photobiologyLamps Version 0.1.3
Catalogue of Lamps

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January 4, 2014

1 Introduction

We will plot the emission spectra of the different lamps for which data is provided in the pacakge. We plot side-by-side the lamp output as spectral energy irradiance and as spectral photon irradiance. All spectra are normalized to an area of one under the whole curve.

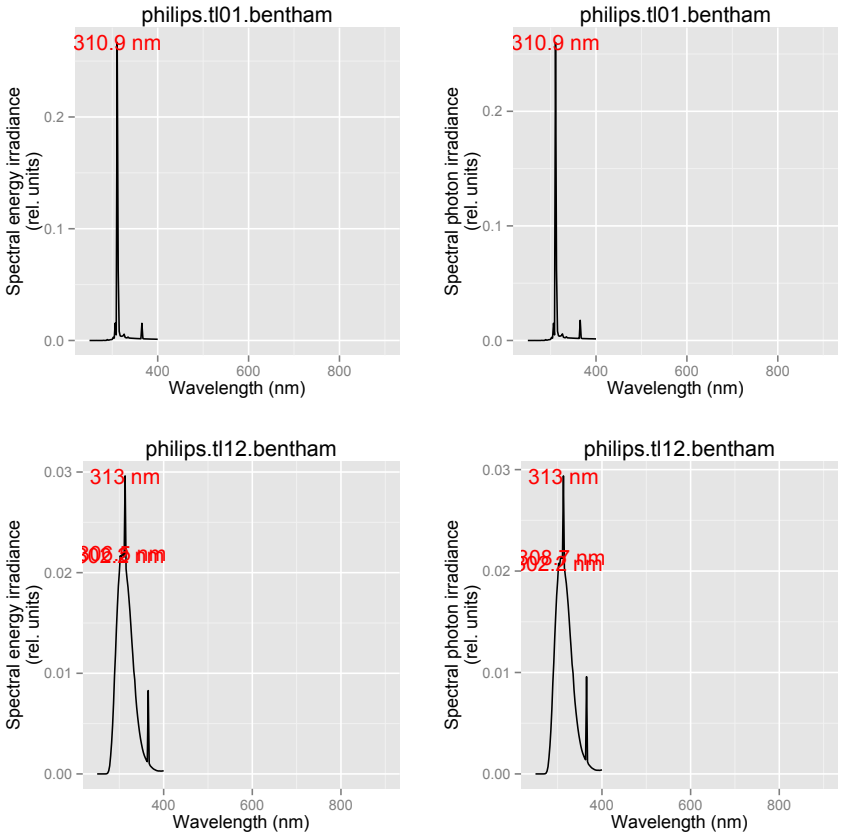
```
library(ggplot2)
library(photobiology)
library(photobiologyLamps)
library(photobiologygg)

## Loading required package:  proto
## Loading required package:  splus2R
```

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

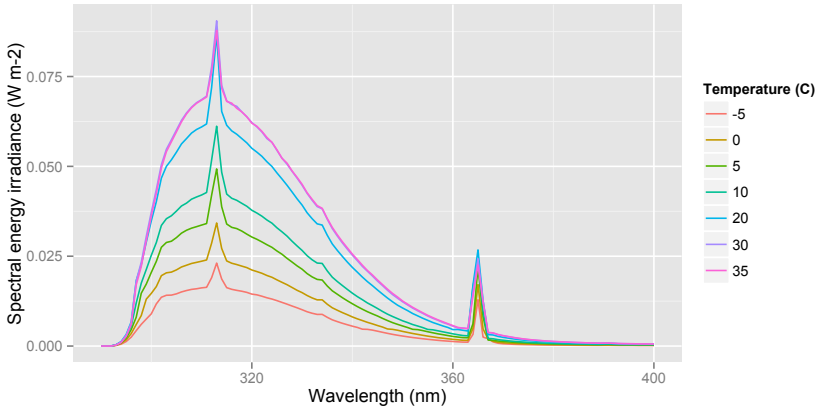
```
lamp.plotter <- function(lamp.name, w.low = 250, w.high = 900, scaled = "area") {
    w.length.out <- seq(from = w.low, to = w.high, length.out = 300)
    e.spectrum.data <- calc_lamp_output(w.length.out = w.length.out, lamp.name = lamp.name,
        unit.out = "energy", scaled = scaled)
    q.spectrum.data <- calc_lamp_output(w.length.out = w.length.out, lamp.name = lamp.name,
        unit.out = "photon", scaled = scaled)
    e.spectrum.data <- na.omit(e.spectrum.data)
    q.spectrum.data <- na.omit(q.spectrum.data)
    fig_energy <- ggplot(aes(x = w.length, y = s.irrad), data = e.spectrum.data) +
        xlim(w.low, w.high) + labs(x = "Wavelength (nm)", y = "Spectral energy irradiance\n(rel. units)",
        title = lamp.name) + geom_line() + stat_peaks(ignore_threshold = 0.33,
        colour = "red")
    fig_photon <- ggplot(aes(x = w.length, y = s.irrad), data = q.spectrum.data) +
        xlim(w.low, w.high) + labs(x = "Wavelength (nm)", y = "Spectral photon irradiance\n(rel. units)",
        title = lamp.name) + geom_line() + stat_peaks(ignore_threshold = 0.33,
        colour = "red")
    print(fig_energy)
    print(fig_photon)
}
```

