

**Release Notes  
RSoft Photonic Component Design Suite  
Version 2017.09**

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**Optical Solutions Group**

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**SYNOPSYS®**

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## Changes to All Products

- New S-Matrix/PDK Generation Utility, which automates a link between the RSoft component tools (BeamPROP, FullWAVE, and ModePROP) and OptSim Circuit. The interface simplifies the creation of optical PDKs for applications such as silicon photonics and allows component performance to be studied within the context of an optical circuit or system. Features include:
  - S-Matrix calculation over a user-specified wavelength or frequency range.
  - New port object (based on existing monitor objects) that acts as a general input/output port for S-Matrix calculation. The launch field can be automatically positioned and oriented at any port, output measurements are made at all ports. Port symmetries can be exploited to reduce calculation time and increase efficiency.
  - In addition to the S-Matrix data, output includes an OptSim model that can easily be imported into OptSim/OptSim Circuit for further simulation, a GDS layout file, and an SPT file to register the GDS layout with PhoeniX Software's OptoDesigner.
  - Tutorial examples illustrate use of this utility.
- Extension of Effective Index Method (EIM, sometimes called 2.5D) to include BeamPROP, FullWAVE, ModePROP, and DiffractMOD
  - EIM can be used to greatly reduce the computation time and memory requirements of a simulation by converting a 3D structure into an approximate 2D structure.
  - The EIM option only affects the simulation; the definition of the original 3D structure is unaltered, allowing this feature to be safely turned on and off without changing the structure.
  - Extended supported structure types to include Rib/Ridge, Diffused, and Channel.
  - New frequency-dependent EIM for pulsed excitation FullWAVE simulations to ensure accurate results.
  - EIM now accounts for the complex part of the refractive index (material loss). This may affect the simulations results for structures with a complex index.
- Changes have been made to the index calculation routine that can affect results slightly under certain meshing conditions.

## Changes to RSoft CAD

In addition to the changes listed in the All Products section, the following changes apply to the RSoft CAD:

- The `pdkinfo()` function returns design parameters from the currently selected PDK. For example, parameters include the width or height of a standard Silicon rib waveguide in the PDK.
- New option to clip GDS output at simulation domain.

## Changes to FullWAVE

In addition to the changes listed in the All Products and RSoft CAD sections, the following changes apply to FullWAVE:

- Improved launch, including improved phase monitor consistency with respect to launch field.
- General improvements to pulsed simulations, including:
  - Added warning and user instructions when materials have frequency dependence but dispersion has not been enabled, or a dispersive material model has not been defined.
  - Improved extraction of data for pulsed simulations.
  - Improved DFT frequency normalization.
  - Default Stop Time is now based on the requested FFT frequency resolution.
- New documentation to show the efficacy of the long-standing conformal mesh feature.
- Added option to set the time span over which the convergence criteria must be met before a FullWAVE simulation is stopped.
- A FullWAVE simulation can now be manually stopped before convergence via the Run/Accept option in the FullWAVE simulation window.
- Improvements have been made to the launch in 2D. This might result in small changes in the result for a 2D simulation.
- An issue has been fixed when calculating the Single-Plane farfield from a Simple Steady-State Output in directions other than +Z.

## Changes to BeamPROP

In addition to the changes listed in the All Products and RSoft CAD sections, the following changes apply to BeamPROP:

- Added MOST measurements for BeamPROP monitor objects.
- Improved phase monitor consistency with respect to launch field.
- Improved 'reflection' overlap monitors (returns 0).
- Significant changes of behavior:

- The handling of EIM polarization in BeamPROP has been improved to ensure consistency between it and all other RSoft tools that now support EIM. This will affect results when EIM is used.
- 2D TM simulations now use the H field formulation to be consistent with other tools and provide better convergence.

## **Changes to DiffractMOD**

In addition to the changes listed in the All Products and RSoft CAD sections, the following changes apply to DiffractMOD:

- The calculation of the overlap monitors has been changed significantly to make their behavior consistent with results from FullWAVE, including directional specificity. This might affect the results.

## **Changes to ModePROP**

In addition to the changes listed in the All Products and RSoft CAD sections, the following changes apply to ModePROP:

- The calculation of the overlap monitors has been changed significantly to make their behavior consistent with results from FullWAVE, including directional specificity. This might affect the results.
- Improved phase monitor consistency with respect to launch field.

## **Changes to MOST**

In addition to the changes listed in the All Products and RSoft CAD sections, the following changes apply to MOST:

- Added support for complex measurements.
- Added MOST measurements for BeamPROP monitor objects.

## **Changes to LaserMOD**

In addition to the changes listed in the All Products and RSoft CAD sections, the following changes apply to LaserMOD:

- Maximum number of components increased to 2000.
- Enhanced material calibration feature by including direct band transition and strain.

## **Changes to Tapered Laser Utility**

In addition to the changes listed in the All Products sections, the following changes apply to The Tapered Laser Utility:

- Improved simulation methodology.