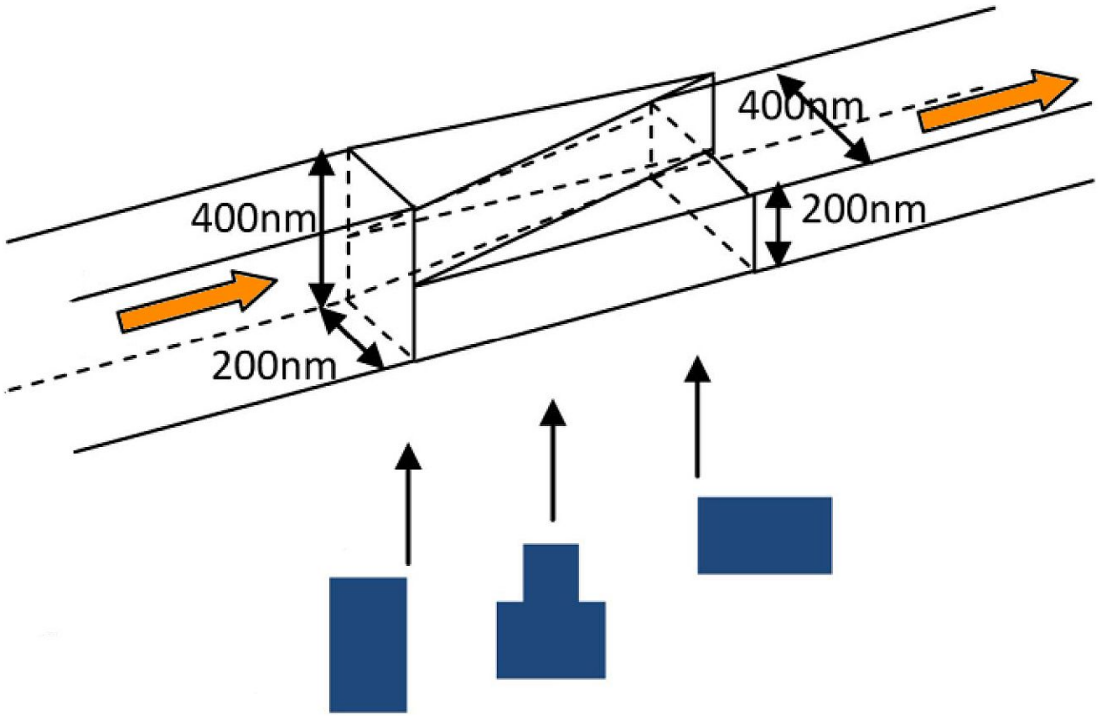
Silicon waveguide based TE mode converter



MW & RF & Optical, Optical Applications, Dielectric Structures, Optical Waveguide, Couplers & Fibers, Time Domain

Units: nm, THz
Wavelength min: 1450 nm
Wavelength max: 1650 nm
Monitors: E-Field, H-Field, PowerFlow
1450 nm,1550 nm &1650 nm

Paper: Silicon waveguide based TE mode converter

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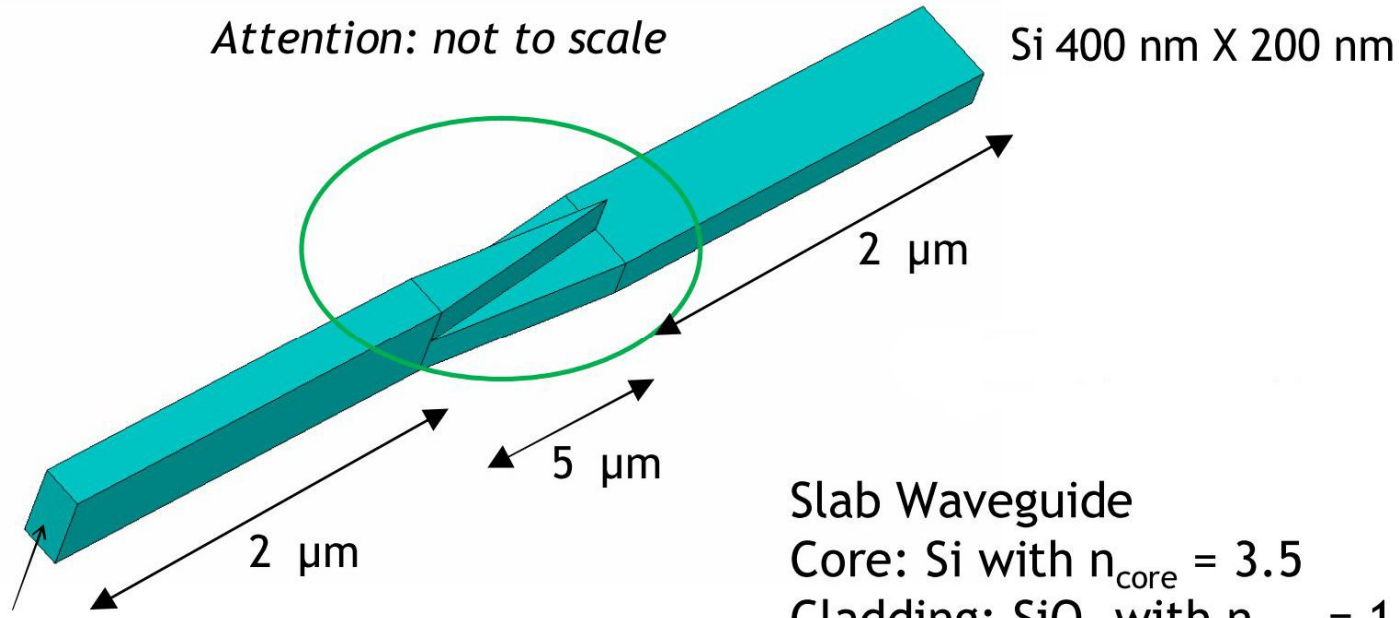
From Paper: “A silicon waveguide based TE mode converter was designed for the mode conversion between a horizontal waveguide and vertical waveguide in the two-layer structure waveguide based polarization diversity circuit.[…]”
Since dielectric fiber devices are usually electrical large, the Time Domain solver will be used.