2 UV-B lamp spectra

```
UVB.lamps <- c("philips.tl01.bentham", "philips.tl12.bentham")
for (lamp in UVB.lamps) {
    lamp.plotter(lamp.name = lamp)
}
```




```
fig_temp <- ggplot(data = qpanel.uvb313.temperature.data, aes(x = w.length,
    y = s.e.irrad, colour = factor(temperature)))
fig_temp <- fig_temp + geom_line() + labs(x = "Wavelength (nm)", y = "Spectral energy irradiance (W m-2)",
    colour = "Temperature (C)")
print(fig_temp)
```

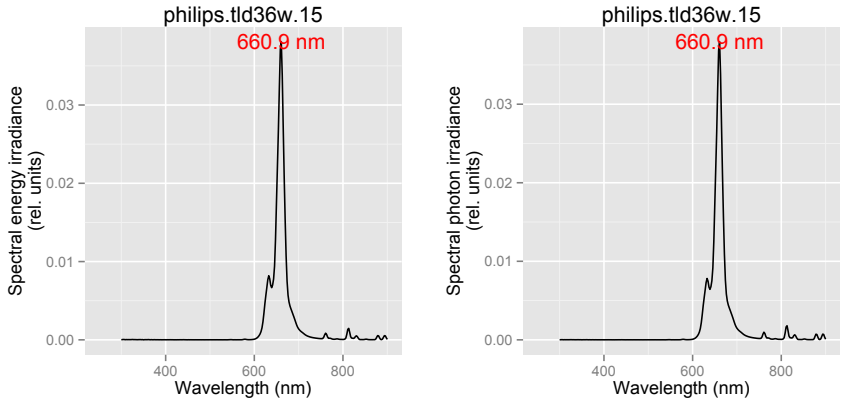


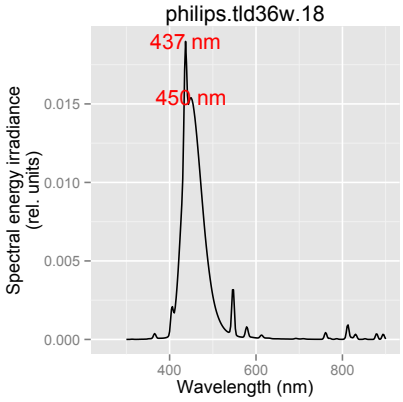
3 UV-A lamp spectra

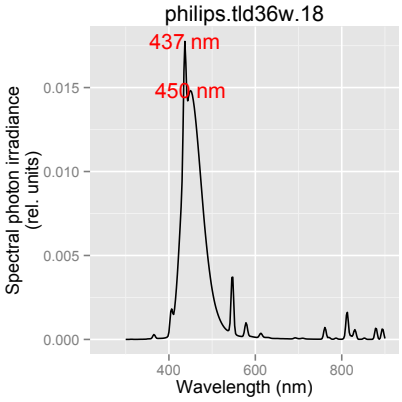
```
UVA.lamps <- c()
for (lamp in UVA.lamps) {
    lamp.plotter(lamp.name = lamp)
}
```

