Design Report: Chip #1

Owen Lin
83322412

Abstract

The goal of the project is to design an interferometer with 2 outputs, achieving 25 GHz spacing at 1310 nm. Ensuring minimal loss with design parameters and effective indexes. This report will present the background, modeling and simulation for the fabrication of the interferometer, noted by the course we will do so for a Mach-Zehnder Interferometer (MZI). Modeling is done using Ansys Lumerical MODE and INTERCONNECT, while the layout is designed with KLayout.

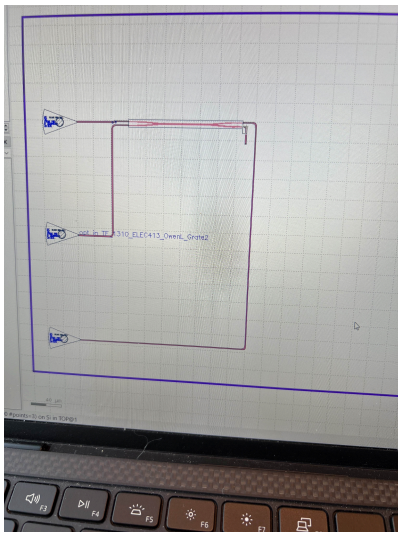
Introduction

A quick description of integrated photonics, the MZI is a fundamental photonic device enabling phase-based optical processing. Below the design and configurations for the MZI will be examined. Some components included in this design are listed below, they are found under the SiEPIC-EBeam-PDK library on KLayout:

- GC_TE_1310_8degOxide_BB
- Waveguide (350nm x 220nm @ 1310 nm)
- Ebeam_splitter_swg_assit_te1310

Model and Simulation

The MZI design consists of the splitter, known as a Y-branch, the light entering the device is split into the two paths and interference will occur at the output where one side is terminated by the TE terminator. There are 3 grating couplers, set up as 1 input to 2 outputs, these will allow for optical signals to be coupled into the photonic circuit. The middle grating coupler is the input with 2 outputs placed on the top and bottom respectively.



The transmissions can be simulated to view the pattern ensuring consistency in design specifications and spacing.