Geometry Details



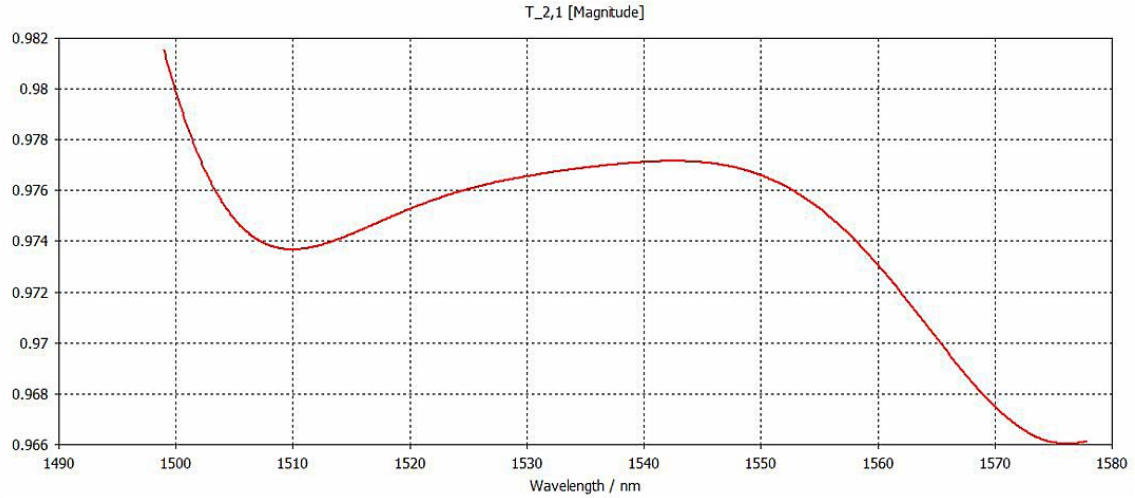
Slab Waveguide
Core: Si with $n_{core} = 3.5$
Cladding: SiO_2 with $n_{clad} = 1.45$

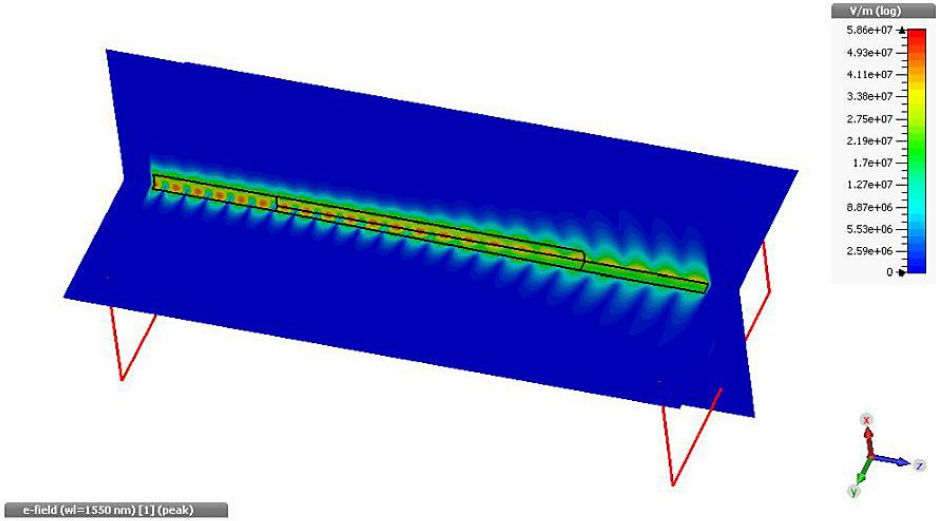
Define new materials Si and SiO_2 with an
Epsilon of 3.5^2 and 1.45^2 respectively.

Define Background Material (cladding) and assign SiO_2 properties to it over 500nm distance.

Use the „Generalized Port Mode Solver” with “Broadband for inhomogeneous ports” and run full simulation in the TD Solver.

