

RSoft Application: Optical Notch Filter Photonic Integrated Circuit (PIC)

Free-Space Cascaded Reflective Bragg Gratings Ultra Narrowband Filter

Overview

A researcher at a major U.S.-based defense company was looking to design an ultra narrowband filter for detecting very narrow spectral lines in light detection and ranging (LiDAR) applications.

The Challenge

Existing phase-shifted fiber Bragg gratings are mostly limited to all-fiber applications. A free-space configuration is preferred for LiDAR applications. Modeling requires device-level simulation accuracy and system-level simulation efficiency.

The Solution

RSoft™ OptSim™ Circuit provides an intuitive, efficient PIC modeling platform with bidirectional interplay of electrical, optical and thermal effects. RSoft GratingMOD™ is used to design and obtain the grating transfer function to be used in OptSim Circuit for modeling the free-space configuration (Figure 1).

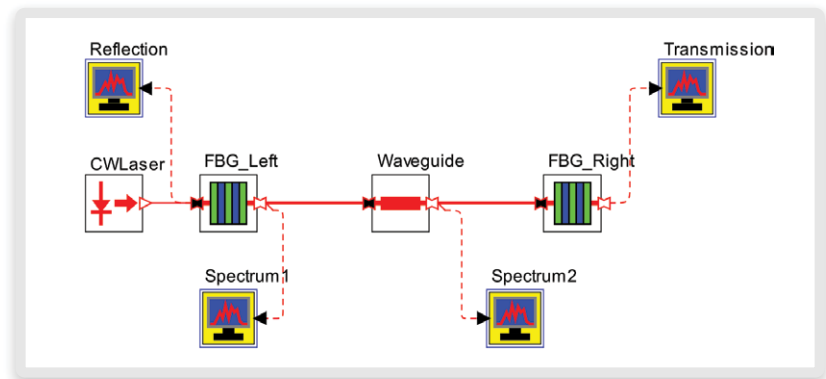


Figure 1. Free-space configuration modeled in OptSim Circuit

The Result

OptSim Circuit accurately models coherent interferometric effects from two reflective volume Bragg gratings. The filter selects 1007.55nm with an extremely narrow (7GHz or 25pm) bandwidth (Figure 2). The simulation is computationally efficient yet captures device-level behavior accurately.

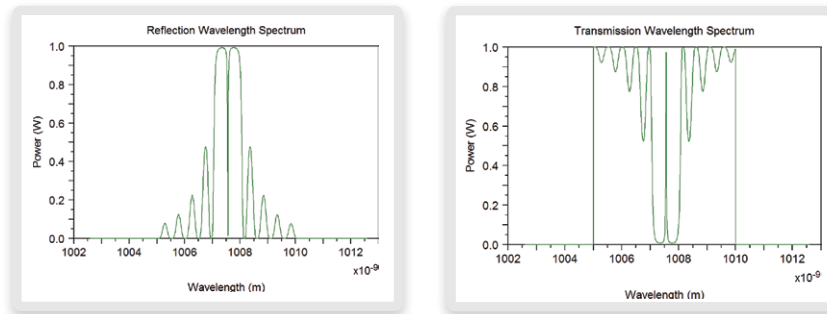


Figure 2. Reflection (left) and transmission (right) spectra for the notch filter PIC in Figure 1

For more information, please contact Synopsys' Optical Solutions Group at (626) 795-9101, visit <http://optics.synopsys.com/rsoft/>, or send an e-mail to rsoft_sales@synopsys.com.