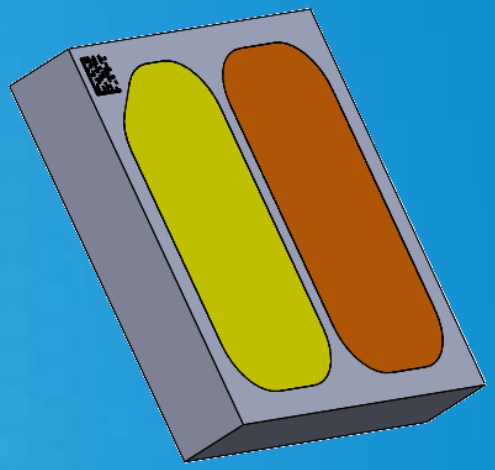
LUXEON Versat Dual Color Optical Rayset Readme

October 1st, 2021



LUMILEDS

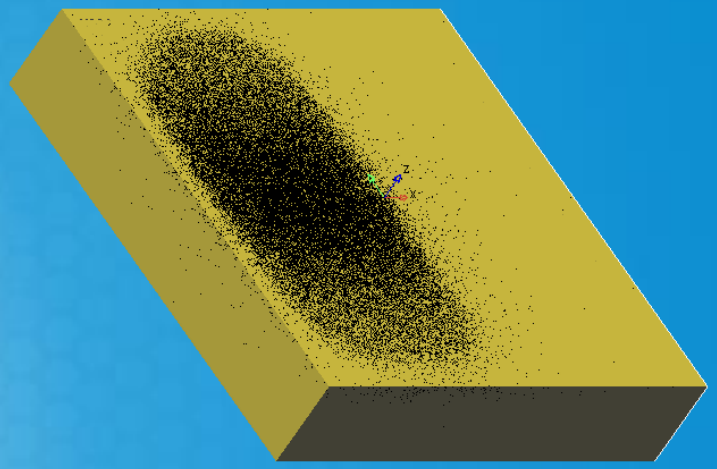
Notes specific to the LUXEON Versat Dual Color raysets

- This readme file describes two raysets. The raysets for the white and the amber part are separately measured. For each part some key properties are shown in the slides below.
  - Page 3 – 14: white (amber off)
  - Page 15 – 26: amber (white off)
- Each rayset is projected onto its respective area on the CAD model. The shift of the rays' starting points is included in the ray data, i.e. the origin of the raysets needs to be set to the origin of the CAD (x,y,z = 0,0,0).

LUXEON Versat Dual Color - Cool White

Optical Rayset Readme

October 1st, 2021

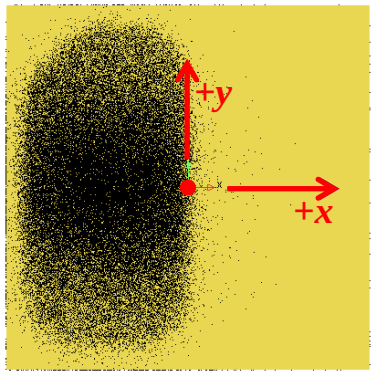


LUMILEDS

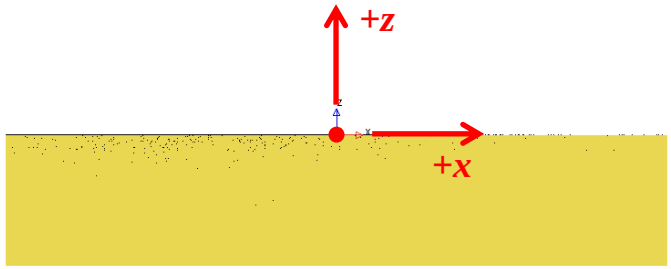
LUXEON Versat Dual Color - Cool White

Coordinate system

Top view



Side view



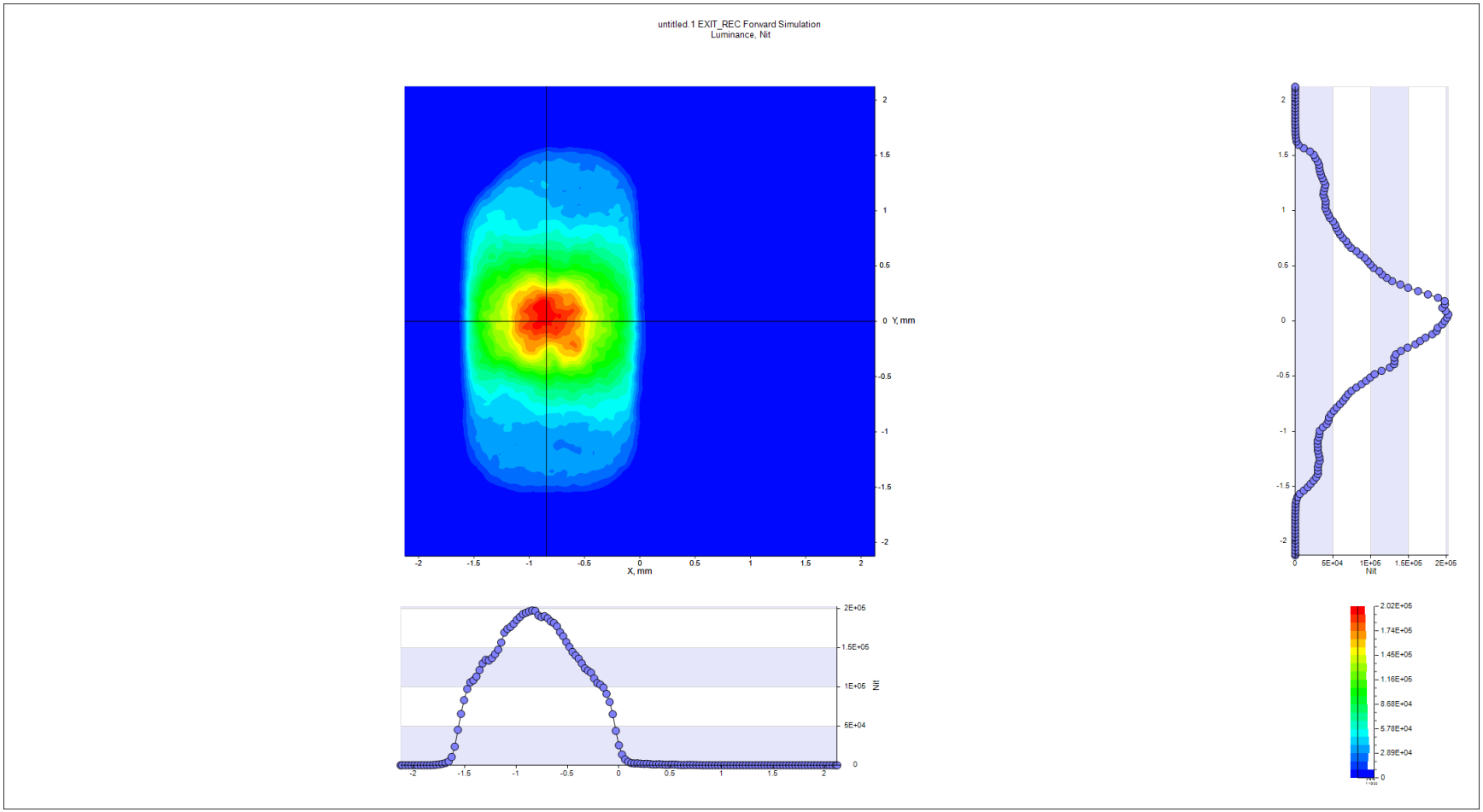
CAD file and rayset files share <u>the same</u> coordinate system, the origin is marked by the red dot in the sketches above:

