

Release Notes
RSoft Photonic Component Design Suite
Version 2016.03

Optical Solutions Group

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SYNOPSYS®

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Changes to All Products

- Integration with Sentaurus TCAD, including support for the TDR file format in the RSoft tools where appropriate. Data can be exchanged in both directions allowing for co-simulation of electronic and optical aspects of a problem. TDR files generated by Sentaurus TCAD can now be used as input files anywhere in the software, including with command line utilities such as bdconv or bduutil. This includes user profiles, tapers, launch fields, etc. Additionally, outputs can be in the TDR format as well. WinPLOT has also been updated to now plot and display TDR data files.
- The licensing policy has been changed to allow a single license to utilize the full computing power of a single computer. Users with a network license can fully utilize two computers for simulation. As before, the number of concurrent simulation jobs is unlimited. In all cases, note that the number of concurrent users of the RSoft CAD and related tools is limited to the number of licenses.
- New RSoft installer executable (Windows) that embeds the required Synopsys Common Licensing (SCL) installer as well as streamlines the installation process. Users will now only have to download and install a single file reducing potential confusion.
- Several common errors in the license key file are checked and warned about during installation, when using the Configure Licensing Utility to update to a new license key file, or when the software is opened.

Changes to RSoft CAD

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

- Added a new Graphene material the RSoft Material Library.
- Added a new Coating Utility which can be used to add a coating on top of a surface defined via a user profile.
- Added a warning when EIM is selected but the local structure type does not match the global structure type. This is disallowed, but previously ran without complaint.
- Added new options to bduutil to scale and translate data files.
- Corrected an issue with slow refresh speed, or apparent non-responsiveness, for designs containing circuit references with large user profiles.
- Corrected a display issue when there is more than one circuit reference and they employ user tapers.
- Fixed an issue when creating circuit references using child files located in different directories than the parent file.
- Fixed issue where a rotated circuit reference may not be interpreted correctly.

- Fixed a naming issue of certain plot files when period ‘.’ characters were used in the output prefix.
- Fixed an issue where the index profile was not calculated correctly when using a rotated extended multilayer segment.
- Fixed an issue where the CAD did not display a tapered extended segment correctly.
- Fixed issue on Linux platforms where certain dropdown options were broken.
- Several updates to WinPLOT, the plotting/charting software included with the RSoft products:
 - Improved WinPLOT to correctly handle monitor names that contain non-standard characters.
 - Extended WinPLOT to plot the 3D RSoft data file format.
 - Corrected a scaling error in WinPLOT that could sometimes occur with Diffraction Angle Plots.
 - Corrected WinPLOT’s handling when displaying multiple plots per page and certain non-applicable editing functions from the toolbar or menu are selected.

Changes to FullWAVE

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

- Several features related to the generation of RSoft BSDF files, see the BSDF Utilities section.
- Updated the FullWAVE Cluster Settings dialog to remove blank entries in the ‘Host Machines’ field.
- Removed point limitation when calculating multi-plane far-field. Note that it may still be possible to have issues if the required memory exceeds the computer capacity.
- Improved the ‘Auto’ logic to determine whether or not to use clustering, as well as the logic that sets the number of processors to use in ‘Auto’ mode.
- Added warnings when the use of anisotropic or magnetic materials is detected but the corresponding simulation options have not been enabled.
- Corrected an error in periodic far field output when the monitor plane was not oriented along the z direction.
- Corrected an issue when periodic boundary conditions are used and a non-uniform grid is enabled but the structure is uniform.
- Addressed an issue with the launch polarizer option in custom controller mode where the relative phase might be incorrect.

- Fixed issue where the dynamic field display was not working correctly for dispersive simulations.
- Fixed an issue with the FDTD Continue option and simulations that contains a simple dispersive material.
- Fixed an issue with periodic far-field output for certain directions.
- Fixed an issue with the plot files for Poynting vector volume monitors.
- Fixed issue for CW simulations with DFT monitors at frequencies difference than the driving frequency which can be important for nonlinear simulation.
- Fixed issue where FullWAVE would not extend a pulse simulation when a power/density monitor was used.
- Important correction to the FullWAVE performance optimizations that were introduced in 2015.06 when running on multiple nodes (should be no change within the same machine).

Changes to BeamPROP

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

- Improvements to more easily interpret the phase in field outputs. This change of behavior will likely change the overall phase of results but they will be more meaningful and accurate.
- Addressed an issue with the launch polarizer option in custom controller mode where the relative phase might be incorrect.
- Fixed an issue when the simulation results from a standalone BeamPROP simulation were different than a MOST scan when using a semi- or full-vector and only a single launch file.
- Added a warning when the Z Slice Grid is set to 0.
- Fixed an issue where the minor component of a monitor was always 0 for some cases.

