

FDTD

3D/2D Maxwell's Solver for Nanophotonic Devices

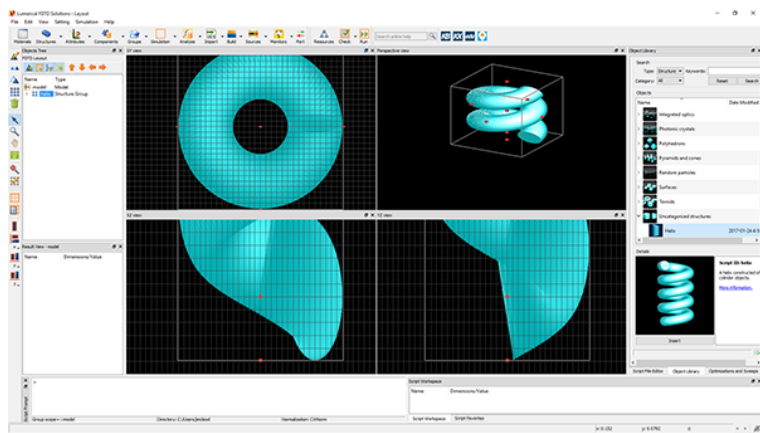
FDTD is the gold-standard for modeling nanophotonic devices, processes, and materials. This finely-tuned implementation of the FDTD method delivers reliable, powerful, and scalable solver performance over a broad spectrum of applications. The integrated design environment provides scripting capability, advanced post-processing, and optimization routines – allowing you to focus on your design and leave the rest to us.

FDTD is a simulator within Lumerical's **DEVICE Multiphysics Simulation Suite**, the world's first multiphysics suite purpose-built for photonics designers. The DEVICE Suite enables designers to accurately model components where the complex interaction of optical, electronic, and thermal phenomena is critical to performance.

[▶ Watch the FDTD overview video](#)

Key FDTD applications include:

- CMOS Image sensors
- OLEDs and Liquid Crystals
- Surface Metrology
- Surface Plasmonics
- Graphene
- Solar Cells
- Integrated Photonic Components
- Metamaterials
- Diffractive Optics and Photonic Crystals

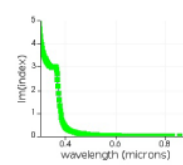


3D CAD Environment

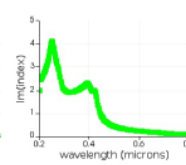
3D CAD Environment and parameterizable simulation objects allow for rapid model iterations.

- Build 1D, 2D, or 3D models
- Define custom surfaces and volumes
- Import geometry from standard CAD and IC layout formats

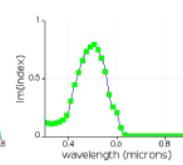
Silicon



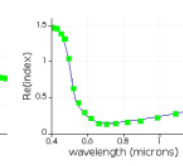
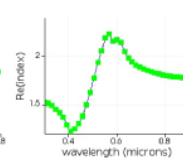
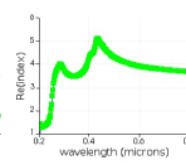
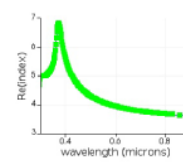
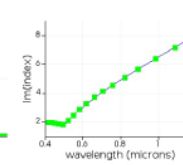
GaAs