xy center == center between both light emitting areas

z=0 plane == top edge of light emitting areas

LUXEON Versat Dual Color - Cool White

Luminance distribution at z = 0 mm

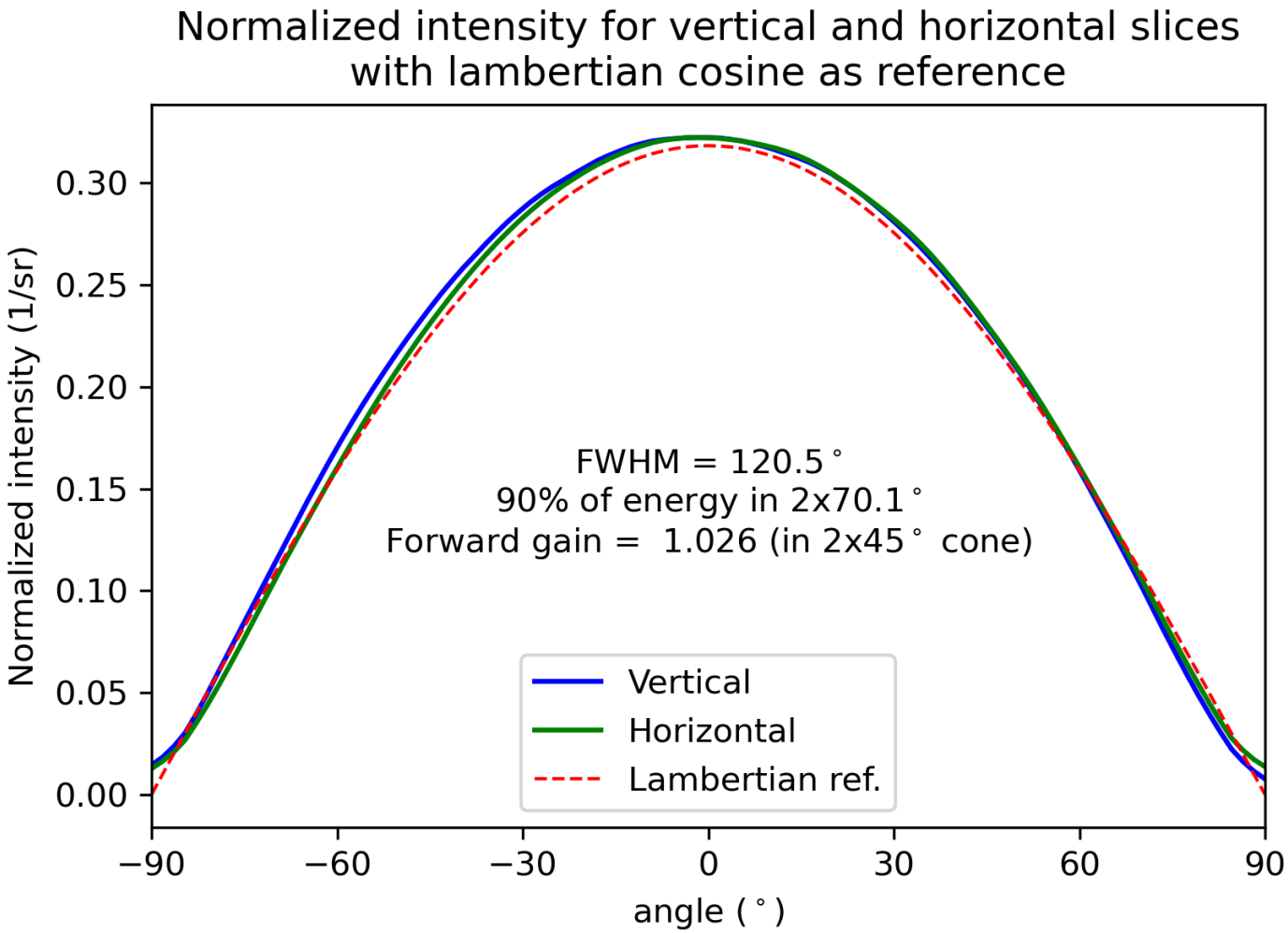


Size of distribution (FWHM) = 1.66 x 1.00 mm²

The two orthogonal lines in the image mark the reference planes of the two cross sections.

LUXEON Versat Dual Color - Cool White

Luminous intensity distribution



Download File Nomenclature (see next slide)

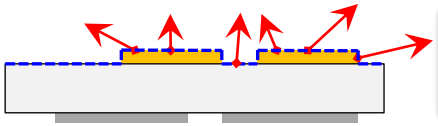
Example

LUXEON_Altilon_SMD2_1x4_gen4plus_20190206_20Mray_proj_Z_spectral_LT.ray

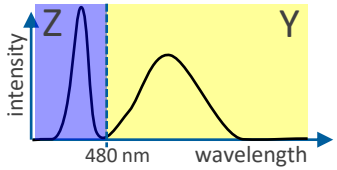
Product Name

Reference Date
helps identifying underlying dataset

Number of rays
e.g. 20 M = 20 · 10^6 rays



Ray starting points
'proj' indicates that ray starting points have been **projected** onto the CAD surface (---).



Spectral range

$$\begin{Bmatrix} \mathrm{Y} \\ \mathrm{Z} \\ - \end{Bmatrix} = \begin{Bmatrix} \text{only yellow} \\ \text{only blue} \\ \text{full} \end{Bmatrix} \text{ spectrum taken into account}$$

Spectral Information

$$\begin{Bmatrix} \text{spectral} \\ - \end{Bmatrix} = \text{individual rays} \begin{Bmatrix} \text{do} \\ \text{don't} \end{Bmatrix} \text{ carry wavelength information}$$

Target Software Package
LightTools (LT), ASAP, Zemax, …

File Extension

Additional Application Notes

Randomization

In some cases, reducing the number of rays in a rayset might be desirable. In order to facilitate the generation of reduced raysets, **all raysets mentioned in this readme file are randomized**. Hence, a rayset having 5 million rays (5M) can simply be generated by taking the first 5M rays from 20M rayset.

