SYNOPSYS®

DATASHEET

RSoft Photonic Device Tools

Features at a Glance

- Rapid virtual prototyping of passive and active photonic and optoelectronic devices
- Discovery of new products with "what if" product scenarios
- Common CAD interface for all tools
- Automatic scanning and parameter optimization
- Scripting in any programming language

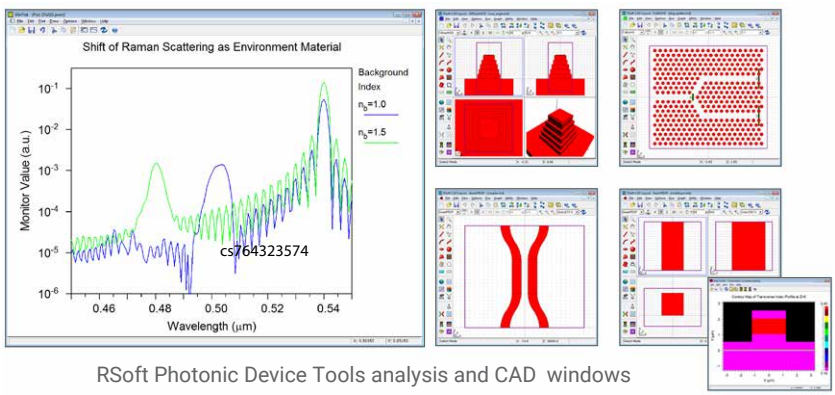
Overview

The RSoft Photonic Device Tools provide the industry's widest portfolio of simulators and optimizers for passive and active photonic and optoelectronic devices, including lasers and VCSELs. We are integrated with Synopsys optical and semiconductor design tools for streamlined, multi-domain co-simulations:

- Synopsys CODE V and LightTools products for rigorous modeling of nano-textured optical structures and diffraction analysis
- Synopsys Sentaurus TCAD products for simulations of complex optoelectronic devices.

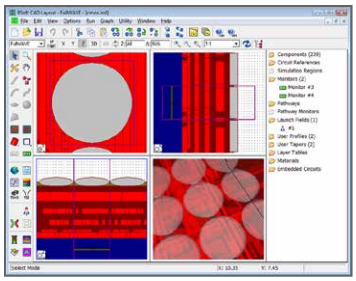
Key Features

- Highly accurate algorithms support rapid virtual prototyping, reduce the need for costly physical prototyping, and speed time to market.
- Assist in the discovery of new products by creating "what if" product scenarios.
- Each algorithm engine shares a common CAD interface; the software can utilize multiple RSoft packages without having to import designs from one software to the next.
- Each simulation engine is licensed separately, giving you the flexibility to select the tools relevant to your work.
- Support automated parameter scanning and optimization with MOST.



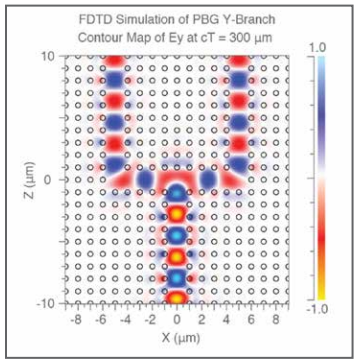
RSoft Photonic Device Tools analysis and CAD windows

Passive Device Tools

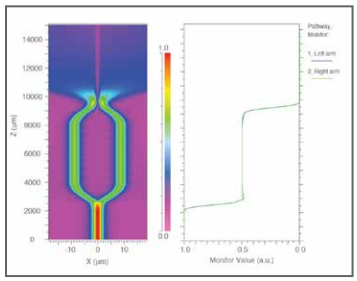


RSoft CAD Environment

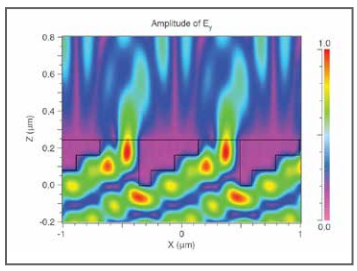
- **RSoft CAD Environment:** The RSoft CAD Environment is the core program of the RSoft passive device tools and allows researchers and engineers to create systems for the design of waveguide devices and optical circuits.
- **FullWAVE FDTD:** This highly sophisticated simulation tool is based on the Finite-Difference Time-Domain (FDTD) method for studying the propagation of light in a wide variety of photonic structures.
- **BeamPROP BPM:** The industry-leading tool based on the Beam Propagation Method (BPM) for the design and simulation of integrated and fiber-optic waveguide devices and circuits.
- **DiffractMOD RCWA:** This design and simulation tool is ideal for diffractive optical structures such as diffractive optical elements, subwavelength periodic structures, and photonic bandgap crystals.
- **BandSOLVE PWE:** This tool is based on the Plane Wave Expansion (PWE) algorithm and is the first commercially available design tool to automate and simplify the modeling and calculation of photonic band structures for all photonic crystal devices.
- **FemSIM FEM**: This generalized mode solver is based on the Finite Element Method (FEM) and can be used to calculate any number of transverse or cavity modes of an arbitrary structure on non-uniform mesh.
- **GratingMOD CMT:** This general design tool based on Coupled Mode Theory (CMT) can be used to analyze and synthesize complicated grating profiles in optical fibers and integrated waveguide circuits for a wide variety of photonic applications.
- **ModePROP EME:** This Eigenmode Expansion Propagation (EME) tool can be used to account for both forward and backward propagation and radiation modes. It provides a rigorous steady-state solution to Maxwell's equations that is based on the highly-stable Modal Transmission Line Theory. A full array of analysis and simulation features make this tool flexible and easy to use.



