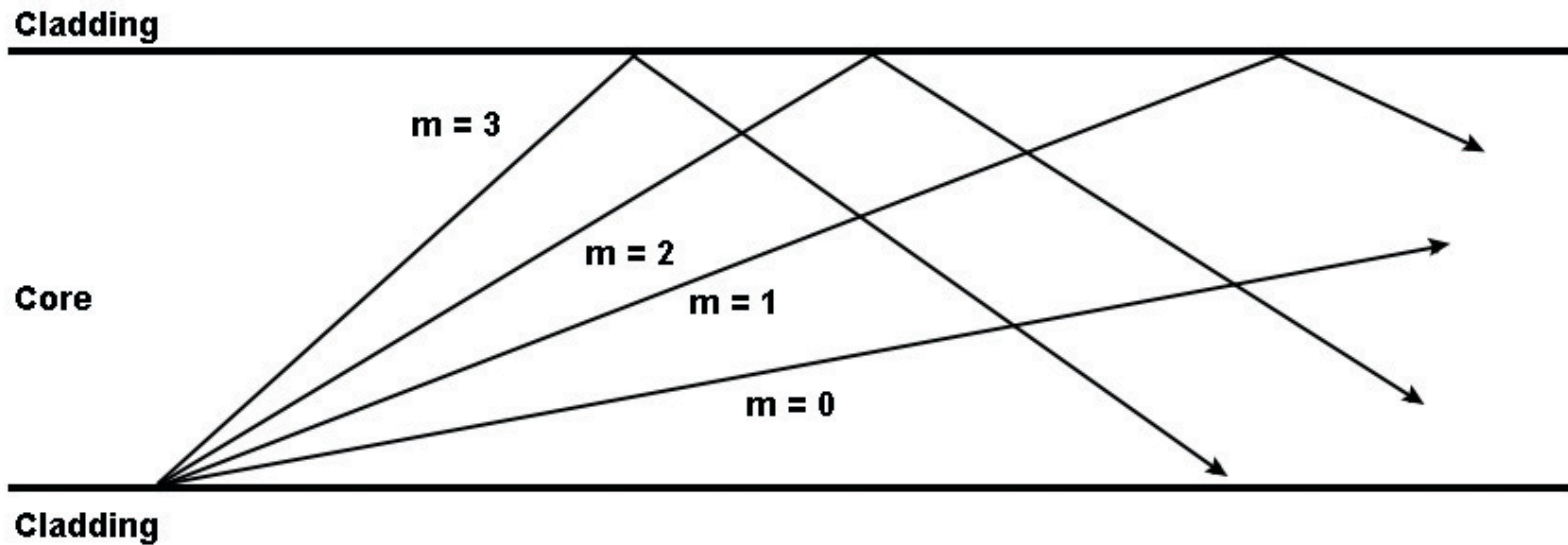


Figure 1-6 *Illustration of the light direction of propagation for fundamental and higher-order modes of a waveguide*

