OptiFDTD

Finite-Difference Time-Domain
Design Software

15.0

New Features

Created to address the needs of research scientists, photonic engineers, professors and students; OptiFDTD satisfies the demand of users who are searching for a powerful yet easy to use photonic device simulation tool.

Optiwave

Key Features for OptiFDTD 15

OptiFDTD strives to provide optical engineers and researchers with the most accurate & easy-to-use tool for the design and analysis of photonic devices. In this release of **OptiFDTD** we have included a series of enhancements that focus on the user experience and design flow.

These new features include:

- New upgraded video codecs
- The multi-tasking of property edits
- Enhanced scripting capabilities for CAD file import
- Integration with Optiwave's new Cloud Compute option

This release also includes the latest version of the Optiwave mode solver application, **OptiMode 5.2**. For more details on **OptiMode 5.2** see the "OptiMode Release Notes" document.

Video codecs

With improvements in video technology, **OptiFDTD** 15 has high quality video codecs available for use when recording simulation results. Videos of the time evolution of fields for arbitrary structures provides resources for research and in-class teaching materials. Available codecs are VP8, VP9, ZLIB, and Theora.
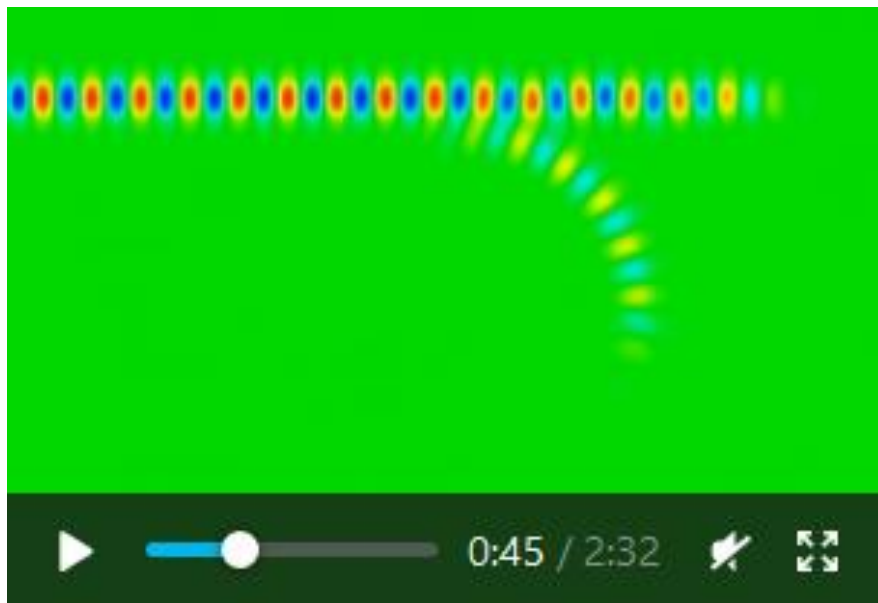

Figure 1: Video of ring resonator.

Multi-tasking property edits

OptiFDTD 15 has extended the design workflow based on the internal project browser within **OptiFDTD Designer** by enabling multiple dialogs for components, materials, or profiles to be simultaneously open. Additionally, property dialogs of linked components, waveguides and profiles have the ability to open corresponding dialogs. These capabilities streamline the overall design workflow.
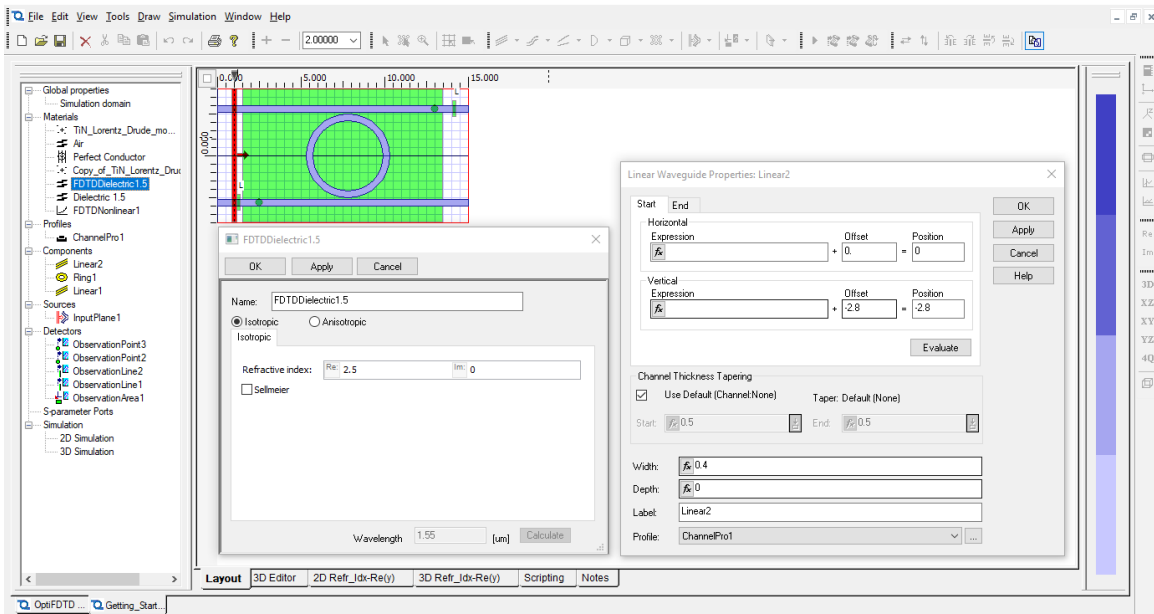
Figure 2: Multi-tasking dialogs