Projected Raysets: Propagated ray starting points

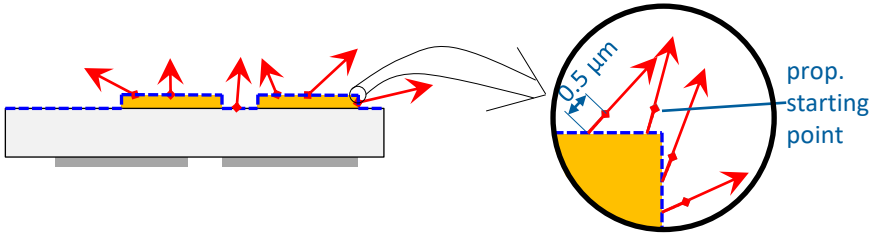
For projected raysets, the following procedure is applied for obtaining the starting points:

(1) Project rays on CAD surface (----) → ray starting points

(2) Propagate rays by 0.5 µm → propagated starting points (•)

All raysets mentioned in this readme file provide propagated starting points.

If raytracing includes the LED CAD, unpropagated rays are prone to be blocked at the surface. Rays with propagated starting points should not suffer from this problem.



LUXEON Versat Dual Color - Cool White

Link to download folder

https://raysets.lumileds.com/index.php/s/qTnkHMZC5Sf9J8b

Files available for download

Prosource

RSMX	LUXEON_Versat_Dual_Color_CW_20211001_1493.RSMX	110 MB	

LightTools

Spectral Projected	LUXEON_Versat_Dual_Color_CW_20211001_40MRays_proj_spectral_LT.ray	1.19 GB	40MRays
Y-Component Projected	LUXEON_Versat_Dual_Color_CW_20211001_20MRays_proj_Y_LT.ray	534 MB	20MRays
Z-Component Projected	LUXEON_Versat_Dual_Color_CW_20211001_20MRays_proj_Z_LT.ray	528 MB	20MRays

ASAP & LucidShape

Y-Component Projected	LUXEON_Versat_Dual_Color_CW_20211001_20MRays_proj_Y_ASAP.dis	534 MB	20MRays
Z-Component Projected	LUXEON_Versat_Dual_Color_CW_20211001_20MRays_proj_Z_ASAP.dis	528 MB	20MRays

OPTIS SPEOS

Y-Component Spectral Projected	LUXEON_Versat_Dual_Color_CW_20211001_20MRays_proj_Y_spectral_Speos.ray	610 MB	20MRays
Z-Component Spectral Projected	LUXEON_Versat_Dual_Color_CW_20211001_20MRays_proj_Z_spectral_Speos.ray	604 MB	20MRays

Zemax

Spectral Projected	LUXEON_Versat_Dual_Color_CW_20211001_40MRays_proj_spectral_zemax.dat	1.19 GB	40MRays

Far Field

IES	LUXEON_Versat_Dual_Color_CW_20211001_40MRays.ies	10.1 kB	

Spectrum

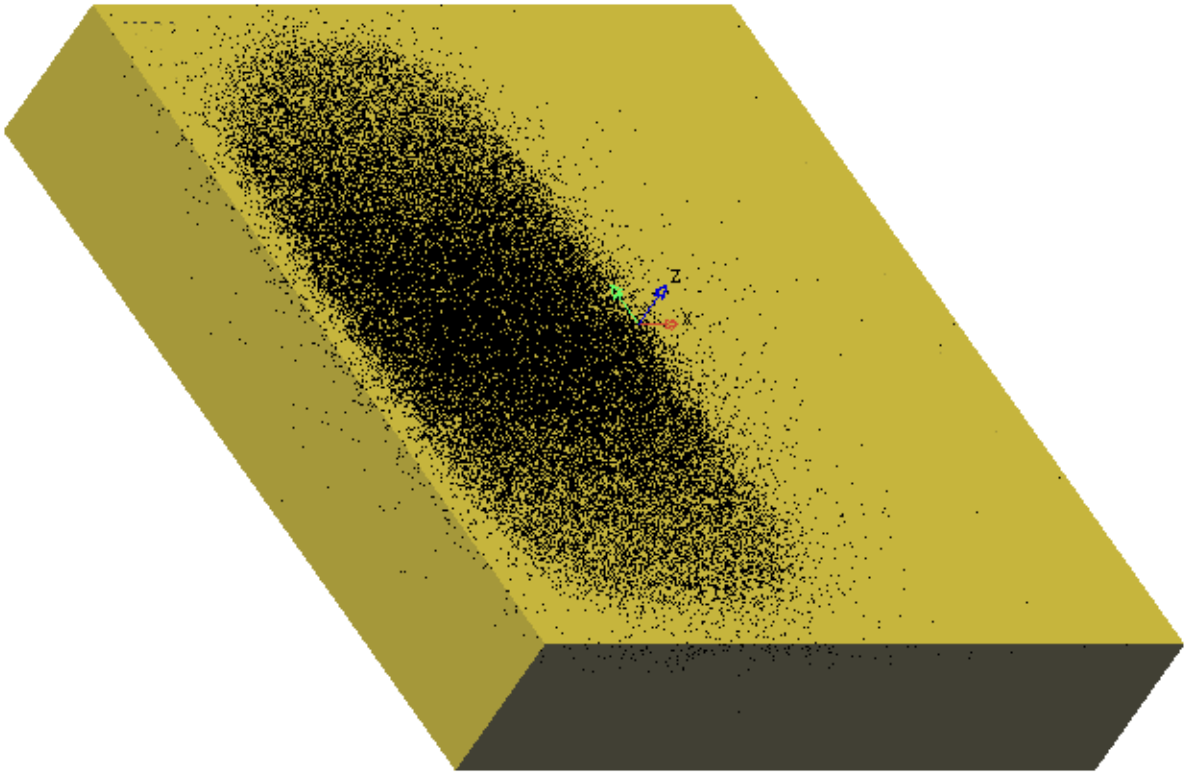
Spectrum	LUXEON_Versat_Dual_Color_CW_20211001_spectrum.txt	17.4 kB	

CAD

STEP	LUXEON_Versat_Dual_Color_CW_20211001_geometry.STEP	570 kB	
IGES	LUXEON_Versat_Dual_Color_CW_20211001_geometry.IGS	600 kB	