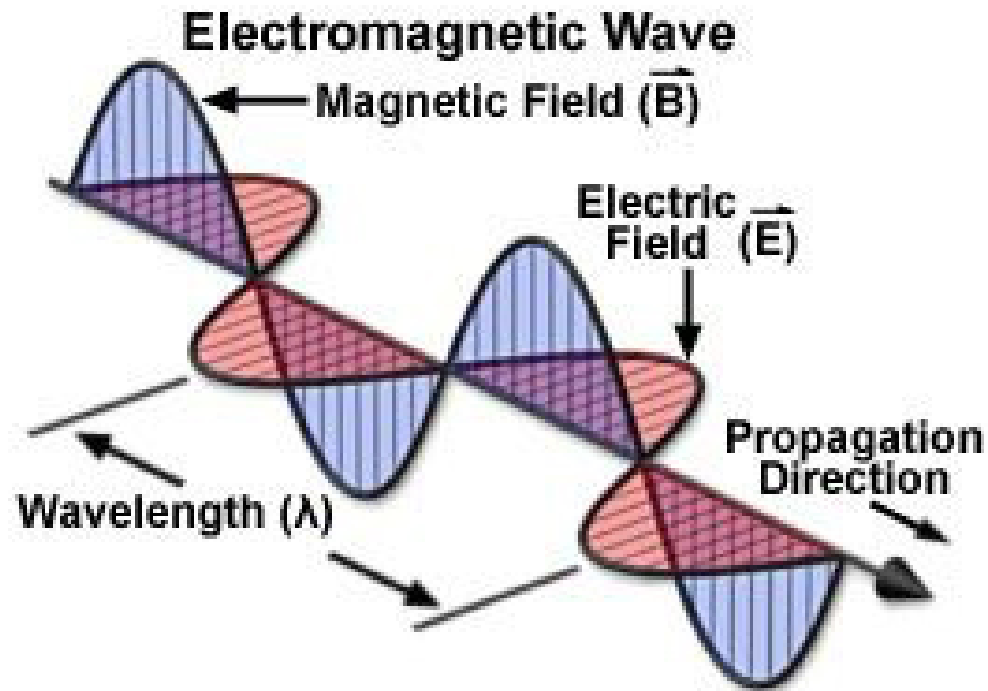


Figure 1-7 *A transverse electromagnetic wave*

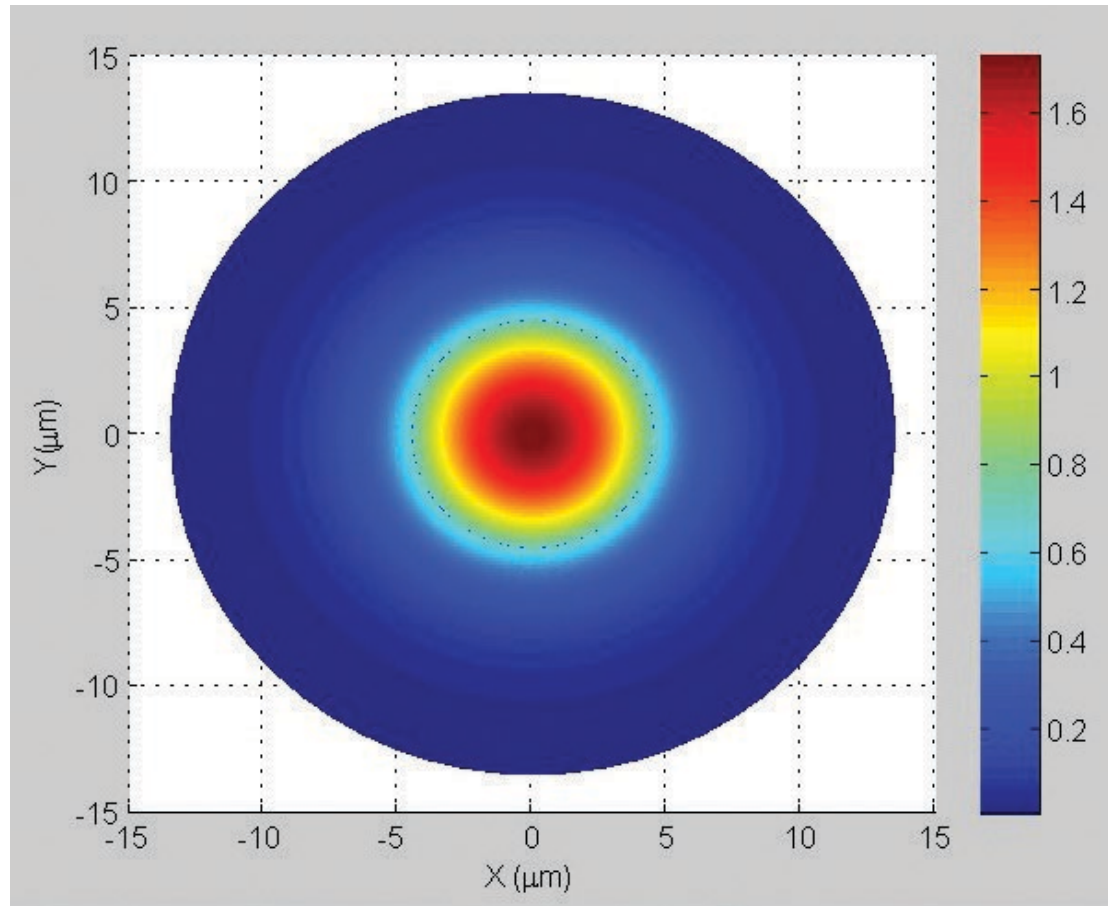


Figure 1-8 a) *Intensity of the electromagnetic field in the waveguide cross section of a single-mode optical fiber for the fundamental mode*

