

LED Utility

The LED Utility[†] accurately simulates novel LED structures and all materials involved. The utility simplifies common tasks associated with LED design and aids in the rigorous computation of extraction ratios and radiation patterns. It utilizes the RSoft CAD to describe the geometry and material properties and uses the RSoft flagship simulation tool FullWAVE for modeling the LED. The RSoft CAD interface is a fully parametric, highly flexible user-friendly design environment with 3D editing capabilities to simplify the description of complex LED geometries. The underlying FullWAVE simulation is based on the Finite-Difference Time-Domain (FDTD) algorithm which is an ab-initio approach for solving Maxwell's equations with no inherent approximations that is well suited to accurately model the intricacies of an LED structure.

Benefits

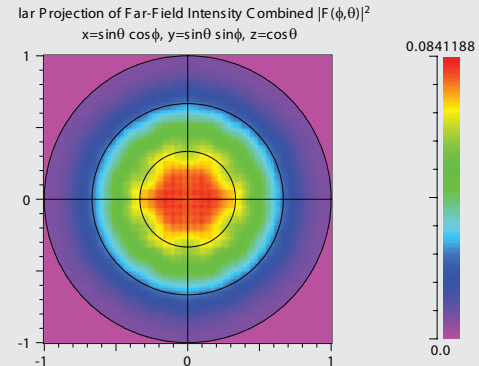
- ▶ Automated optical simulation of incoherent LED structures.
- ▶ Fully integrated into the RSoft CAD Environment.

Applications

- ▶ LED design
- ▶ LED extraction efficiency optimization
- ▶ Studying effect of patterns on LED operation

Featured Application

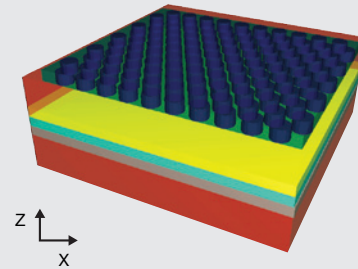
A radiation pattern of a nano-patterned LED structure computed by the LED Utility. This is a combined result for the wavelength range 400 to 700 nm.



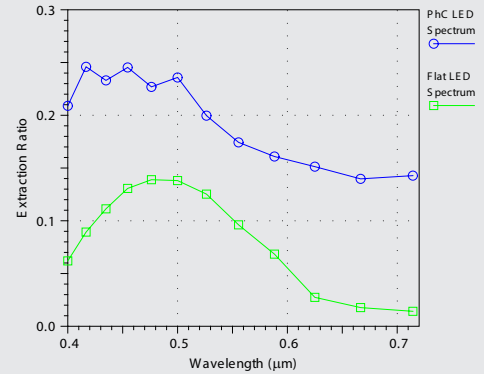
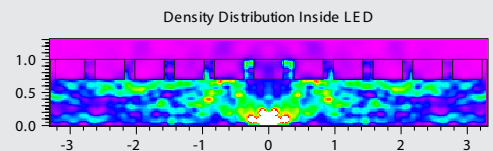
[†]The LED Utility provides RSoft FullWAVE users the functionality described here. All simulation tools are licensed separately.

Features

- ▶ Arbitrary LED geometry can easily be created in the RSoft CAD.
- ▶ Important material properties such as frequency-dependent complex refractive indices can be used.
- ▶ Rigorous optical simulation is performed by the RSoft FullWAVE FDTD simulation tool.
- ▶ Works with FullWAVE clustering to provide faster results.
- ▶ Incorporates an unpolarized incoherent light source.
- ▶ Outputs LED extraction efficiency and radiation patterns in addition to the standard FullWAVE output.
- ▶ Automated parameter studies and design optimization using MOST (page 24).



A nano-patterned LED structure.



Simulation results for a single FullWAVE simulation (top) and extraction efficiency over the wavelength range of 400 to 700 nm.

SEE PAGE 42 FOR SYSTEM REQUIREMENTS