photobiologyLamps Version 0.1.2
Catalogue of LEDs

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1 Introduction

We will plot the emission spectra of the different LEDs for which data is provided in the pacakge. We plot the spectra as spectral energy irradiance. All spectra are normalized to an area of one under the whole curve.

```
library(ggplot2)
library(photobiology)

## Loading required package:  lubridate
## Loading required package:  data.table
##
## Attaching package:  'data.table'
##
## The following objects are masked from 'package:lubridate':
##
##    hour, mday, month, quarter, wday, week, yday, year
##
##
## Attaching package:  'photobiology'
##
## The following object is masked from 'package:data.table':
##
##    rbindlist

library(photobiologyLEDs)
library(photobiologygg)

## Loading required package:  photobiologyWavebands
## Loading required package:  proto
## Loading required package:  splus2R
## Loading required package:  plyr
##
## Attaching package:  'plyr'
##
## The following object is masked from 'package:lubridate':
##
##    here
```

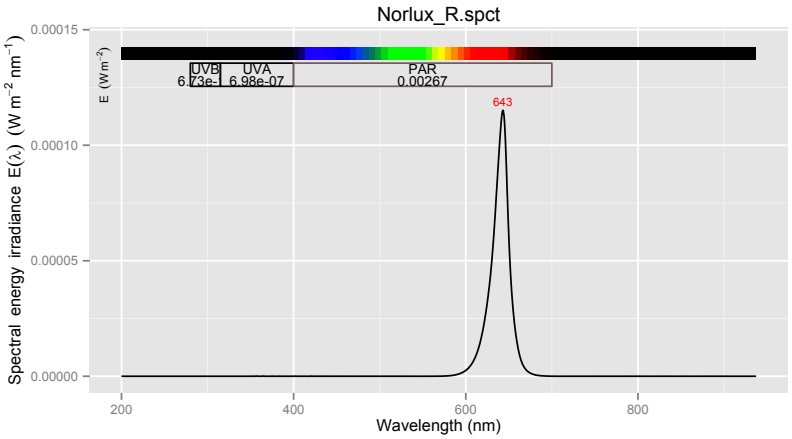
We define a function to do the actual plotting so as to not repeat code, and to make changes easier in the future.

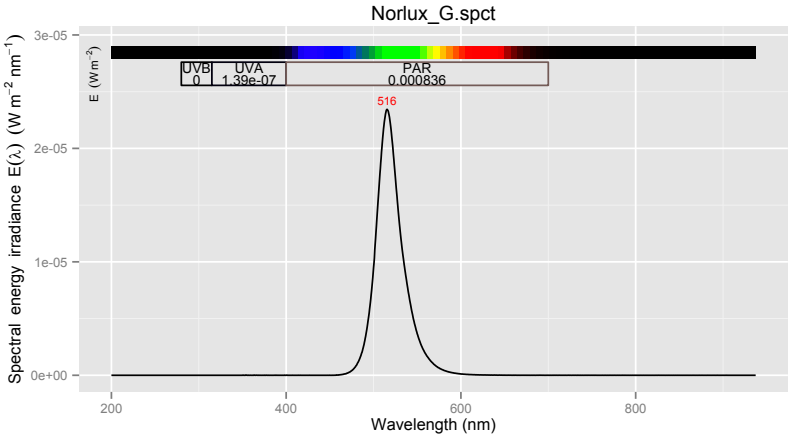
```
lamp.plotter <- function(lamp.name, w.low=250.0, w.high=900.0, scaled="area"){
  w.band <- waveband(c(w.low, w.high))
  object.name <- paste(lamp.name, ".spct", sep="")
a.spct <- copy(get(object.name))
# a.spct <- trim_spct(a.spct, w.band, fill = NA)
e2q(a.spct, byref=TRUE)
print(plot(a.spct, unit="energy") + labs(title=object.name) + theme_grey(10))
# print(plot(a.spct, unit="photon") + labs(title=object.name) + theme_grey(10))
}
```