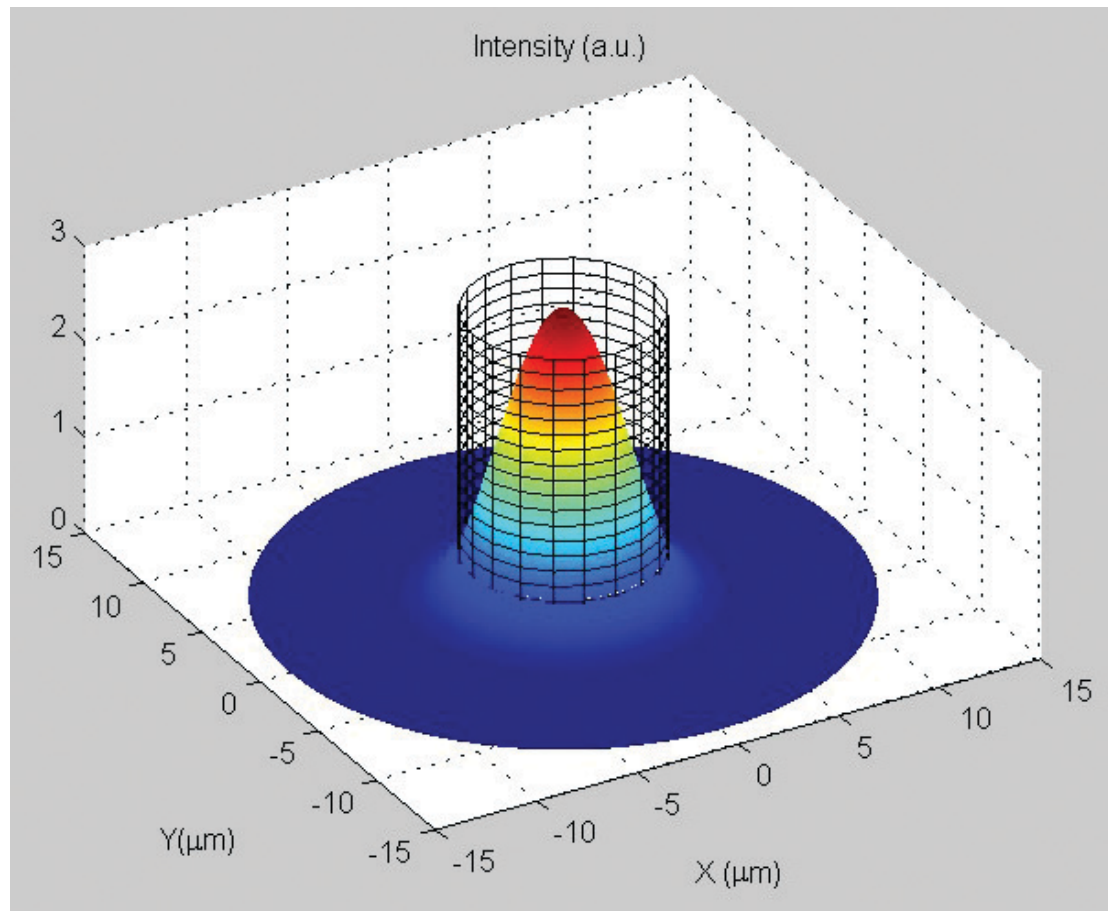


Figure 1-8 b) *Three-dimensional representation of the intensity of the fundamental mode*

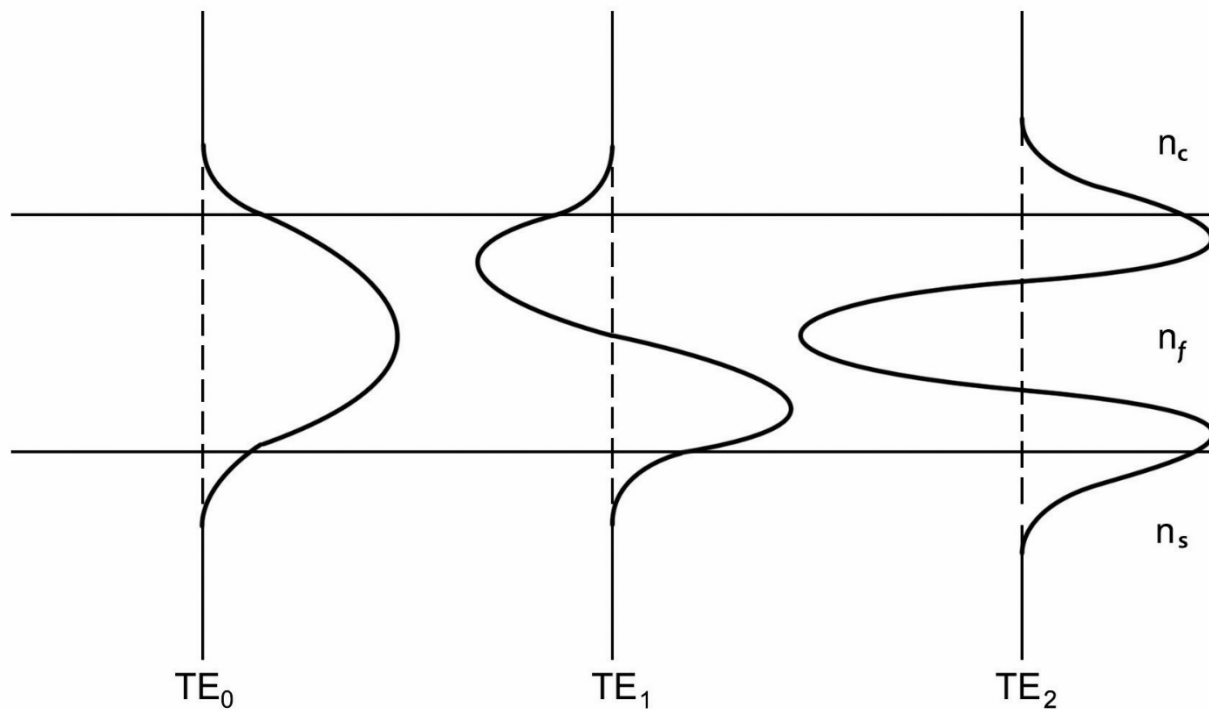


Figure 1-9 *Intensity distribution for fundamental mode and two higher-order modes along a line passing through the center of the waveguide*

