Optiwave

OptiGrating
Optical Grating Design Software

Fiber Bragg Grating Design

Applications

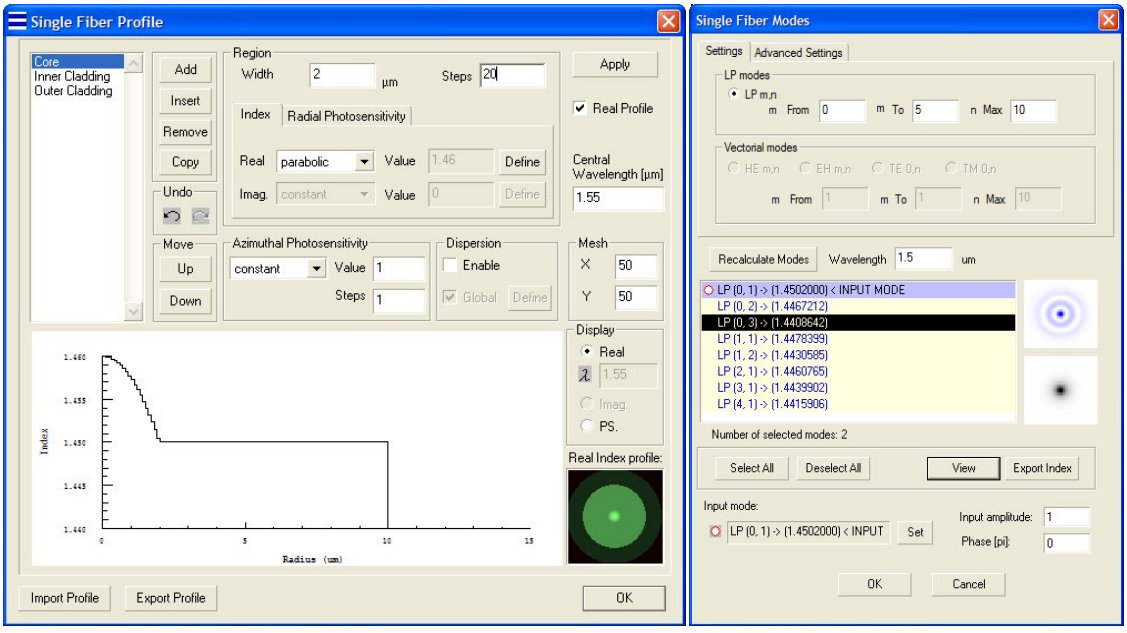
Modelling, simulation, and design of

- Fiber bragg gratings
- Long period fiber gratings
- Waveguide gratings
- Fiber sensors (temperature and strain)
- Grating assisted couplers
- Series of gratings
- Fabry-Perot grating resonators

Overview

OptiGrating is an implementation of the Coupled Mode Theory of optical gratings. This is a powerful tool for the analysis of coupling and reflection among guided modes of optical waveguides and fibers. OptiGrating also has specialized modules for simulating physical conditions such as temperature and strain on the grating.

Fiber Bragg Grating Design

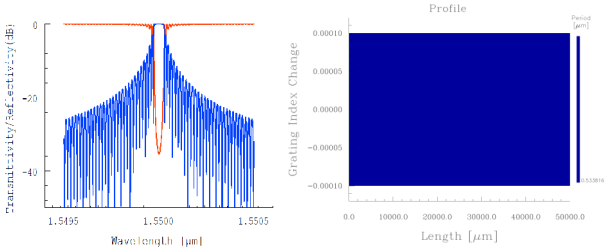


Benefits

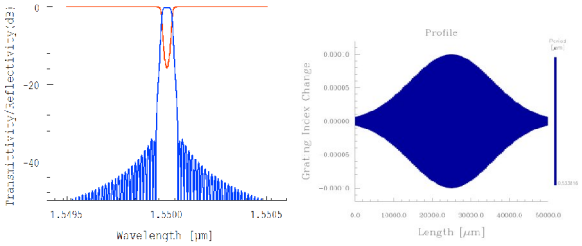
- Significantly reduces product development costs and boosts productivity through a comprehensive design environment to help design, test, and simulate optical components.
- Quickly identify spectra and propagation characteristics of gratings and grating assisted couplers.
- Confirm designs with proof of concept simulations
- Avoid design errors

Simulation Description

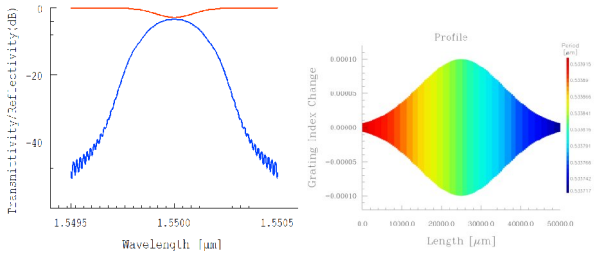
Here we can see the reflection spectrum (blue) and transmission spectrum (red) for a uniform grating.



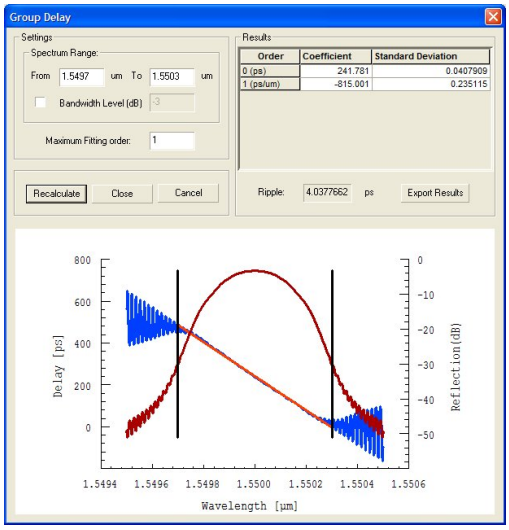
The level of the sidebands can be reduced by apodizing the grating. The grating modulation is increased gradually as the propagation progresses down the fiber grating.



The transmission spectrum can be broadened by chirping the grating.

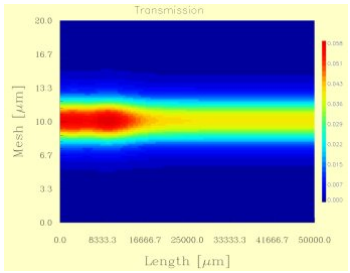


The grating has a slightly longer period at the beginning, indicated by the red colour. The period gets shorter over the length of the grating. The delay of the reflection spectrum is changed by the chirping, there is longer delay for shorter wavelengths of about 400 picoseconds.

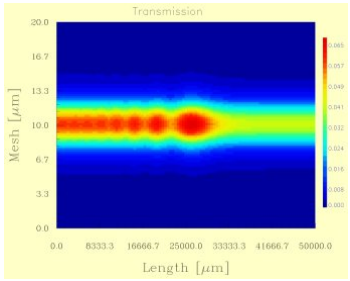


The velocity of light on the optical fiber is the vacuum light speed divided by the modal index of the fiber, or about 200 microns per picosecond. Therefore in 400 picoseconds the light will move 80,000 μm, or 8 cm. The length of the grating is 5 cm, which suggests the blue light is delayed because the reflection for blue does not take place until near the end of the grating, whereas red is reflected immediately.

OptiGrating can simulate propagation of light at any wavelength. At a longer wavelength, 1.5501 μm, the light does not penetrate far into the grating



But at the shorter wavelength of 1.5499 μm, it goes deeper into the grating



Which is the reason for the longer delay in reflection.