Evanescent-wave-coupled optical light beam deflector with symmetrical structure

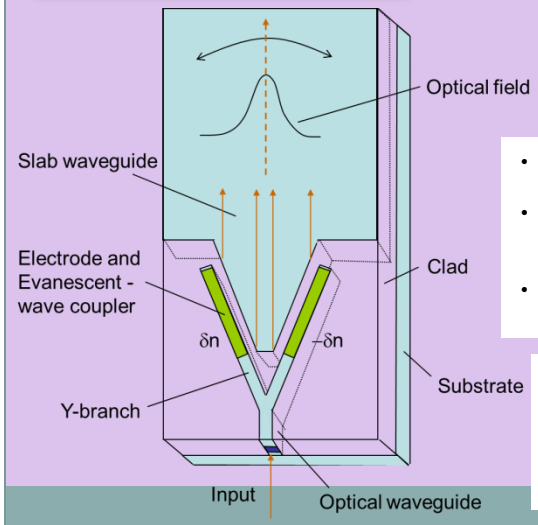
Hideaki Okayama

Oki Electric Industry Co., Ltd.

Introduction

Aim: simple waveguide type beam deflector
Application: switching, printer, measurement

Device Structure

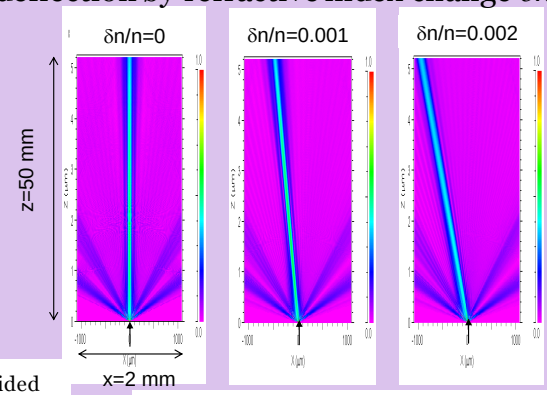


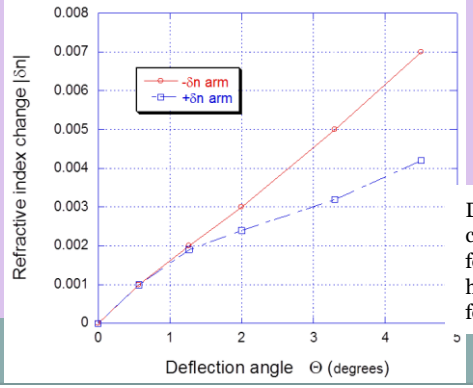
- Input light is divided by Y-branch
- Light is coupled to slab waveguide through gap.
- Light beam is formed in the slab waveguide.

Light beam is deflected by changing refractive index *n* of the branch.
Refractive indices in left and right branch arms are changed as δn and −δn respectively.

Simulation Results

Simulation by 2D-BPM showing light beam deflection by refractive index change *δn*





Different refractive index change s *δn* were required for two branch arm s at high deflection angle to form single light beam

- 1.55um wide waveguide (Δ=1%)
- 1.2um gap
- 10° branch angle
- 3mm long branch
- 1.55um wavelength
- Refractive index n=2

Conclusion

■Symmetric light beam deflector based on Y-branch evanescent wave coupled to slab waveguide is described

■3^{0} deflection with $3\sim5\times10^{-3}$ refractive index change:

Deflection-Angle Θ(rad)~(δn/n)/sin(γ/2)
γ:branch angle

Beam-Width (angle: rad) ~λ/[Lsin(γ/2)]
λ: wavelength, L: branch-length

Reference
H. Okayama, Optical Review (2010) vol. 17, p.375