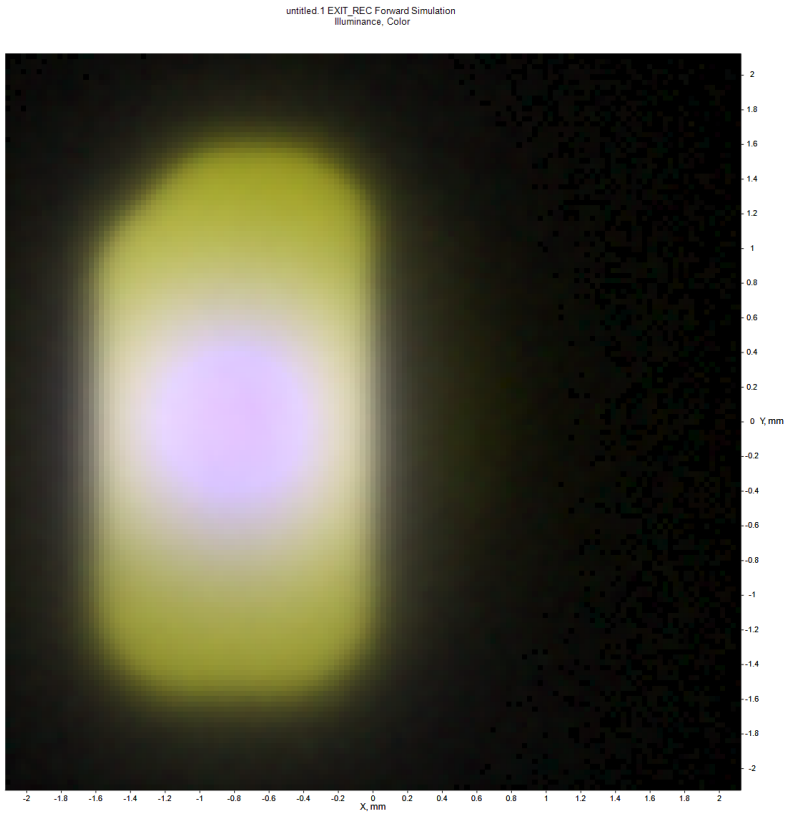
LUXEON Versat Dual Color - Cool White

3D CAD view + ray starting points



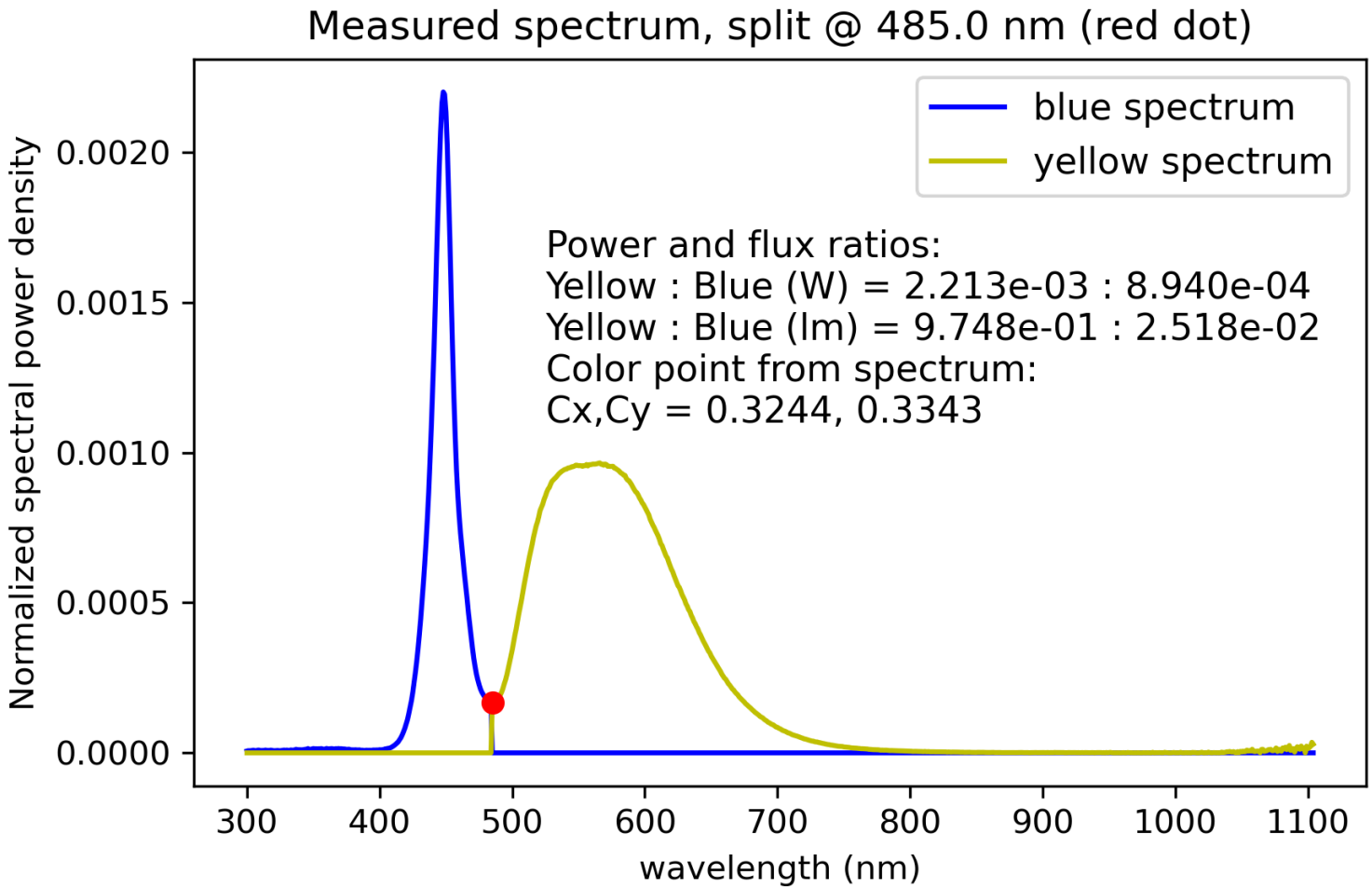
LUXEON Versat Dual Color - Cool White

Illuminance color chart (color over position)



LUXEON Versat Dual Color - Cool White

Measured spectrum split in blue (Z) and yellow (Y) components



LUXEON Versat Dual Color - Cool White

Color data info

Parameter	Value
yellow : blue ratio (W) (from measured spectrum)	2.213e-03 : 8.940e-04
yellow : blue ratio (lm) (from measured spectrum)	9.748e-01 : 2.518e-02
Average color point Cx, Cy (from measured spectrum)	0.3244, 0.3343
Average color point Cx, Cy (from simulation)	0.3243, 0.3341
Color point Cx, Cy @ HV (from simulation)	0.3156, 0.3160
Average CCT (K) (from simulation)	5.883e+03