4 Narrow spectrum VIS lamps

```
colour.lamps <- c("philips.tld36w.15", "philips.tld36w.18")
for (lamp in colour.lamps) {
    lamp.plotter(lamp.name = lamp)
}
```

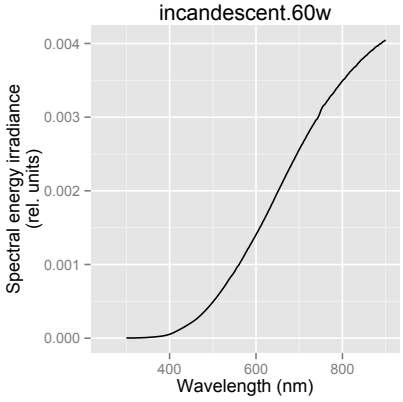


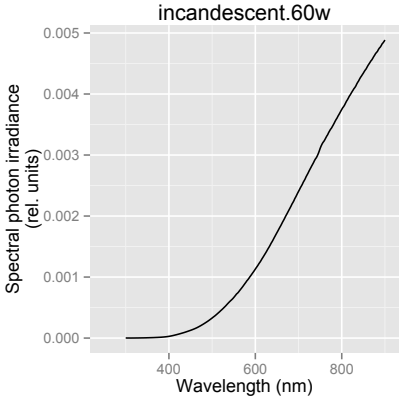


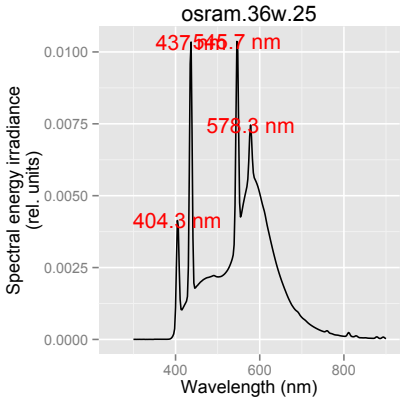


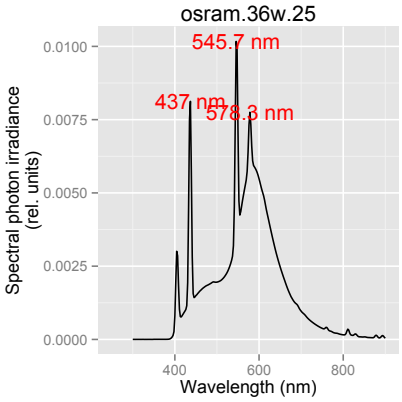
5 Broad VIS lamps

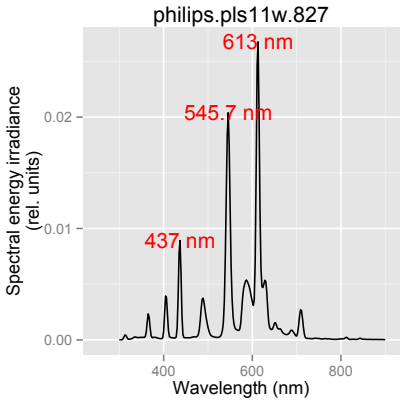
```
white.lamps <- c("incandescent.60w", "osram.36w.25", "philips.pls11w.827", "philips.tld36w.83",
    "philips.tld36w.865", "philips.tld36w.89", "philips.tld36w.92", "philips.tll36w.950",
    "sylvania.215w.vho")
for (lamp in white.lamps) {
    lamp.plotter(lamp.name = lamp)
}
```