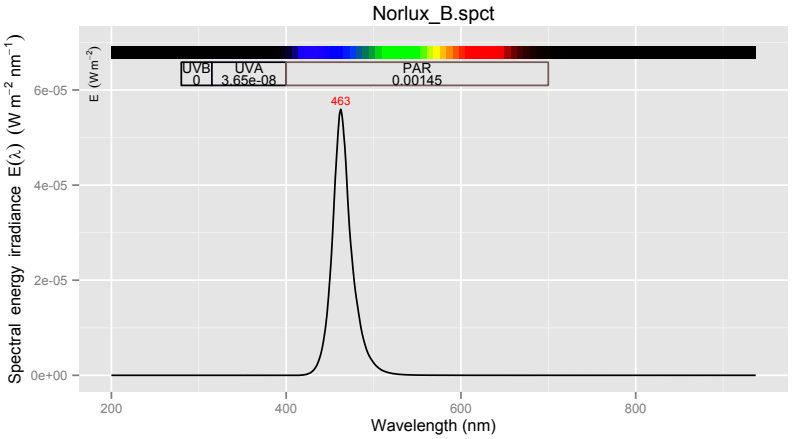
2 Norlux LED arrays

RGB array

```
Norlux.LEDs <- c("Norlux_R", "Norlux_G", "Norlux_B")
for (lamp in Norlux.LEDs) {
  lamp.plotter(lamp.name=lamp)
}
```

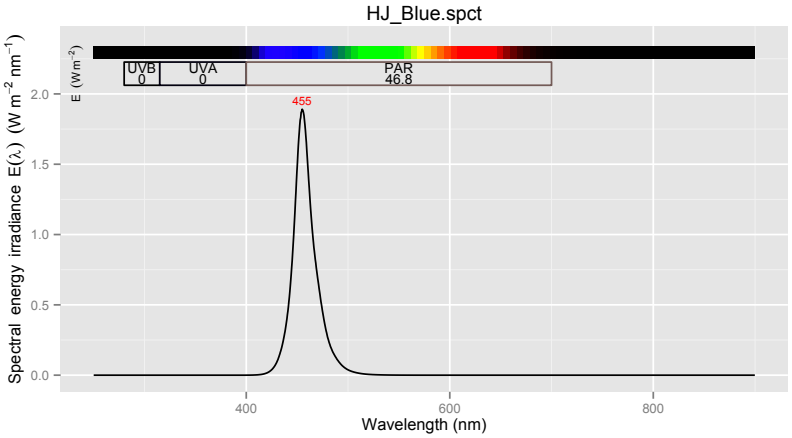






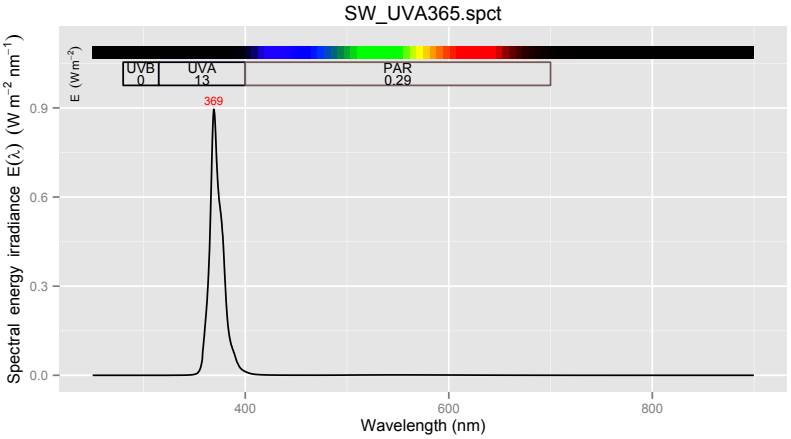
3 Huey-Jann LED arrays

```
HJ.LEDs <- c("HJ_Blue")
for (lamp in HJ.LEDs) {
  lamp.plotter(lamp.name=lamp)
}
```