Lumileds ref.: SJ001493_LUXEON Versat Dual Color - Cool White_20211001

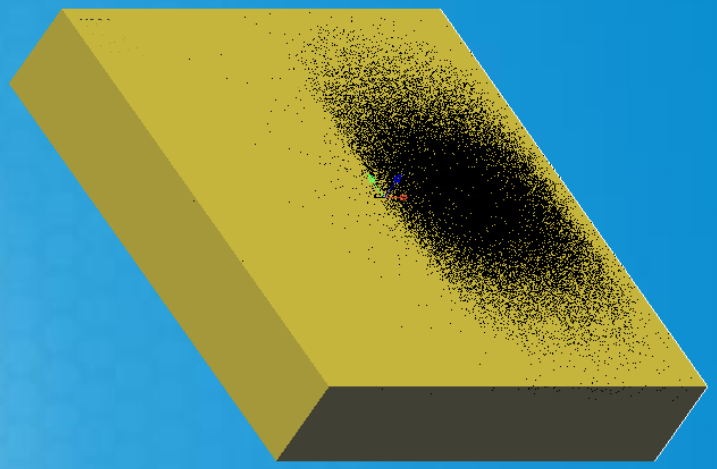
Neither Lumileds Holding B.V. nor its affiliates shall be liable for any kind of loss of data or any other damages, direct, indirect or consequential, resulting from the use of the provided information and data. Although Lumileds Holding B.V. and/or its affiliates have attempted to provide the most accurate information and data, the materials and services information and data are provided “as is,” and neither Lumileds Holding B.V. nor its affiliates warrants or guarantees the contents and correctness of the provided information and data. Lumileds Holding B.V. and its affiliates reserve the right to make changes without notice. You as user agree to this disclaimer and user agreement with the use of the provided materials, information and data. A listing of Lumileds product/patent coverage may be accessed at lumileds.com/patents.

© 2021 Lumileds Holding B.V. All rights reserved.

LUXEON Versat Dual Color - PC Amber

Optical Rayset Readme

October 1st, 2021

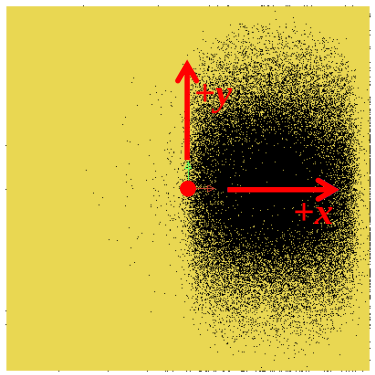


LUMILEDS

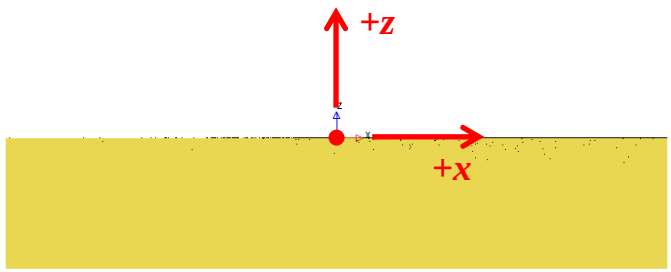
LUXEON Versat Dual Color - PC Amber

Coordinate system

Top view



Side view



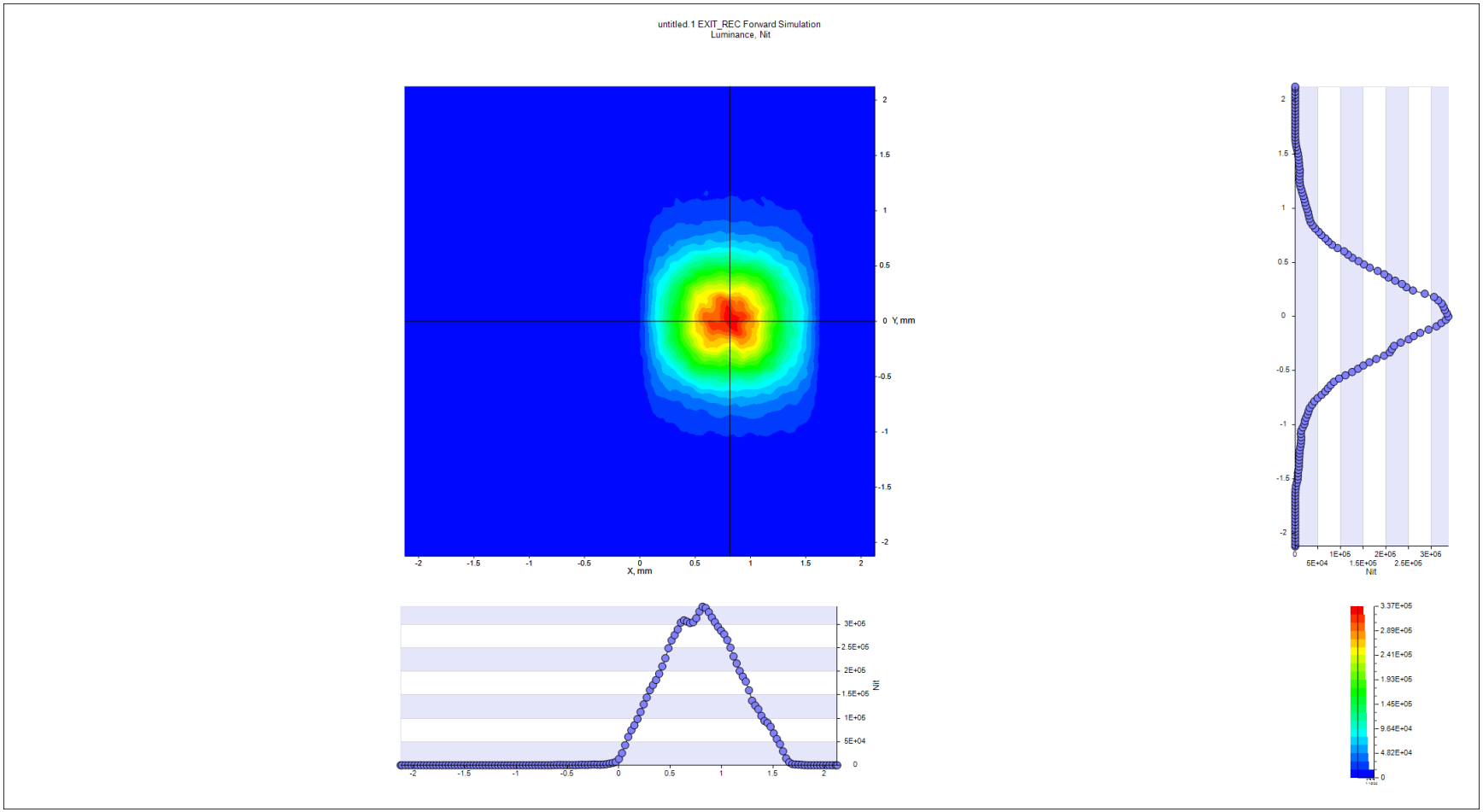
CAD file and rayset files share <u>the same</u> coordinate system, the origin is marked by the red dot in the sketches above:

xy center == center between both light emitting areas

z=0 plane == top edge of light emitting areas

LUXEON Versat Dual Color - PC Amber

Luminance distribution at z = 0 mm

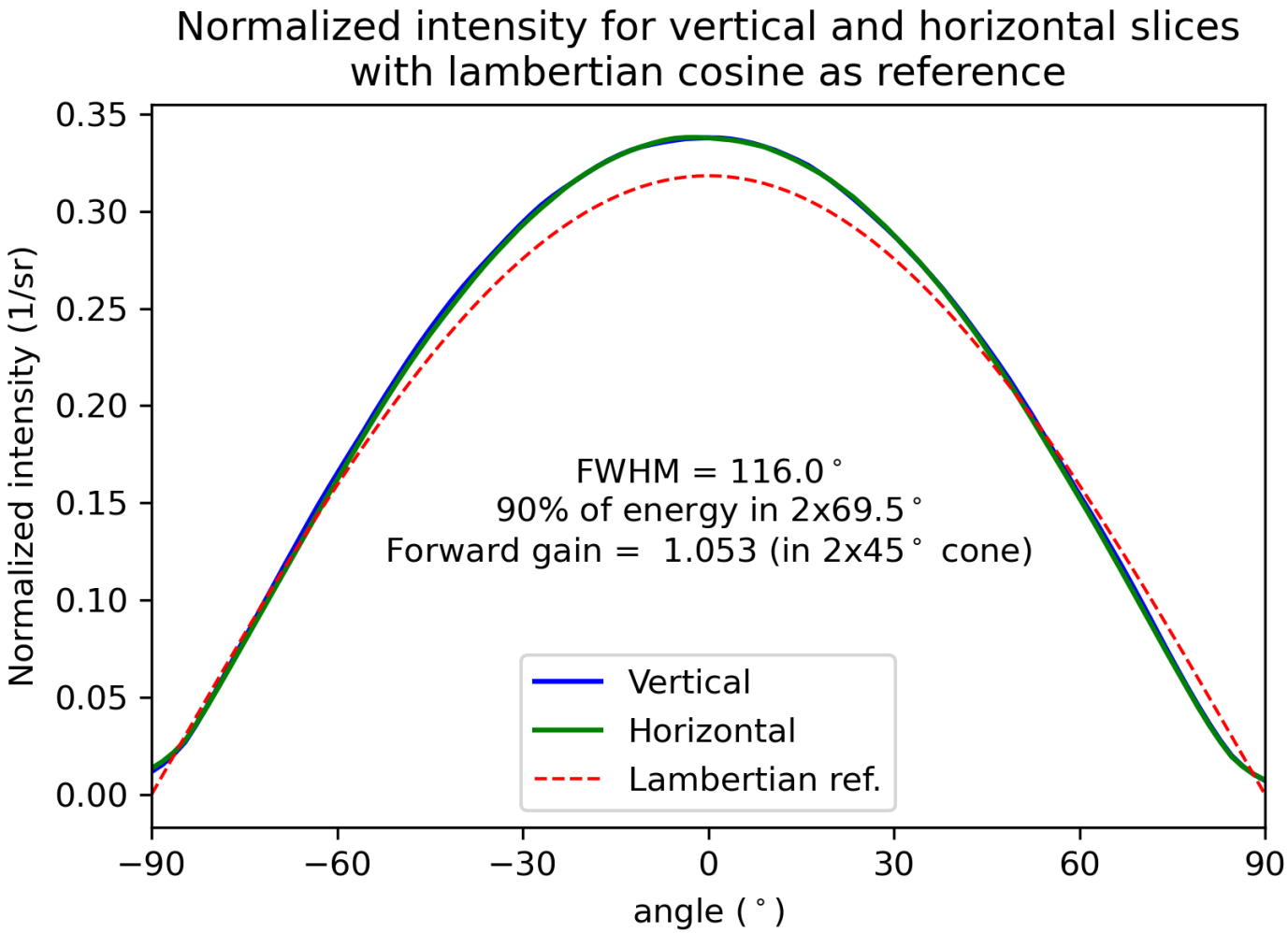


Size of distribution (FWHM) = 1.69 x 0.86 mm²

The two orthogonal lines in the image mark the reference planes of the two cross sections.

LUXEON Versat Dual Color - PC Amber

Luminous intensity distribution



Download File Nomenclature (see next slide)

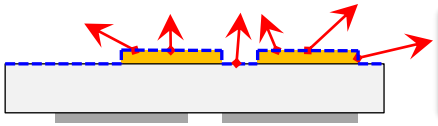
Example

LUXEON_Altilon_SMD2_1x4_gen4plus_20190206_20Mray_proj_Z_spectral_LT.ray

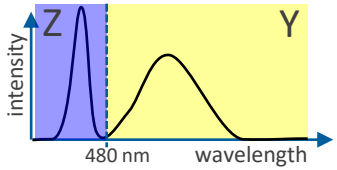
Product Name

Reference Date
helps identifying underlying dataset

Number of rays
e.g. 20 M = 20 · 10^6 rays



Ray starting points
'proj' indicates that ray starting points have been **projected** onto the CAD surface (---).



Spectral range

$$\begin{Bmatrix} \mathrm{Y} \\ \mathrm{Z} \\ - \end{Bmatrix} = \begin{Bmatrix} \text{only yellow} \\ \text{only blue} \\ \text{full} \end{Bmatrix} \text{ spectrum taken into account}$$

Spectral Information

$$\begin{Bmatrix} \text{spectral} \\ - \end{Bmatrix} = \text{individual rays} \begin{Bmatrix} \text{do} \\ \text{don't} \end{Bmatrix} \text{ carry wavelength information}$$

Target Software Package
LightTools (LT), ASAP, Zemax, …

File Extension

Additional Application Notes

Randomization

In some cases, reducing the number of rays in a rayset might be desirable. In order to facilitate the generation of reduced raysets, **all raysets mentioned in this readme file are randomized**. Hence, a rayset having 5 million rays (5M) can simply be generated by taking the first 5M rays from 20M rayset.