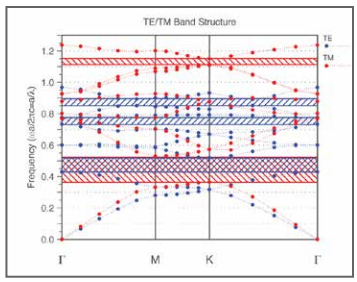
FullWAVE FDTD



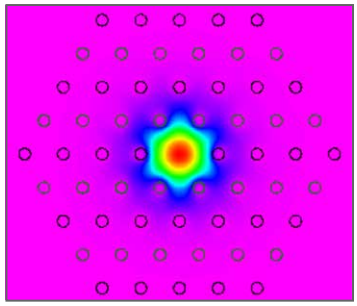
BeamPROP BPM



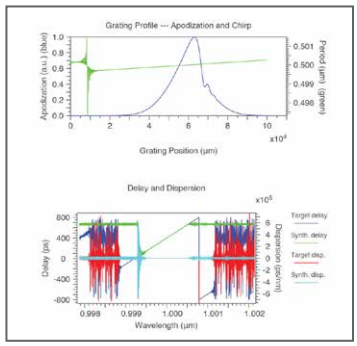
DiffractMOD RCWA



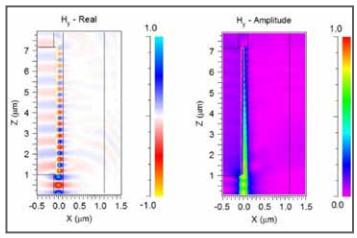
BandSOLVE PWE



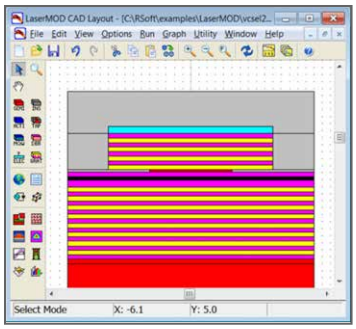
FemSIM FEM



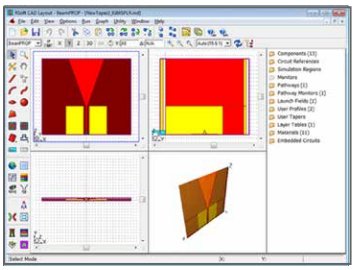
GratingMOD CMT



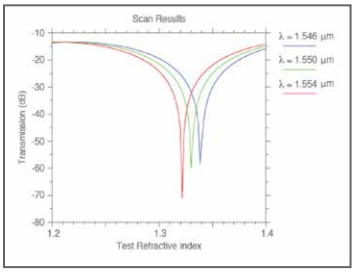
ModePROP EME



LaserMOD



Tapered Laser Utility



MOST

Active Device Tools

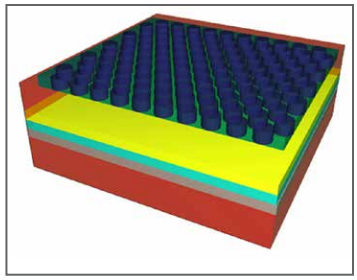
- **LaserMOD:** This tool is designed to simulate the optical, electronic, and thermal properties of semiconductor lasers and similar active devices.
- **Tapered Laser Utility:** This utility provides an efficient and accurate design tool for analyzing and optimizing tapered semiconductor laser diodes.

Other Options & Utilities

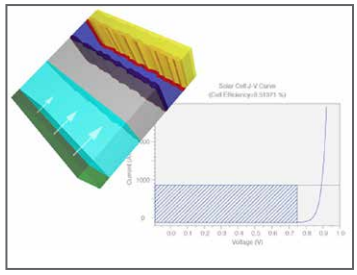
- **LED Utility:** Use this tool to accurately simulate next-gen LED structures and materials. This utility simplifies common tasks and assists in the rigorous computation of extraction ratios and radiation patterns.
- **Solar Cell Utility:** This utility provides an optical and electronic simulation solution for solar cell devices. Use this utility to aid in the computation of J-V curves, quantum efficiency spectra, and overall cell efficiency.
- **Multi-Physics Utility:** This utility can be used in conjunction with any of the RSoft passive device tools. It provides a convenient interface for including disturbances of the refractive index profile of a structure in a simulation.

Optimization and Parameter Scanning

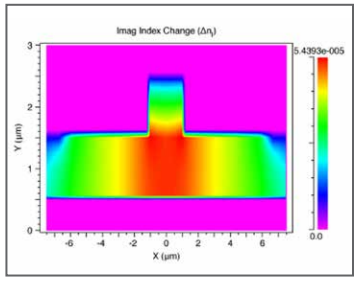
- **MOST:** The Multi-Variable Optimization and Scanning Tool (MOST) is an exciting solution to the critical problem of design optimization for photonic devices. During the research or design cycle, it is crucial to understand the full parameter space of the system. Acting as an automated driver for the RSoft physics-based simulators, MOST takes the drudgery out of these important operations by streamlining the definition, calculation, and analysis of scans and optimizations. If you license multiple RSoft tools, MOST can automate the distribution of work across your entire network with virtually a single mouse click.



LED Utility



Solar Cell Utility Solar Cell Utility



Multi-Physics Utility

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