Simulation





In the first part you have to simulate with CST Microwave Studio the e-field of the waveguide, the wavelength dependence, energy losses…

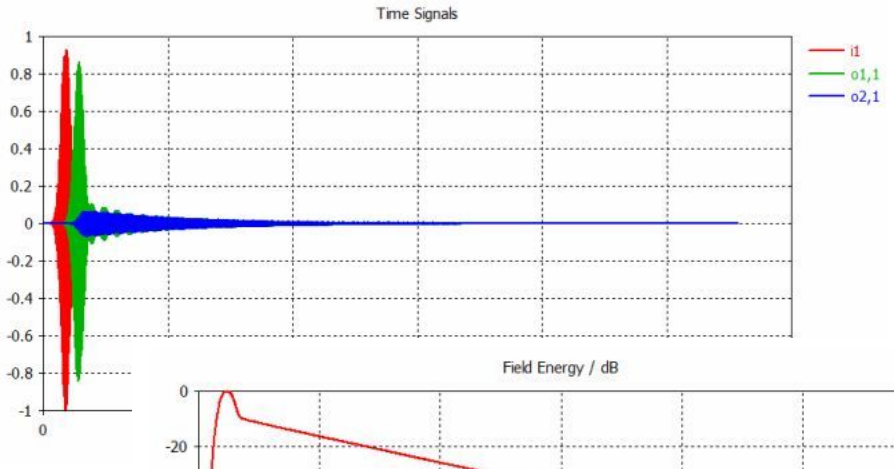
In the second part of your work you have to study the behavior of the variations:

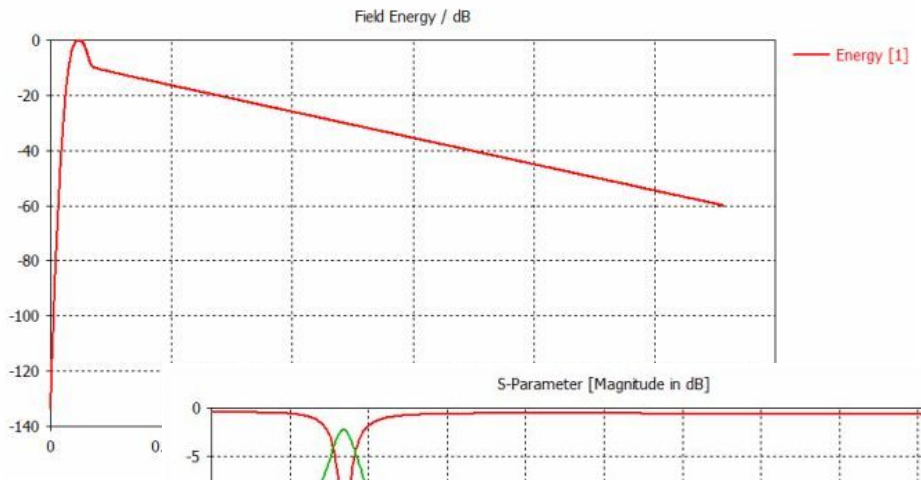
- length of the converter (middle part) in this respect for the best conversation rate

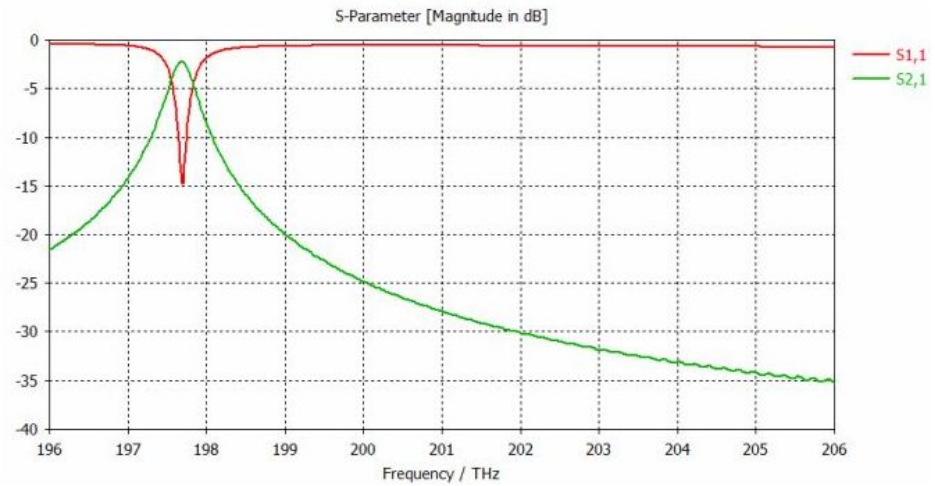
- length of the converter (middle part) in this respect for the selected wavelength of 650nm, 850nm and 1440nm

- to take an convergence investigation of the grid

Results







At the end of your project you have to present your results in one talk in our group and submit an elaboration/documentation of your work.

You can explain why the “Generalized Port Mode Solver” is the preferred excitation for dispersive waveguide ports.