Projected Raysets: Propagated ray starting points

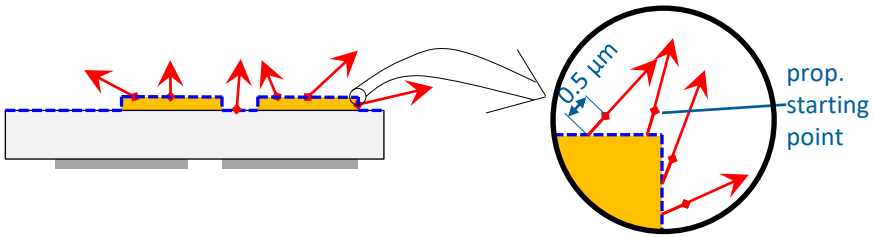
For projected raysets, the following procedure is applied for obtaining the starting points:

(1) Project rays on CAD surface (----) → ray starting points

(2) Propagate rays by 0.5 µm → propagated starting points (•)

All raysets mentioned in this readme file provide propagated starting points.

If raytracing includes the LED CAD, unpropagated rays are prone to be blocked at the surface. Rays with propagated starting points should not suffer from this problem.



LUXEON Versat Dual Color - PC Amber

Link to download folder

https://raysets.lumileds.com/index.php/s/Za8pBbtC3wTGSKW

Files available for download

Prosource

RSMX	LUXEON_Versat_Dual_Color_PCA_20211001_1478.RSMX	101 MB	

LightTools

Spectral Projected	LUXEON_Versat_Dual_Color_PCA_20211001_40MRays_proj_spectral_LT.ray	1.18 GB	40MRays
Y-Component Projected	LUXEON_Versat_Dual_Color_PCA_20211001_20MRays_proj_Y_LT.ray	534 MB	20MRays
Z-Component Projected	LUXEON_Versat_Dual_Color_PCA_20211001_20MRays_proj_Z_LT.ray	520 MB	20MRays

ASAP & LucidShape

Y-Component Projected	LUXEON_Versat_Dual_Color_PCA_20211001_20MRays_proj_Y_ASAP.dis	534 MB	20MRays
Z-Component Projected	LUXEON_Versat_Dual_Color_PCA_20211001_20MRays_proj_Z_ASAP.dis	520 MB	20MRays

OPTIS SPEOS

Y-Component Spectral Projected	LUXEON_Versat_Dual_Color_PCA_20211001_20MRays_proj_Y_spectral_Speos.ray	610 MB	20MRays
Z-Component Spectral Projected	LUXEON_Versat_Dual_Color_PCA_20211001_20MRays_proj_Z_spectral_Speos.ray	594 MB	20MRays

Zemax

Spectral Projected	LUXEON_Versat_Dual_Color_PCA_20211001_40MRays_proj_spectral_zemax.dat	1.18 GB	40MRays

Far Field

IES	LUXEON_Versat_Dual_Color_PCA_20211001_40MRays.ies	10.1 kB	

Spectrum

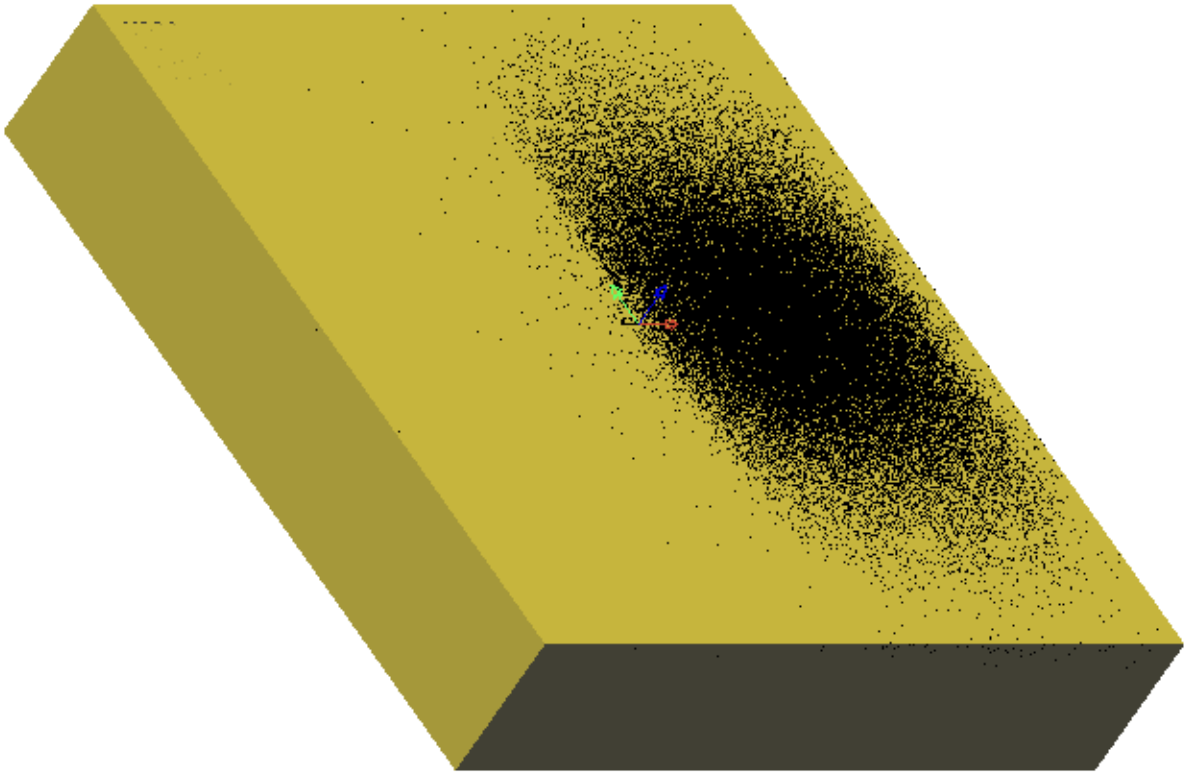
Spectrum	LUXEON_Versat_Dual_Color_PCA_20211001_spectrum.txt	17.4 kB	

CAD

STEP	LUXEON_Versat_Dual_Color_PCA_20211001_geometry.STEP	570 kB	
IGES	LUXEON_Versat_Dual_Color_PCA_20211001_geometry.IGS	600 kB	