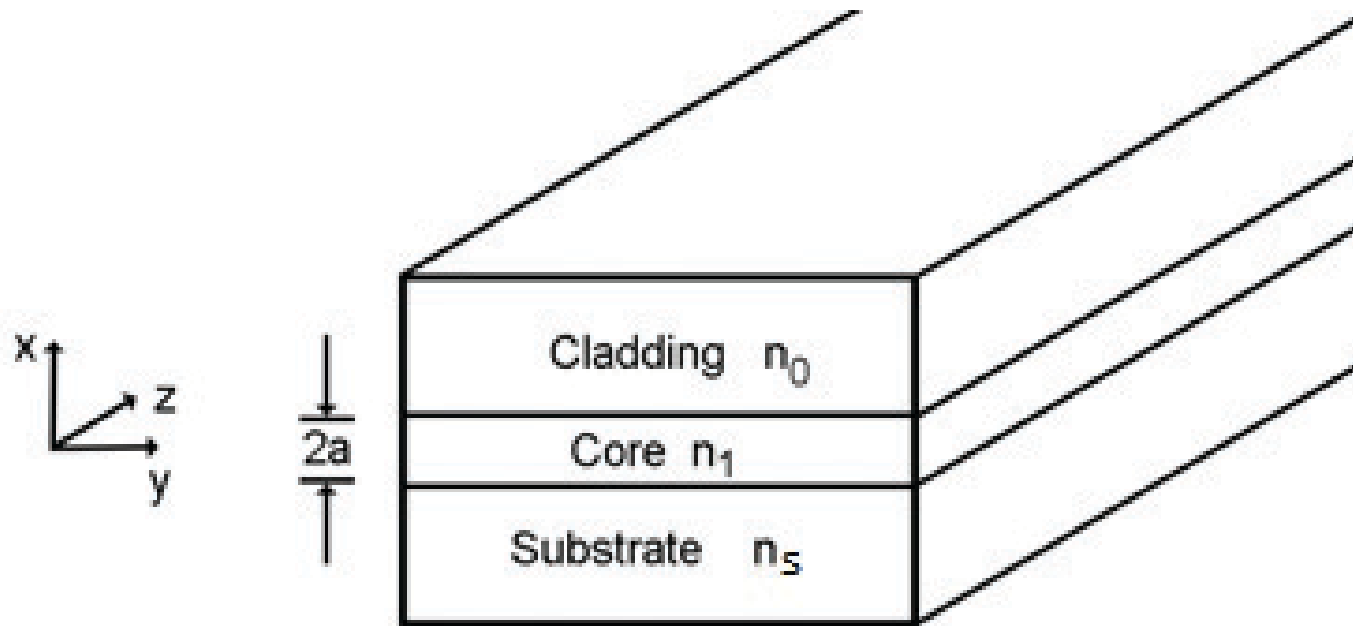


Figure 1-10 *Planar optical waveguide*

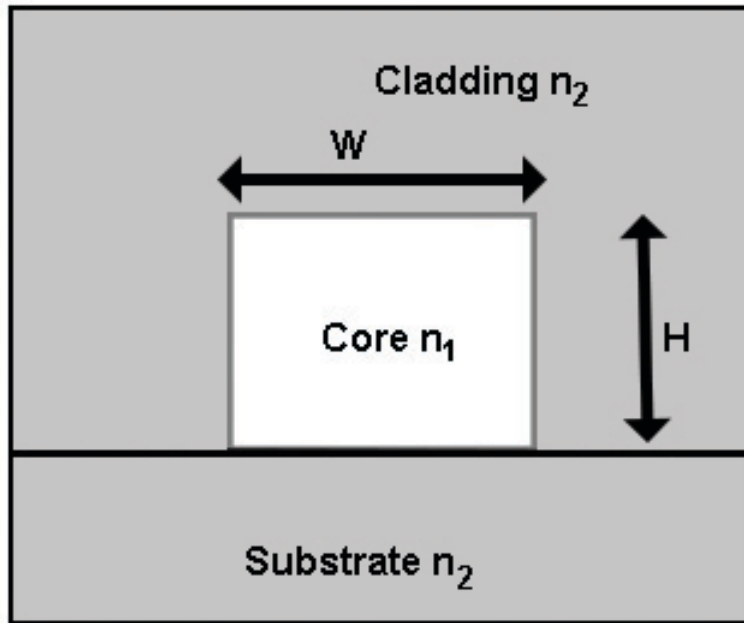


Figure 1-11 a) *Channel waveguide*

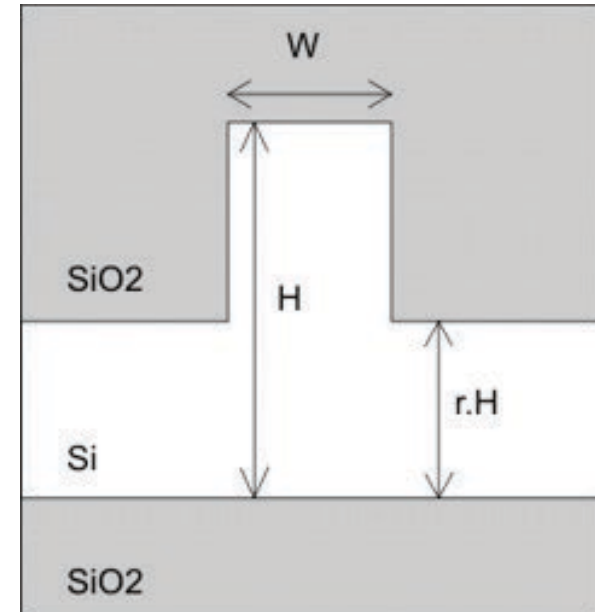


Figure 1-11 b) *Ridge waveguide*

