



SimuLAMP™

Software for Optical and Thermal Design and
Optimization of LED Lamps and Arrays

Release Notes

Version 2.0



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1. Release Notes 2.0

This section describes new options in version 2.0 compared to version 1.1:

LED Characteristics Tab

- **LED Characteristics** tab now consists of **Optical** and **Electrical** sections for optical and electrical specifications of LED respectively.
- **Optical** specifications tab consists of emission spectrum and emission pattern specifications.
- To specify emission spectrum the parametric approximation with temperature and current dependent parameters added (instead of Gauss approximation used in previous version). Also a possibility of spectrum specification by function of three arguments (wavelength, temperature and current) added using group of functions Spectrum (wl, I, T).
- Emission pattern of LED now can be specified. The user has a choice of three built-in patterns (Lambertian, isotropic and unidirectional), a function of polar angle, temperature and wavelength (using combination of Diagram (fi, g) and Wavelength (wl, T) functions), and finally **RATRO™¹** ray file describing LED near-field distribution.
- On **Electrical** specifications tab two new options added. The user can now specify I-V and I-L characteristics with temperature and current dependent functions (Characteristics (I,T)). Also there is a possibility of parametric approximation using Shockley model with temperature dependent parameters. After specifying characteristics the user can make a table of values by clicking button **Make table** and setting necessary values of currents and temperatures.

¹ RATRO™ — **RAy-TRacing SimulatOr** of Light Propagation
<http://www.str-soft.com/products/RATRO/>

Phosphor Tab

- More detailed phosphor specification given. Phosphor characteristics are divided into four groups: Particles Parameters, Optical Properties, Conversion Medium Parameters and Scattering Properties.
- The user can specify size distribution of phosphor particles using Gauss distribution or group of functions Distribution (r), while in version 1.1 there was only possibility of setting an average size.
- Refractive index of phosphor particles parameter added and can be set as a function of temperature and wavelength.
- Emission and excitation spectrum can be specified parametrically using empirical approximation with temperature dependent parameters (instead of simple Gauss and band approximations used in version 1.1).
- Internal quantum efficiency (IQE) of the phosphor can be additionally specified by temperature dependent function using the group Temperature (T).
- New models of light scattering by phosphor particles added: Mie theory and Rayleigh theory. Using the chosen model spectrum of scattering and absorption cross sections and also scattering pattern are calculated before the main solving procedure. The user can also specify scattering and absorption cross sections manually using temperature dependent spectral function.
- Scattering pattern can be calculated using Mie or Rayleigh model or specified manually using functions from groups Diagram (fi, g), Diagram (fi, wl). Like in previous version the user can also apply Henney-Greenstein model for scattering pattern, however it is possible now to set asymmetry factor as a function of wavelength and temperature and also use the results obtained from Mie theory calculations.
- In Rayleigh model based calculations additional property called effective refractive index of matrix is plotted in a separate chart as a function of the wavelength. This property can be calculated using Monecke or Bruggeman models.
- All phosphor properties are calculated before main solving procedure and the results are plotted in separate charts, so that the user can analyze it and modify parameters if necessary.



Conversion Tab

- **Conversion Medium** section of **Phosphor** tab used in version 1.1 is replaced by a new **Conversion** tab in current version.
- Three additional properties (scattering, absorption and extinction length) are calculated and plotted in a separate chart.

Solver Tab

- Emission distribution of LED is removed from Solver tab (in current version this property is specified in Optical section on LED Characteristics tab).
- On tab **Far-Field Results -> Distribution** an angular grid can be shown now.
- On tab **Far-Field Results -> Radiant Pattern** Intensity Distribution, Color Distribution and Color Temperature plots are removed.

Functions

- New groups of functions added. The user can specify temperature and/or current dependent functions, temperature and current dependent functions of wavelength, functions of radial coordinate, functions of polar angle and asymmetry factor or wavelength.

Additional Changes

- Radiative heat exchange can be specified on external boundaries by setting thermal emissivity parameter. This parameter is set 0 by default.
- Some small changes in interface design are made for more convenient usage.

2. Support

Hot-line support is provided for customers. The support includes free of charge supply of updated versions released during the support period and technical consulting on **SimuLAMP** operation.



3. More info

More detailed information about the **SimuLAMP** package is available at the site of STR, Inc.: <http://www.str-soft.com/products/SimuLED/SimuLAMP> . Trial license can be requested by the e-mail address simuled-support@str-soft.com .