Enhanced scripting capabilities for structure import

Increasingly complex designs combined with dynamic analysis requires not only the ability to import structures from known standard CAD file formats but **OptiFDTD 15** now provides the ability to automate the configuration and import of these files.

```
00
01    WGMgr.DeleteAll
02    ObservePtMgr.DeleteAll
03    PointSourceMgr.DeleteAll
04    InputPlaneMgr.DeleteAll
05
06    'Create an object for import settings.
07    dim import_settings
08    set import_settings = MaskFileImporter.CreateObjForImportSettings
09
10    'Ignore some layers in the original design.
11    ignore_layers = Array("12", "107")
12    import_settings.IgnoreLayers ignore_layers
13
14    'Can set accuracy if this is a DXF file.
15    import_settings.SetDXFAccuracy 0.01
16
17    'Assign existed profiles to layers.
18    dim profiles
19    dim layers
20    profiles= Array("WG_Channel_Example", "WG_Fiber_Example", "WG_Fiber_Example")
21    'Note: The profile "WG_Fiber_Example" will be the profile for all layers other than "0" and "1".
22    layers= Array("0", "1", "")
23    import_settings.AssignProfilesToLayers profiles, layers
24    import_settings.SetFile "C:\data\TE_ring_resonator.gds"
25
26    'Import the contents from the file based on the settings
27    dim resultinfo
28    set resultinfo = MaskFileImporter.Import(import_settings)
29
30    'Check if we have something imported in the current layout.
31    if resultinfo.IsSuccessful Then
32    msgbox "Succeded"
33    else
34    msgbox resultinfo.geterrormessage
35    end if
36
```

Figure 3: Script example for CAD file import.

Optiwave's New Cloud Compute

OptiFDTD 15.0+ users will be able to export FDTD designs to Linux files (.fdu) and simulate them using our new Cloud Compute service. There is no need to sign up for an Amazon Web Services (AWS) account, example files will be provided, and full functionality & access will be provided to all interested users.

Figure 4: Optiwave's Cloud Compute simulator interface.

Minor Enhancements and Bug Fixes

Optimization of Project Browser Controls

The Project Browser, introduced in **OptiFDTD 14**, has acquired further controls over the design layout including component deletion and order.

Real time estimate reporting during simulations

The simulation dialog now provides tracking estimates for simulation duration, elapsed time, and time remaining.

Improved user control over accuracy GDS II export

The ability to export structures as GDS II layouts has been upgraded to now provide better accuracy in polygon generation for curved structures.

Optimization of OptiMode Finite-Element Method (FEM) mode solver interface

The interface between the **OptiMode** FEM mode solver and **OptiFDTD** has been optimized to improve accuracy with mode injection.

Creation of a viewer for the full Lorentz-Drude Dispersive material

The Lorentz-Drude material now provides users with a plot of the refractive index dispersion based on the model coefficients. The coefficients can be user-generated or automatically generated from experimental data files.

Improved accuracy of the calculation of frequency domain results for observation points

There was an opportunity to improve the accuracy of the reported frequency spectrum calculated from the time domain information reported from observation points during continuous wave simulations.