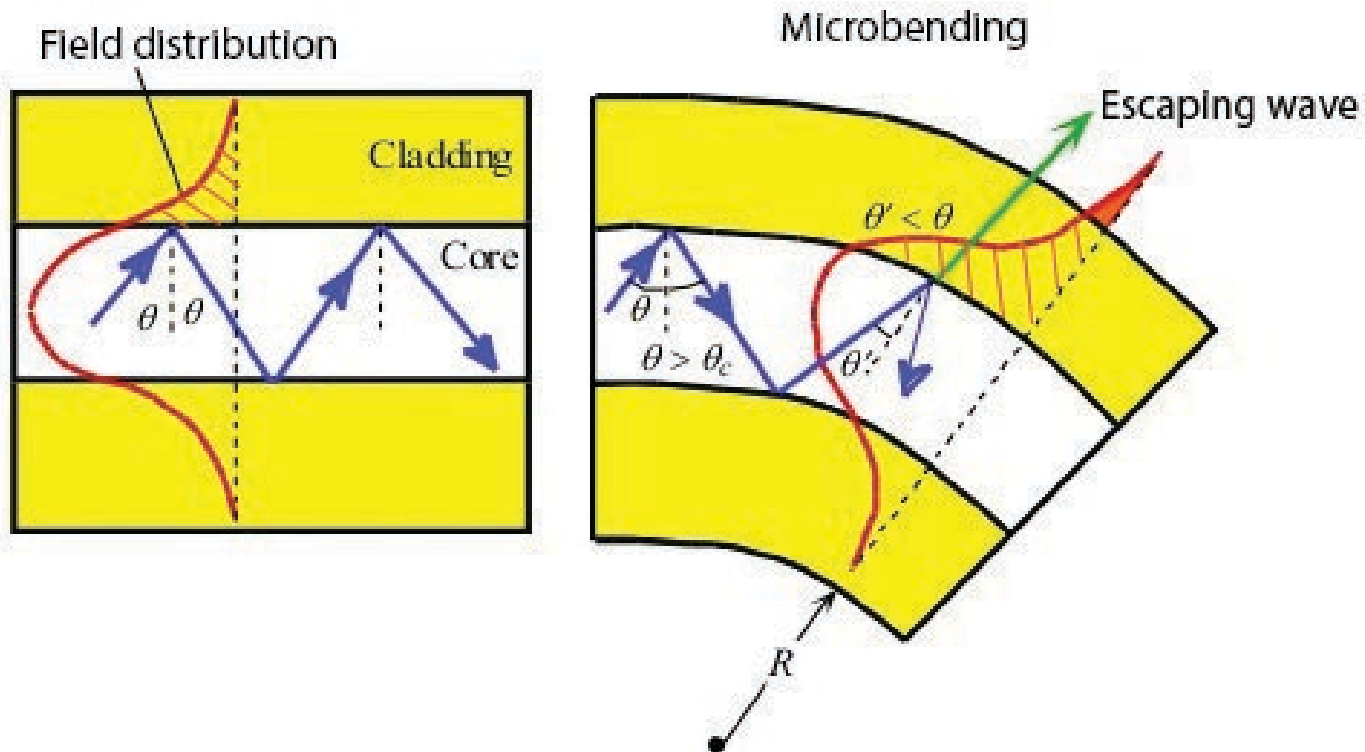


Figure 1-12 *Light-intensity distribution for straight and bend waveguides. A small amount of light is lost in the bend waveguide due to the violation of the total internal reflection condition.*