4 Shezhen Weili LED arrays

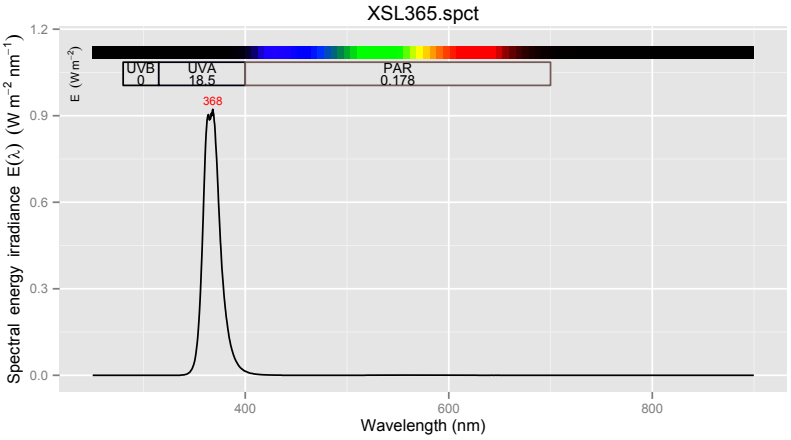
```
SW.LEDs <- c("SW_UVA365")
for (lamp in SW.LEDs) {
  lamp.plotter(lamp.name=lamp)
}
```

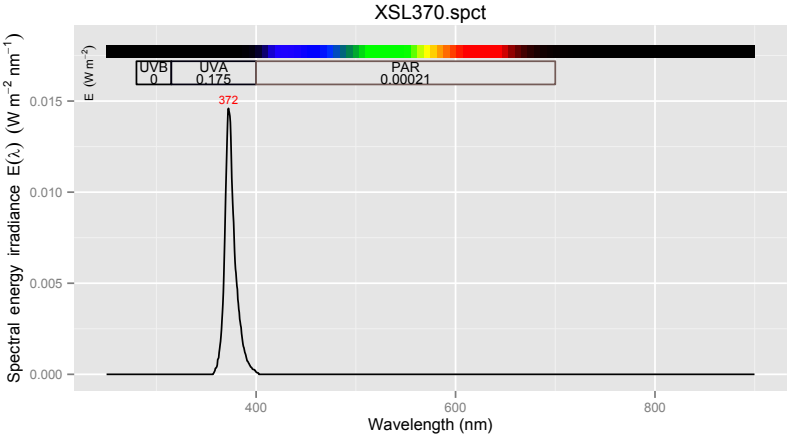


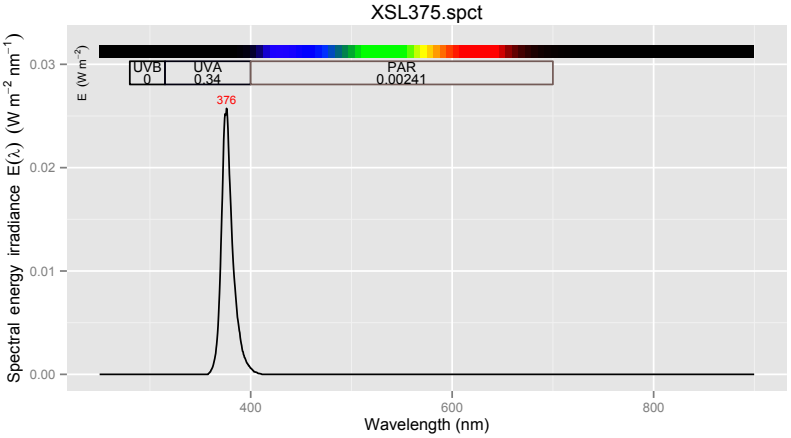
5 Roithner Laser LEDs and LED arrays

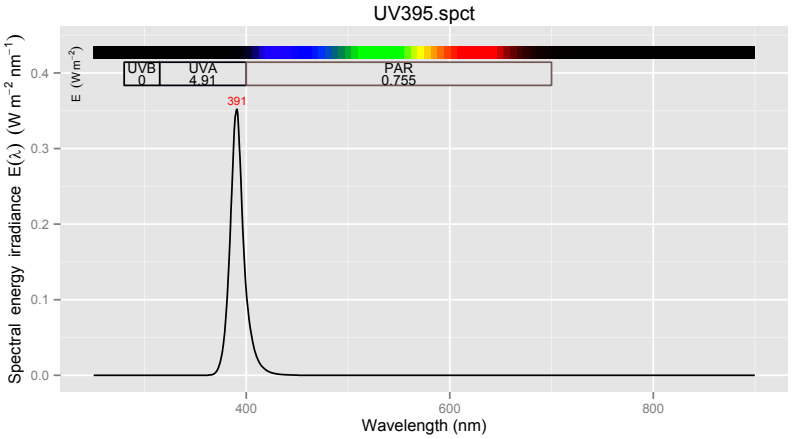
5.1 UV

```
RL.UV.LEDs <- c("XSL365", "XSL370", "XSL375", "UV395")
for (lamp in RL.UV.LEDs) {
  lamp.plotter(lamp.name=lamp)
}
```