P3HT:PCBM



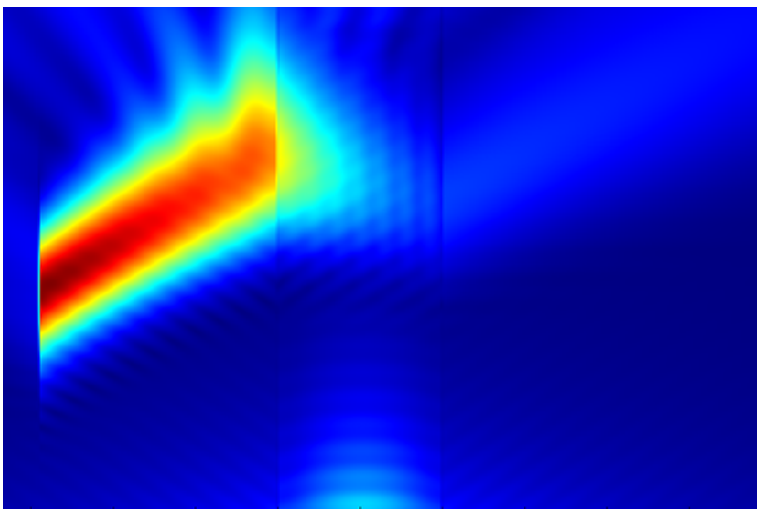
Gold



Multi-coefficient Models

Uses multi-coefficient models for accurate material modeling over large wavelength ranges.

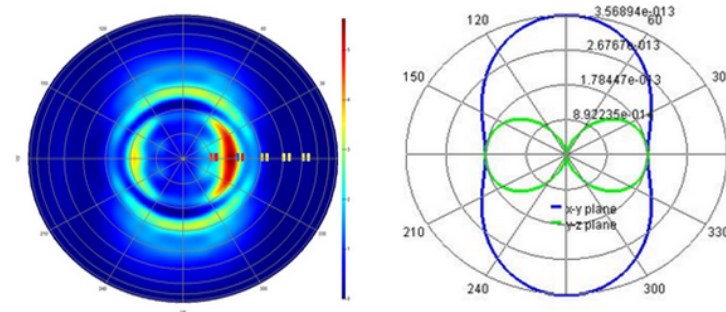
- Accurately represent real materials over broad wavelength ranges
- Automatically generate models from sample data, or define the functions yourself.
- Advanced conformal mesh is compatible with dispersive and high-index contrast materials, with high accuracy for coarse mesh



Nonlinearity and Anisotropy

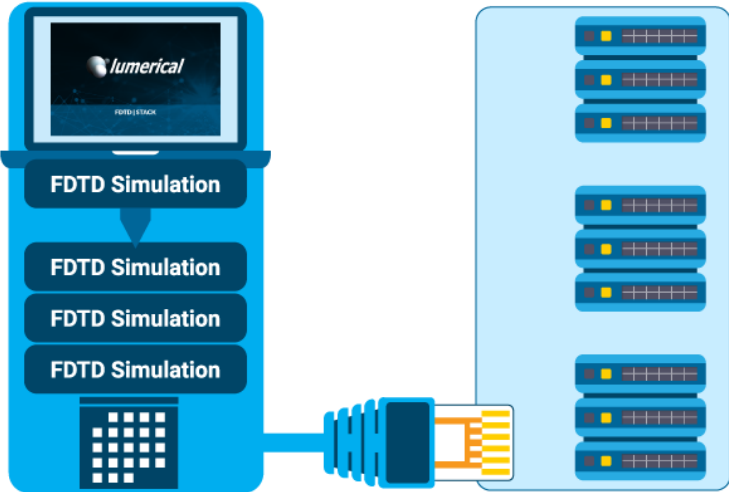
Simulate devices fabricated with nonlinear materials or materials with spatially varying anisotropy.

- Choose from a wide range of nonlinear, negative index, and gain models
- Define new material models with flexible material plug-ins



Powerful Post-Processing

Powerful post-processing capability, including far-field projection, band structure analysis, bidirectional scattering distribution function (BSDF) generation, Q-factor analysis, and charge generation rate.