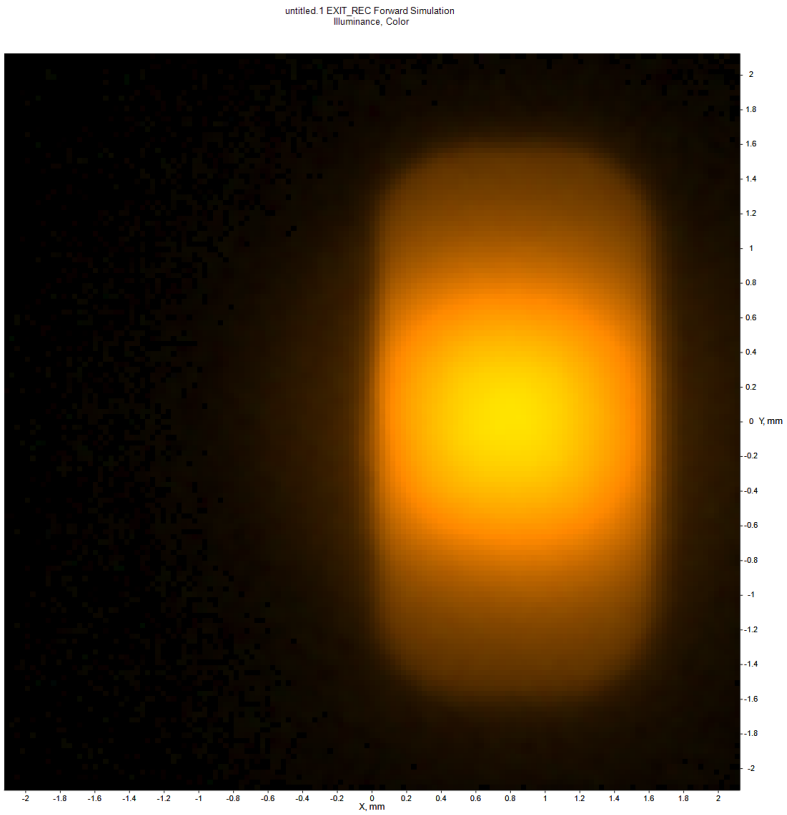
LUXEON Versat Dual Color - PC Amber

3D CAD view + ray starting points



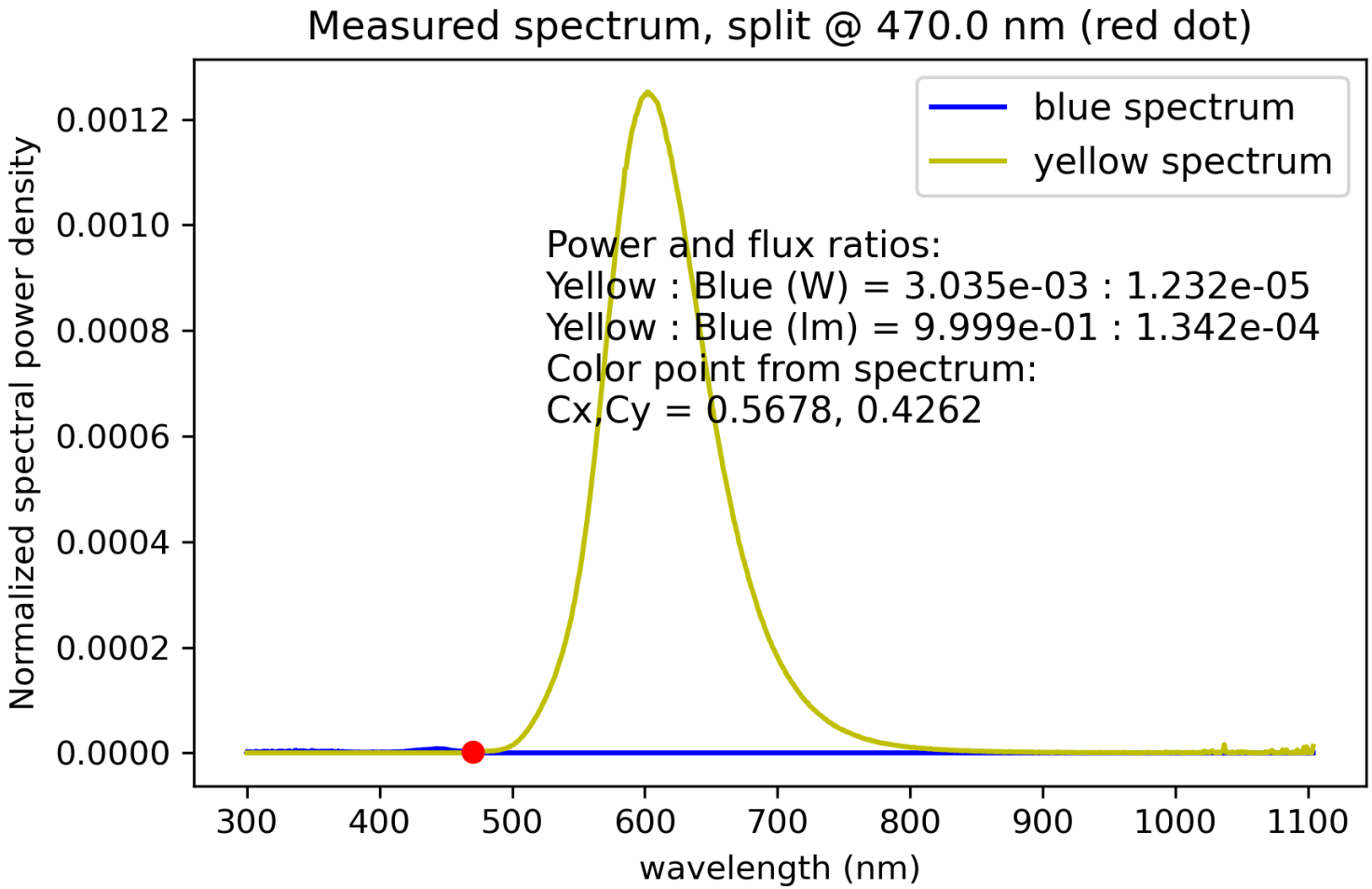
LUXEON Versat Dual Color - PC Amber

Illuminance color chart (color over position)



LUXEON Versat Dual Color - PC Amber

Measured spectrum split in blue (Z) and yellow (Y) components



LUXEON Versat Dual Color - PC Amber

Color data info

Parameter	Value
yellow : blue ratio (W) (from measured spectrum)	3.035e-03 : 1.232e-05
yellow : blue ratio (lm) (from measured spectrum)	9.999e-01 : 1.342e-04
Average color point Cx, Cy (from measured spectrum)	0.5678, 0.4262
Average color point Cx, Cy (from simulation)	0.5680, 0.4260
Color point Cx, Cy @ HV (from simulation)	0.5690, 0.4243
Average CCT (K) (from simulation)	1.772e+03

Lumileds ref.: SJ001478_LUXEON Versat Dual Color - PC Amber_20211001

Neither Lumileds Holding B.V. nor its affiliates shall be liable for any kind of loss of data or any other damages, direct, indirect or consequential, resulting from the use of the provided information and data. Although Lumileds Holding B.V. and/or its affiliates have attempted to provide the most accurate information and data, the materials and services information and data are provided “as is,” and neither Lumileds Holding B.V. nor its affiliates warrants or guarantees the contents and correctness of the provided information and data. Lumileds Holding B.V. and its affiliates reserve the right to make changes without notice. You as user agree to this disclaimer and user agreement with the use of the provided materials, information and data. A listing of Lumileds product/patent coverage may be accessed at lumileds.com/patents.

© 2021 Lumileds Holding B.V. All rights reserved.