XSL365.spct
Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 0
UVA 18.5
PAR 0.178
368
1.2
0.9
0.6
0.3
0.0
400
600
800
Wavelength (nm)


XSL370.spct
Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 0
UVA 0.175
PAR 0.00021
372
0.015
0.010
0.005
0.000
400
600
800
Wavelength (nm)


XSL375.spct
Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 0
UVA 0.34
PAR 0.00241
376
0.03
0.02
0.01
0.00
400
600
800
Wavelength (nm)



6 Tao Yuan LEDs

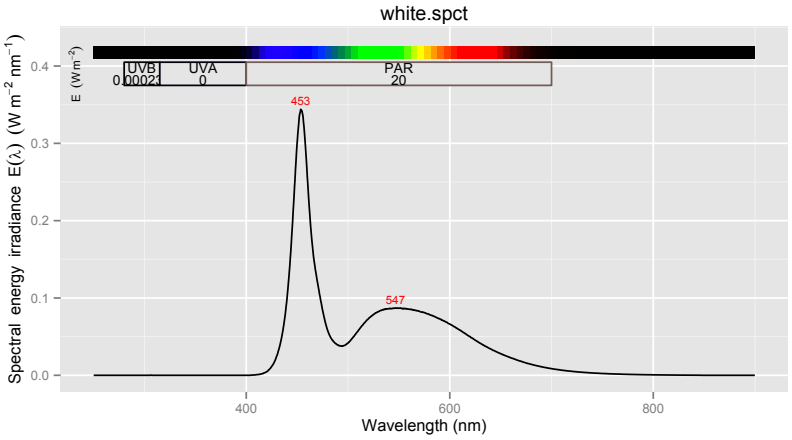
6.1 UV

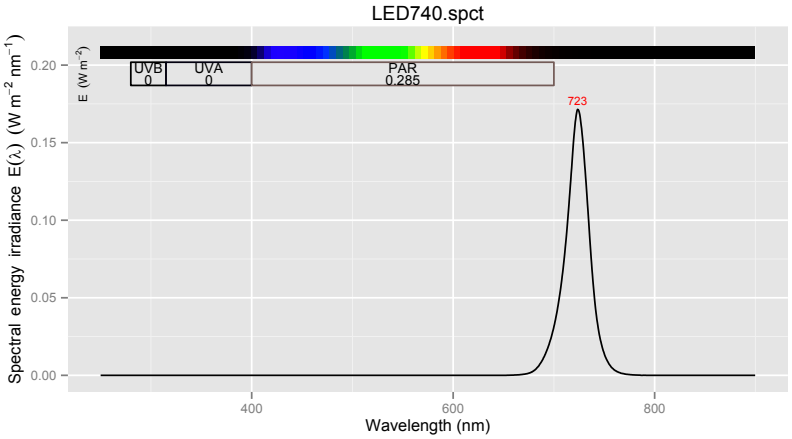
```
TY.UV.LEDs <- c("")
for (lamp in TYL.UV.LEDs) {
  lamp.plotter(lamp.name=lamp)
}
```