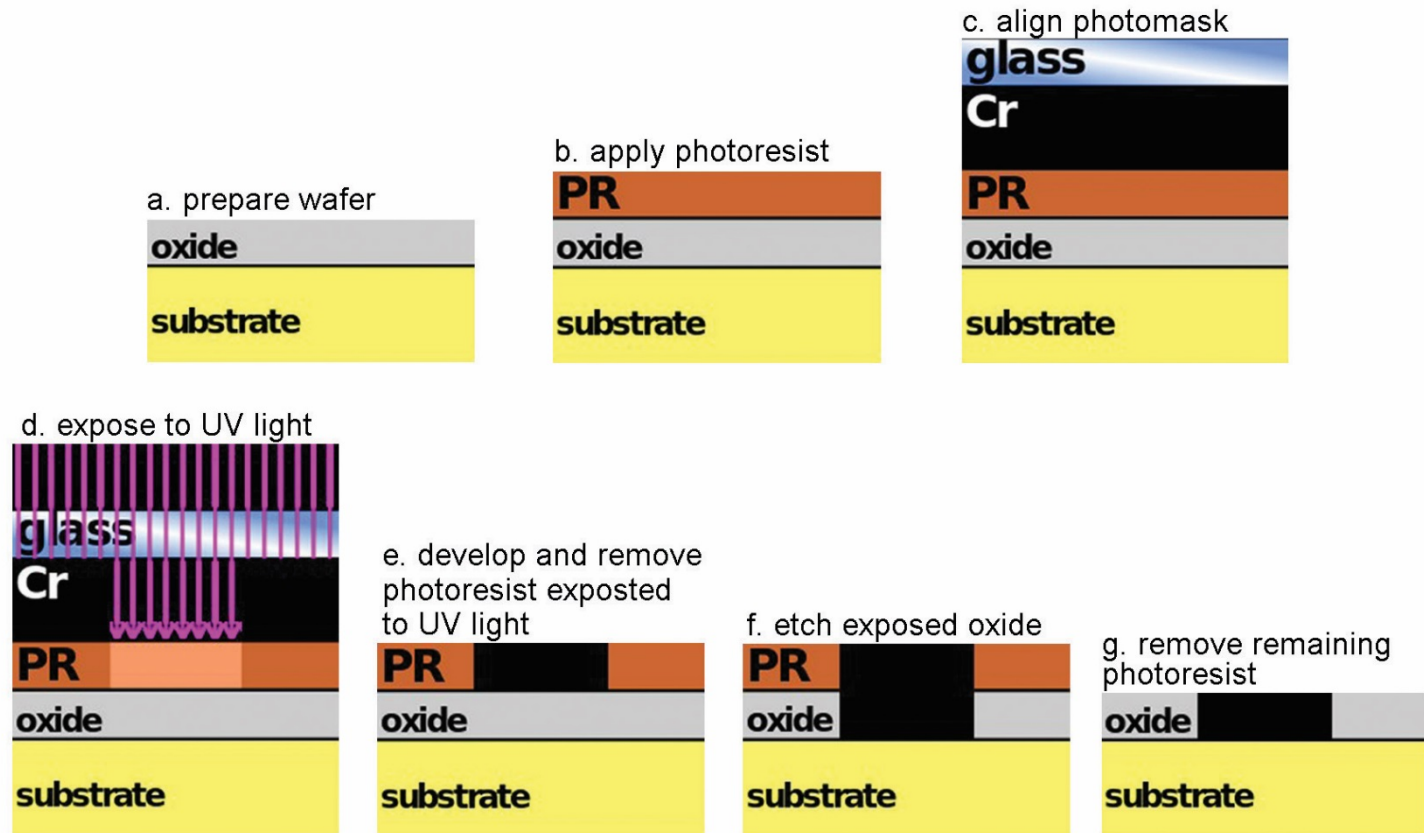


Figure 1-13 *Photolithography and etching*

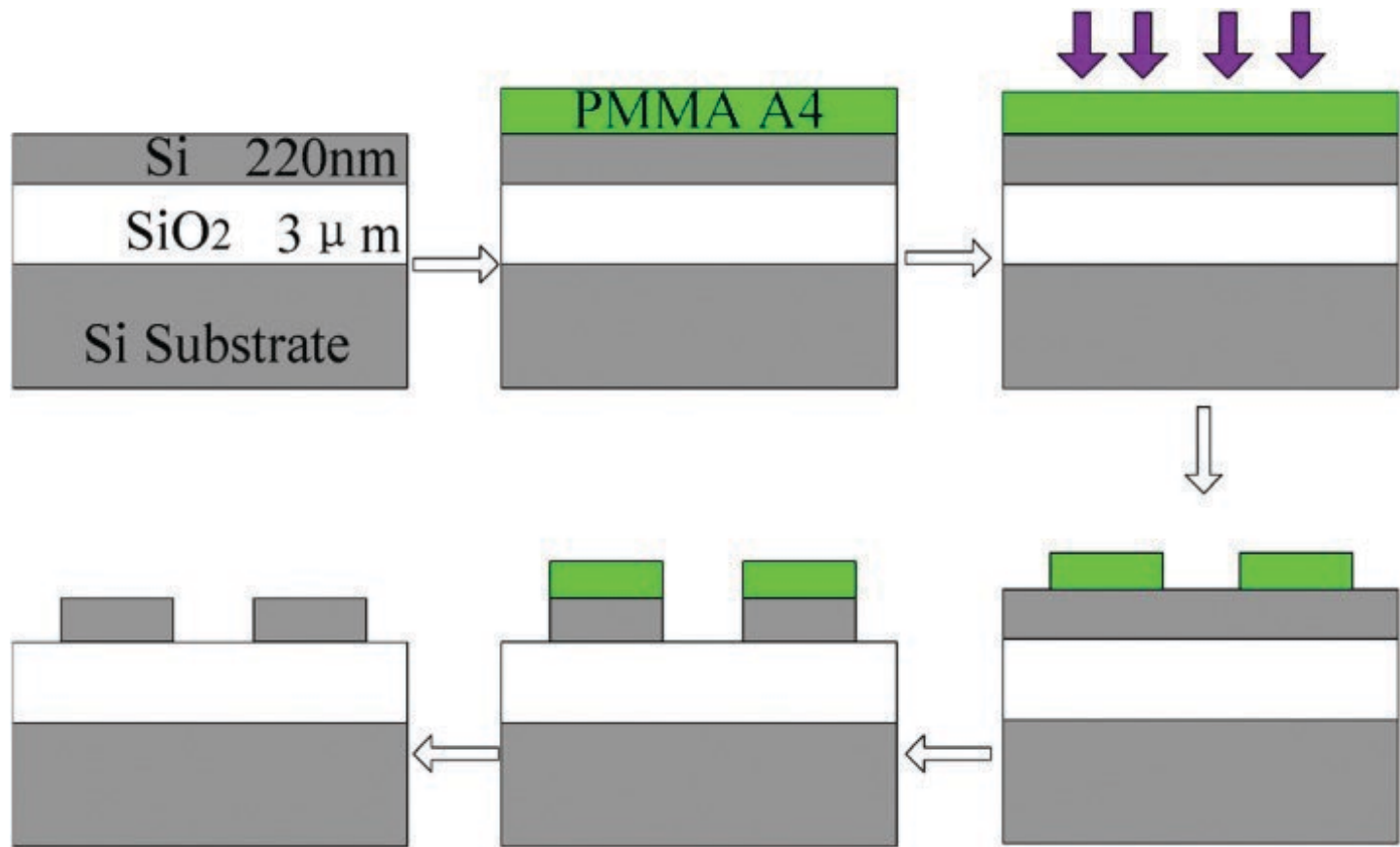


Figure 1-14 *Photolithography and etching of silicon waveguides with silica lower cladding*