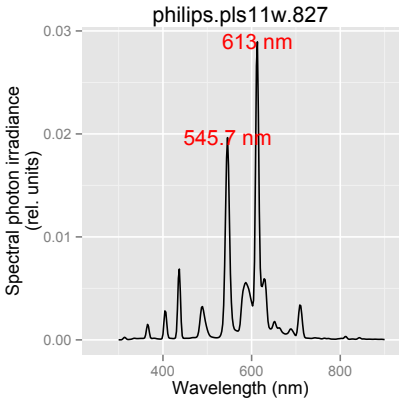


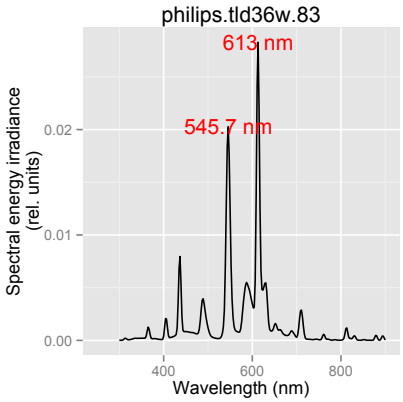


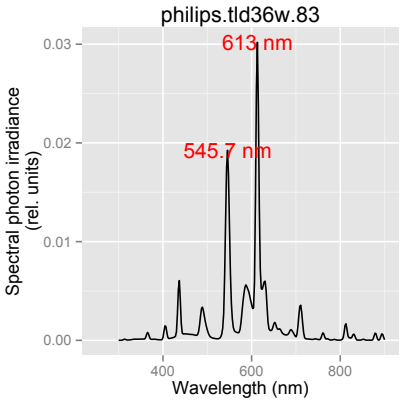

osram.36w.25
545.7 nm
578.3 nm
404.3 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)

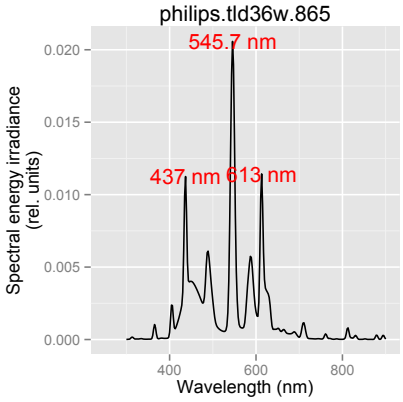

osram.36w.25
545.7 nm
437 nm
578.3 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)

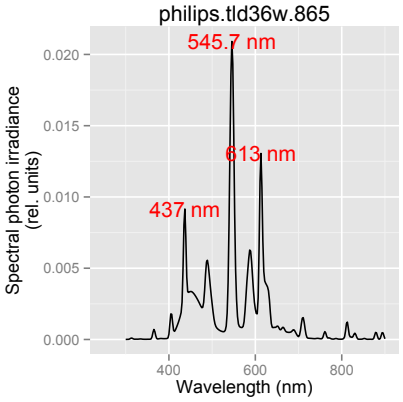

philips.pls11w.827
613 nm
545.7 nm
437 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)

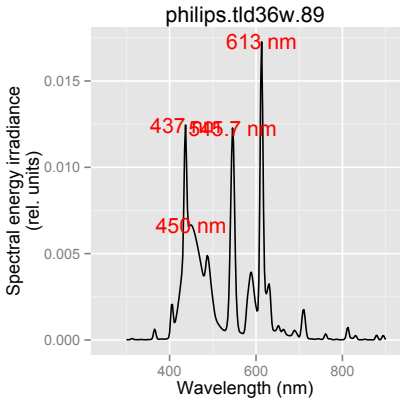

philips.pls11w.827
613 nm
545.7 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)

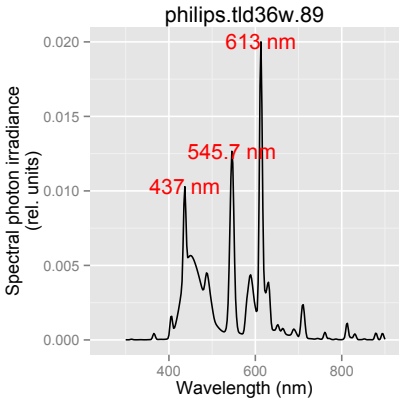

philips.tld36w.83
613 nm
545.7 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)