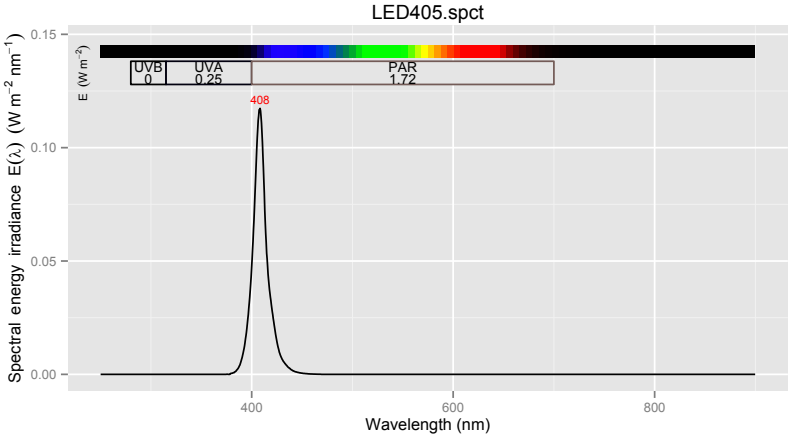
7 Other LEDs and LED arrays

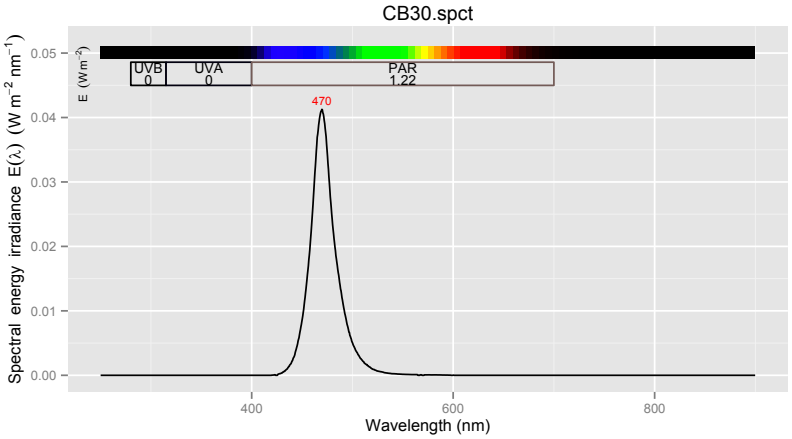
7.1 UV

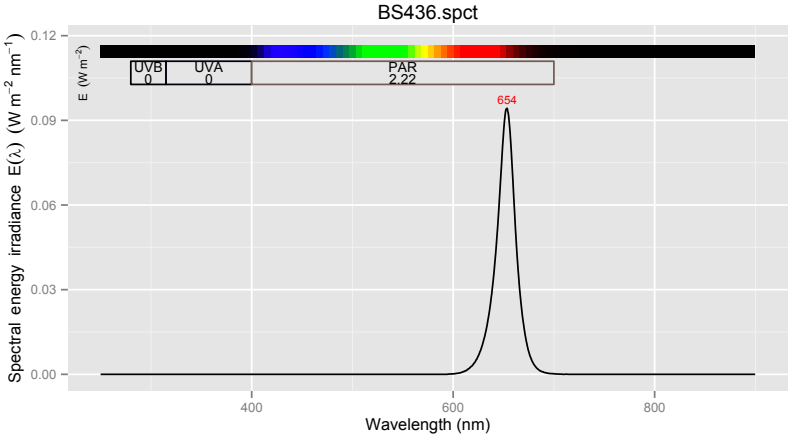
```
other.LEDs <- c("white", "LED740", "LED405", "CB30", "BS436")
for (lamp in other.LEDs) {
  lamp.plotter(lamp.name=lamp)
}
```


white.spct
Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 0.00023
UVA 0
PAR 20
453
547
0.0
0.1
0.2
0.3
0.4
400
600
800
Wavelength (nm)


LED740.spct
Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 0
UVA 0
PAR 0.285
723
0.00
0.05
0.10
0.15
0.20
400
600
800
Wavelength (nm)


LED405.spct
Spectral energy irradiance E(λ) (W m⁻² nm⁻¹)
E (W m⁻²)
UVB 0
UVA 0.25
PAR 1.72
408
0.00
0.05
0.10
0.15
400
600
800
Wavelength (nm)


CB30.spct
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
E (W m^{-2})
UVB 0
UVA 0
PAR 1.22
470
0.05
0.04
0.03
0.02
0.01
0.00
400
600
800
Wavelength (nm)


BS436.spct
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
E (W m^{-2})
UVB 0
UVA 0
PAR 2.22
654
0.12
0.09
0.06
0.03
0.00
400
600
800
Wavelength (nm)