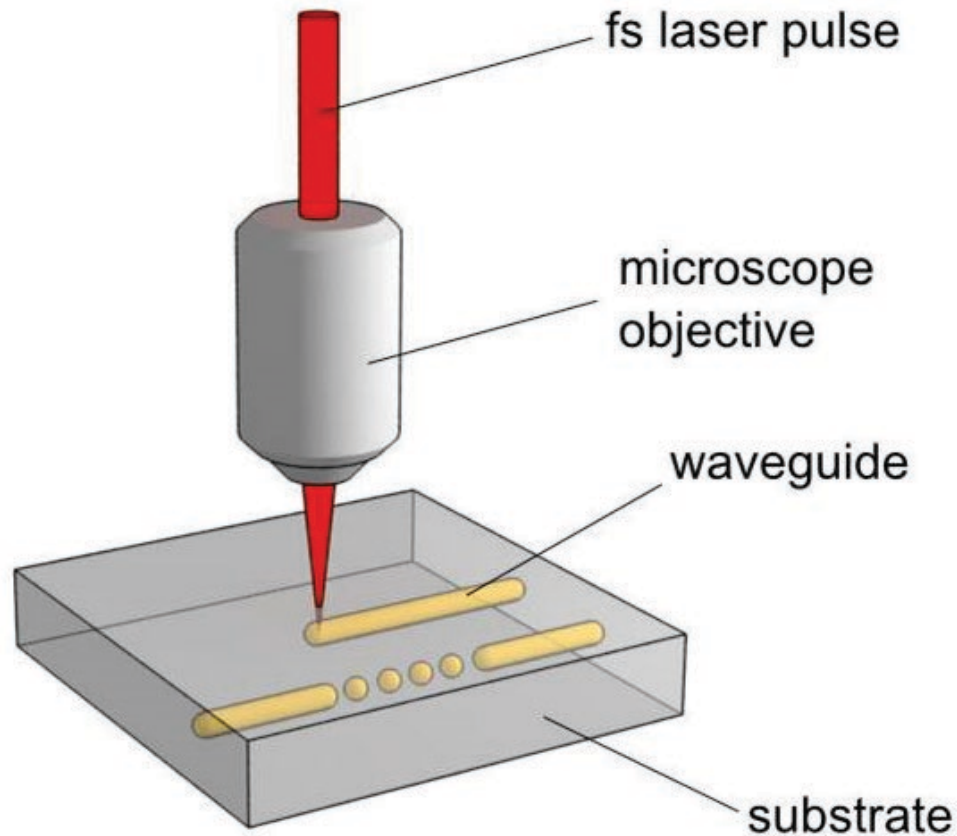


Figure 1-15 *Direct laser writing of waveguides inside a substrate using a femtosecond (fs) laser*

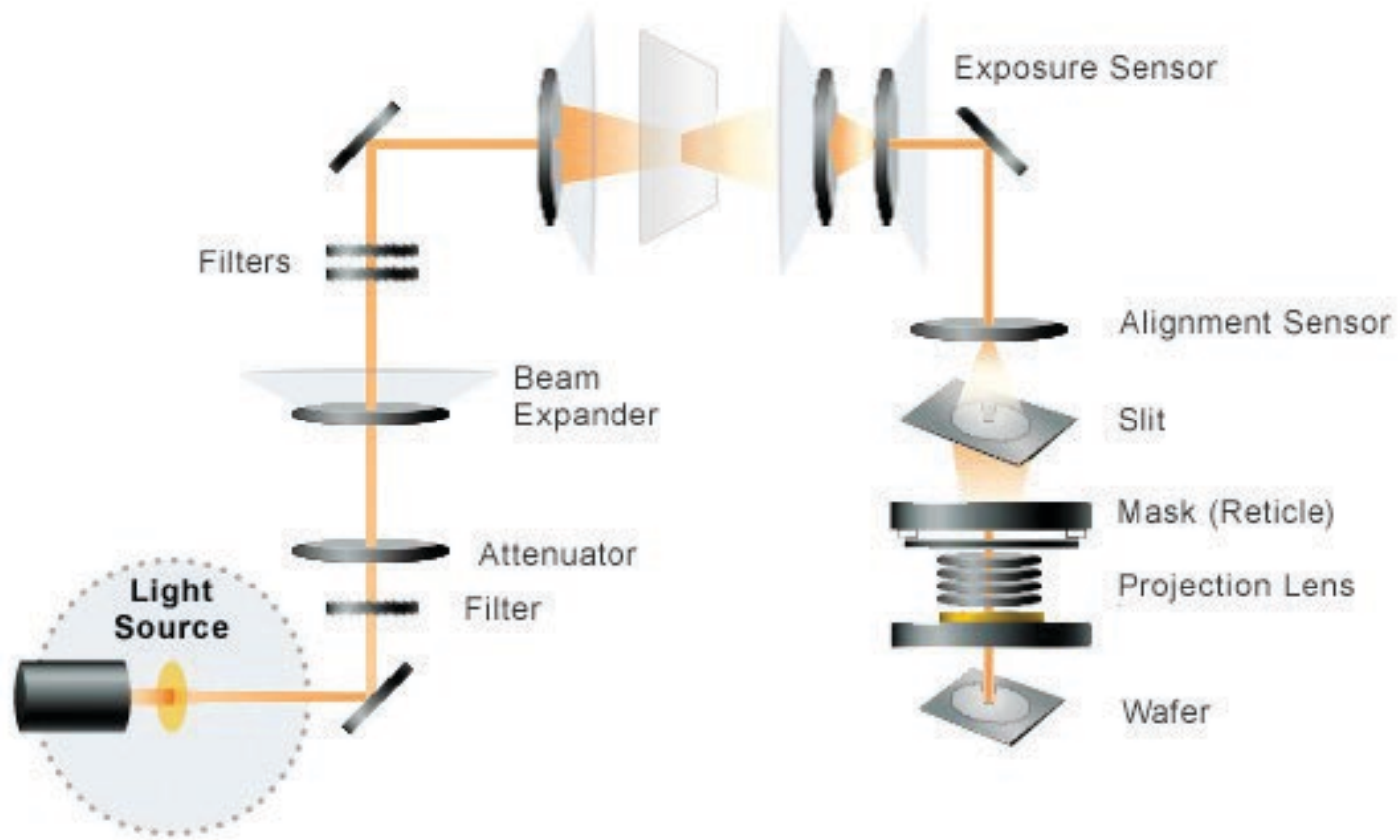


Figure 1-16 *Reduction scanning photolithography system*



Figure 1-17 *Commercial RIE equipment used for dry etching*