Changes to DiffractMOD

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

- Several features related to the generation of RSoft BSDF files, see the BSDF Utilities section.
- Corrected an issue when the number of harmonics was very large (memory usage over around 30-40 GB) which would result in a crash.

- Corrected an issue with MOST measurements when the number of harmonics in the output options settings exceeded the actual number of harmonics used in the simulation.
- Deprecated support for GPU acceleration.
- Significant changes include:
 - Disabled Diffraction Angle Plot output when doing an internal scan.
 - Added control over advanced conventions used for launch conditions and some outputs. DiffractMOD has historically used the *-theta* and *-s* variants, but these will be deprecated in a future release. The *+theta* and *+s* variants have always been automatically used when calculated RSoft BSDF files and for display in the RSoft CAD.

Changes to ModePROP

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

- Addressed an issue with the launch polarizer option in custom controller mode where the relative phase might be incorrect.
- Deprecated support for GPU acceleration.

Changes to FemSIM

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

- Improved validation of user input.

Changes to LED Utility

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

- Fixed an issue where incorrect results were produced when the far-field refractive index was not equal to the near-field index.

Changes to BSDF Utilities

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

- Improved performance of the RSoft BSDF UDOP, yielding significantly faster LightTools simulations (generally ~5x, up to ~40x for unpolarized cases).
- Leveraged MOST Cluster framework in order to speed up the calculation of RSoft BSDF files. The BSDF cluster options distribute the calculation of RSoft BSDF files amongst several computers so that the calculations complete much faster. Multiple

'points' in the RSoft BSDF file are calculated in parallel and combined once all 'points' have been calculated.

- Added new BSDF Viewer to allow users to look at the results stored in an RSoft BSDF file. Users can query an RSoft BSDF file as a function of incident angle(s), wavelength, polarization, and side (front or back). For a given set of conditions, the BSDF Viewer will show a variety of information and plots.
- New optimized BSDF calculation with DiffractMOD that speeds up the calculation by nearly 2x.
- Added a self-contained installer for the RSoft BSDF UDOP and related utilities to allow it to be installed on machines that have LightTools but do not need a full installation of the RSoft suite.
- Added a LightTools Optical Property File (OPR file) to allow more convenient use of the RSoft BSDF UDOP, especially in situations where the LightTools user is not licensed for the Advanced Physics module.
- Added a new String Parameter setting to the RSoft BSDF UDOP to control advanced options.
- Improved warning messages in the RSoft BSDF UDOP and in bsdfutil for the case of index mismatch, missing front or back side data, wavelength out of range, and angles out of range. Added options to disable these when appropriate.
- Added a Loss/Gain tag when generating RSoft BSDF files with either DiffractMOD or FullWAVE which outputs information regarding whether any materials in the structure are lossy or have gain. This is used by the RSoft BSDF UDOP and BSDF Viewer for improved power conservation.
- A new file format for RSoft BSDF data which, under certain circumstances, allows results of several calculations to be merged.
- Added new features to bsdfutil utility including subsampling, analyzing, and merging multiple RSoft BSDF files. Additional options can be used to view information about the data in the BSDF file.
- Corrected an issue with the RSoft BSDF UDOP which prevented it from operating properly when applied to curved surfaces in LightTools.
- Addressed an issue when FullWAVE was used for BSDF calculation of backside scattering data at grazing incident (~90 deg).
- Fixed an issue with the detection of an index mismatch between the data in the BSDF file and the LightTools structure.
- Fixed issue where the 2015.06-1 installer did not replace the RSoft BSDF UDOP when installed over a previous version.
- Fixed issue where the BSDF Generation Utility dialog would not work on Linux.

- Significant changes include:
 - Changed default interpolation scheme used to calculate outputs at input conditions not explicitly contained in the BSDF file. Slight changes in results will occur, the new results have the same level of accuracy, and this new method produces much faster UDOP results.

Changes to Multi-Physics Utility

In addition to the changes listed in the All Products, RSoft CAD, the following changes apply to the Multi-Physics Utility:

- New interface with TCAD allows doping profiles and other such data to be used in the Multi-Physics Utility.

Changes to MOST

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

- Added access to the MOST Cluster Settings from the RSoft CAD window.
- Updated the MOST Cluster Settings dialog to remove blank entries in the 'Host Machines' field.
- Extended MOST clustering framework to apply to the generation of RSoft BSDF files. See the BSDF Utilities section.
- Improved ability to abort jobs and associated simulations when clustering.
- Corrected an issue with MOST when there was a single point in a clustered scan and the number of processes was more than 1.
- Fixed an issue where MOST vector measurements were not working correctly in certain circumstances.

Changes to LaserMOD

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

- New interface with TCAD allows doping profiles and other such data to be used in LaserMOD.