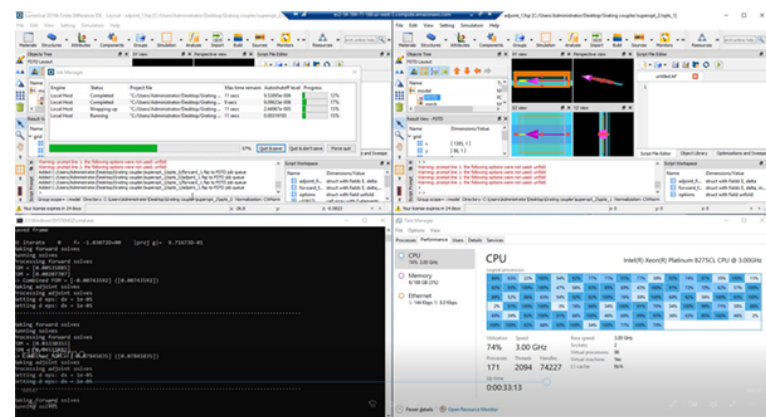


FDTD Accelerator

Lumerical's high-performing FDTD works seamlessly with high-performance computing (HPC):

- Greatly speed up single very-large simulations or parameter-sweeps with many small simulations
- Works seamlessly with on-premise platforms or cloud platforms such as Amazon AWS, Microsoft Azure, Google Cloud, and Alibaba Cloud
- Using FDTD's built-in scheduler, launch many parallel servers with little effort
- Job check-pointing to reduce computing costs by enabling users to recover from hardware failures or access to inexpensive spot pricing from cloud providers
- Support for Amazon Linux and self-activated licensing.

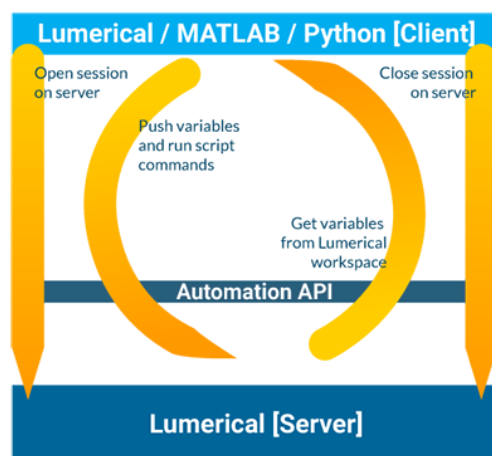
[Read about HPC FDTD on AWS \(Amazon Web Services\)](#)



FDTD Burst Pack

Burst Packs offer a convenient way to purchase additional FDTD Accelerators:

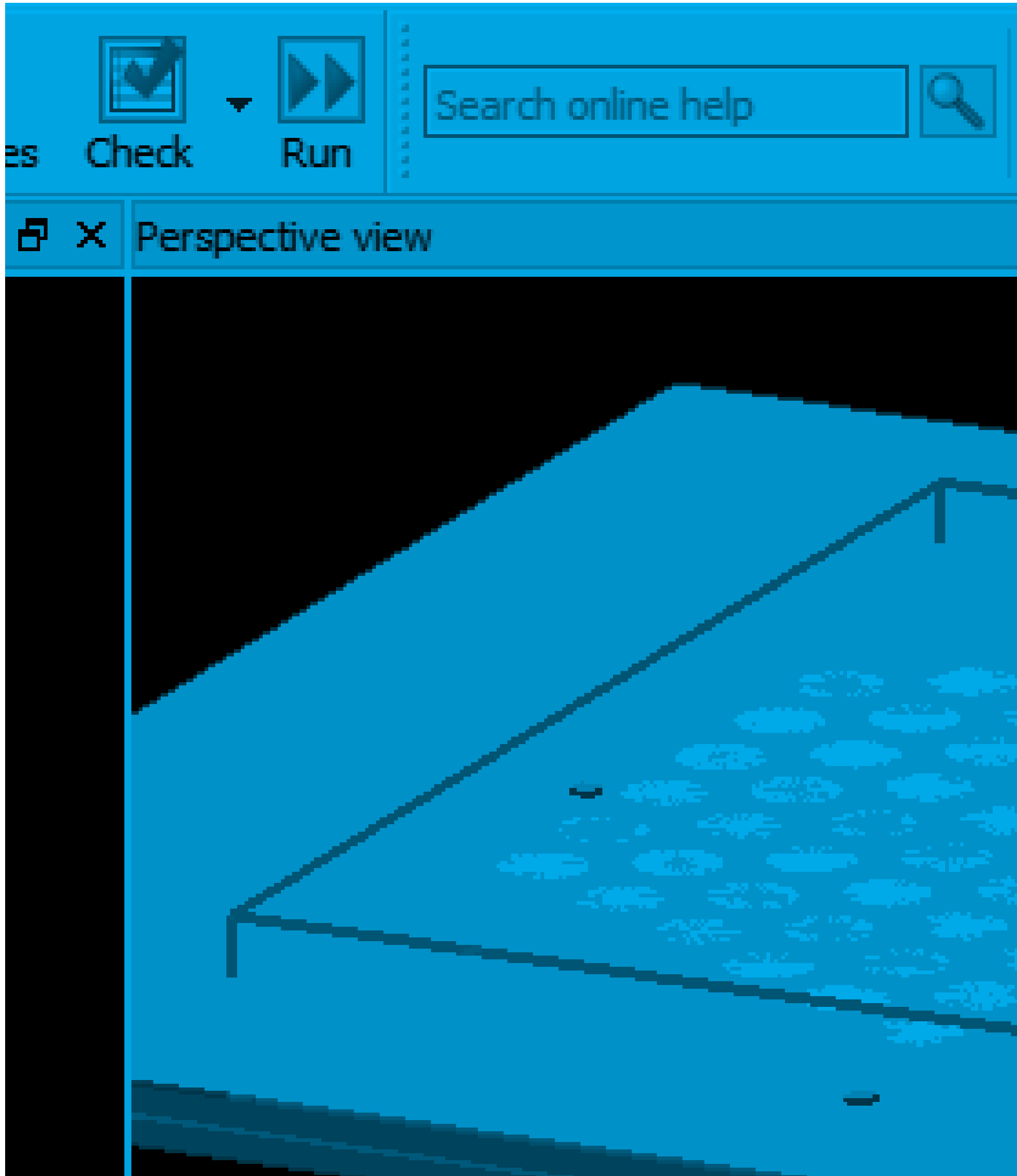
- Each Burst Pack contains 1 full FDTD license and 10 FDTD Accelerator licenses to enable users to process a large number of jobs on a Cloud/HPC system in a short amount of time
- Flexible cost-efficient pricing model for 10-day and 30-day “bursts”
- Quickly and seamlessly transition FDTD simulations to the cloud to take advantage of massive computing resources from popular cloud computing providers.



Automation

FDTD is interoperable with all Lumerical tools through the Lumerical scripting language, Automation API, and Python and MATLAB APIs.

- Build, run, and control simulations across multiple tools.
- Use a single file to run optical, thermal, and electrical simulations before post-processing the data in MATLAB.



Want to know more about FDTD?
Ready for a quote?

Contact Lumerical

Script Workspac

Name

Knowledge Exchange (KX) [↗](#)

Online community



Lumerical University (EDU) [↗](#)

Take a course



Knowledge Base (KB) [↗](#)

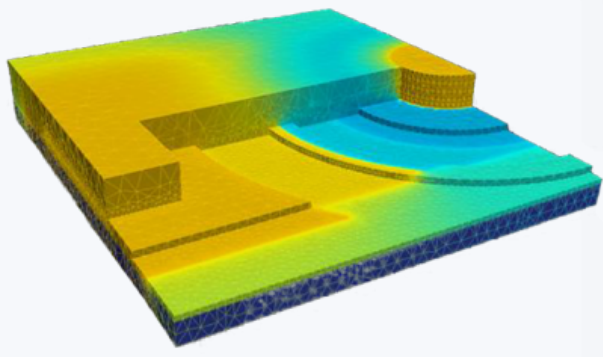
Reference manuals



Need help with your Lumerical products?

Our product experts and support specialists make us the preferred full service R&D solution partner in the industry.

[Visit our Support page](#)



Explore Lumerical's suite of photonic tools

DEVICE Suite

Photonic Multiphysics Simulation Products



SYSTEM Suite

Photonic Integrated Circuit Simulation Products



Interoperability

Interfaces, Automation, & Foundry Support Products



Get started now with a free 30-day trial.

Evaluate for Free