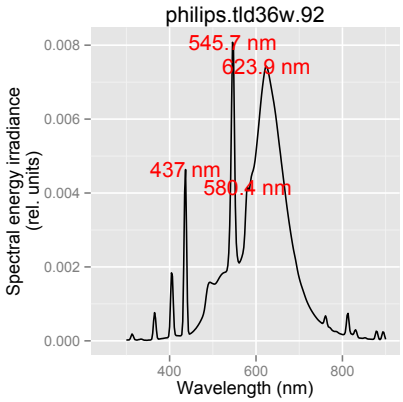

philips.tld36w.83
613 nm
545.7 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)

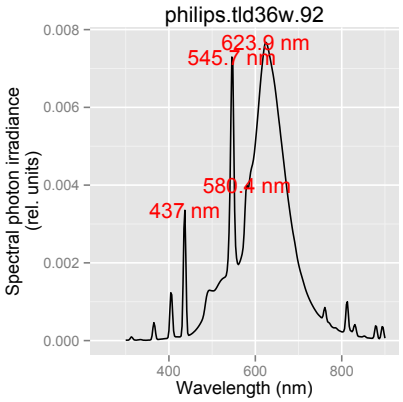

philips.tld36w.865
545.7 nm
437 nm
613 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)

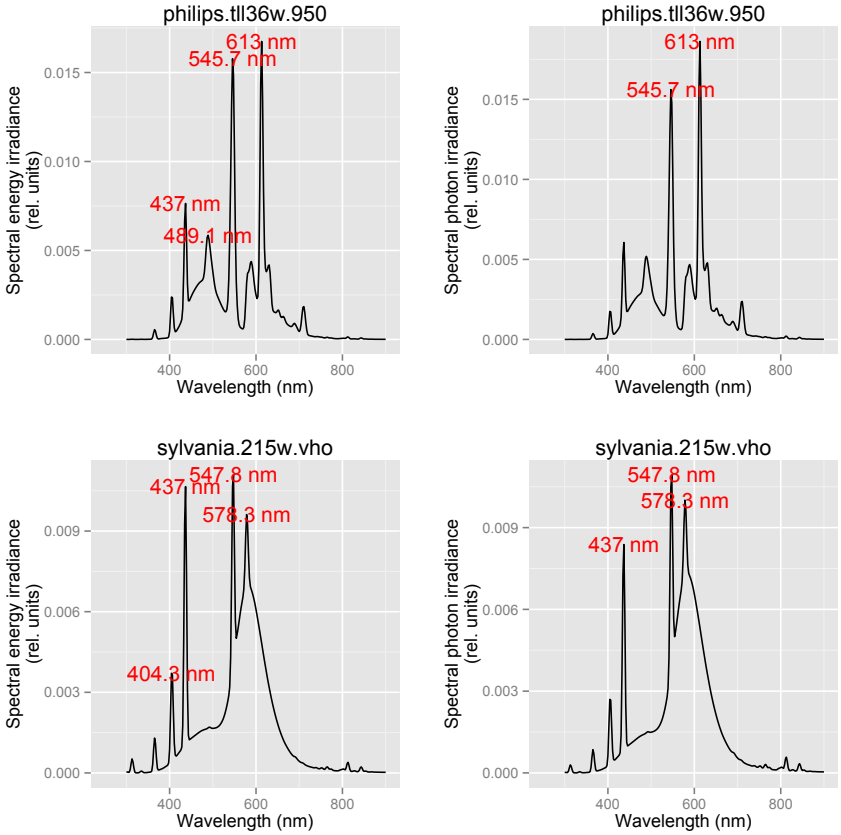

philips.tld36w.865
545.7 nm
613 nm
437 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)


philips.tld36w.89
613 nm
545.7 nm
437 nm
450 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)


philips.tld36w.89
613 nm
545.7 nm
437 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)


philips.tld36w.92
545.7 nm
623.0 nm
437 nm
580.4 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)


philips.tld36w.92
623.0 nm
545.7 nm
580.4 nm
437 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)


philips.tll36w.950
613 nm
545.7 nm
437 nm
489.1 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)
philips.tll36w.950
613 nm
545.7 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)
sylvania.215w.vho
547.8 nm
437 nm
578.3 nm
404.3 nm
Spectral energy irradiance (rel. units)
Wavelength (nm)
sylvania.215w.vho
547.8 nm
578.3 nm
437 nm
Spectral photon irradiance (rel. units)
Wavelength (nm)