Adiabatic Coupler

Last Updated: August 2019

Description

50/50% 2×2 broadband adiabatic 3-dB couplers/splitters. Two 3-dB couplers can be used to make an unbalanced Mach-Zehnder Interferometer (MZI), showing a large extinction ratio. The advantage of this device compared to the Y-Branch is that it has 2x2 ports, thus the MZI has two outputs. Compared to the directional coupler, it is less wavelength sensitive.

Model name

Ebeam_adiabatic_te1550 & ebeam_adiabatic_tm1550

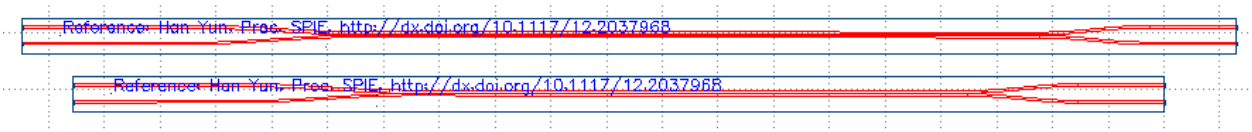

Fig. 1: Compact Model of Adiabatic Coupler (Above: TE Polarization, Below: TM Polarization)

Compact Model Information

- Support for TE and TM polarization using their respective models
- Operating at 1550 nm wavelength
- Performance:
  - TE – TBD
  - TM - TBD
- For use with strip waveguides only
- Splitting ratio was extracted from the unbalanced MZI spectra.
- Excess loss negligible

Parameters

N/A

Simulation Results

From [Source]:

[Insert Simulation Results]

Fig. 3: Simulation Results for Adiabatic Couplers

http://github.com/lukasc-ubc/SiEPIC_EBeam_PDK/

Experimental Results

From [Source]:

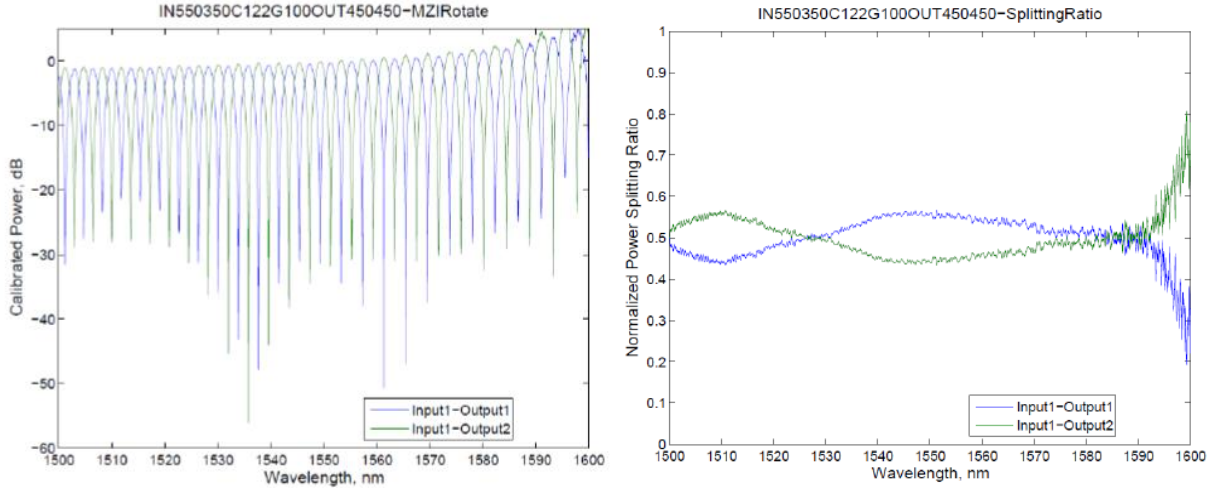

Fig. 4: Experimental Results for Adiabatic Couplers

Additional Details

- Design tools & methodology:
  - 3D-FDTD (Lumerical FDTD Solutions)
  - Eigenmode expansion propagator (MODE Solutions)

Reference

1. Han Yun, et al., "2×2 Adiabatic 3-dB Coupler on Silicon-on-Insulator Rib Waveguides", Proc. SPIE, Photonics North 2013, vol. 8915, pp. 89150V, 06/2013 http://dx.doi.org/10.1117/12.2037968