photobiologyLamps Version 0.3.4
Catalogue of Lamps

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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.

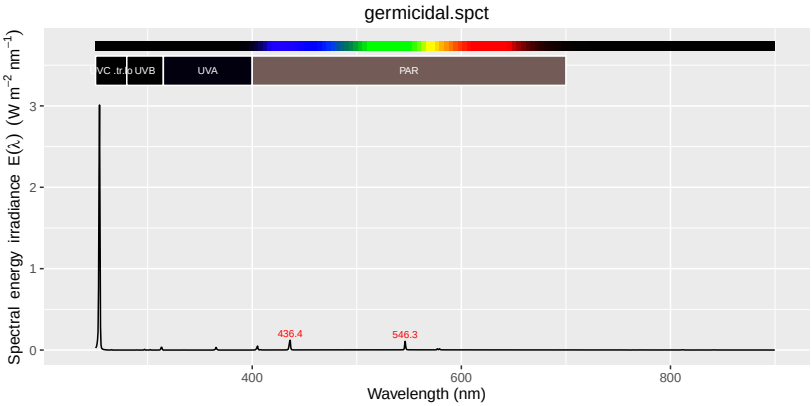
```
library(photobiology)
library(photobiologyWavebands)
library(photobiologyLamps)
library(ggplot2)
library(ggspectra)
```

```
options(photobiology.plot.annotations =
          c("boxes", "labels", "colour.guide", "peaks", "title"))
```

2 UV-C lamp spectra

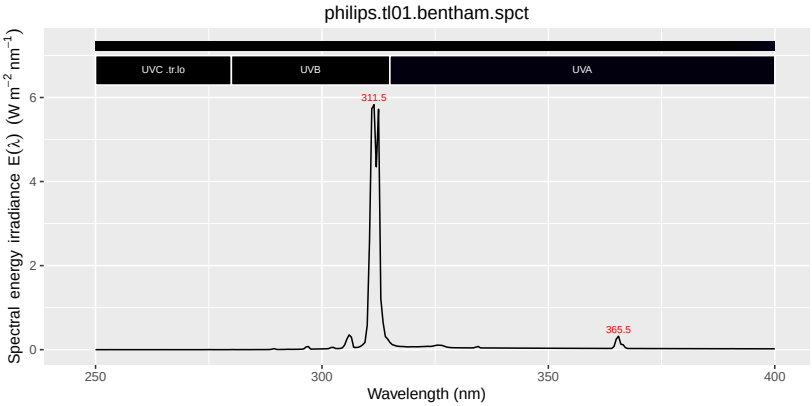
```
plot(germicidal.spct)
cat(comment(germicidal.spct))
```

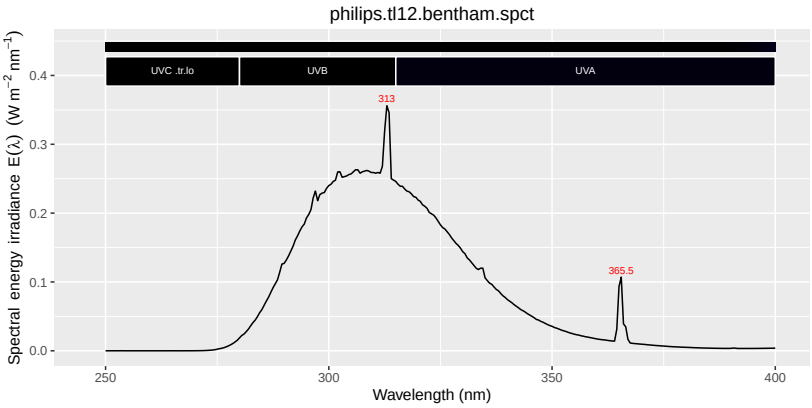
```
## Spectrometer: MayaPro2000 s/n MAYP11278
## Bench with grating HC1, filter 000 and slit 010s
## Measured on 2015-06-02 10:42:35
## processed on 2015-06-02 with MayaCalc ver 3.2.3
## using HDR: TRUE, using NR: TRUE, method: original
## calibration dated (automatic): 2014-10-15
## number of scans        :         6,         1
## integration times (ms) :     943.1,    9430.6
## total times (s)        :    5.6584,    9.4306
## max counts             : 51087 out of 64000 (80%)
## signal O.K.
```



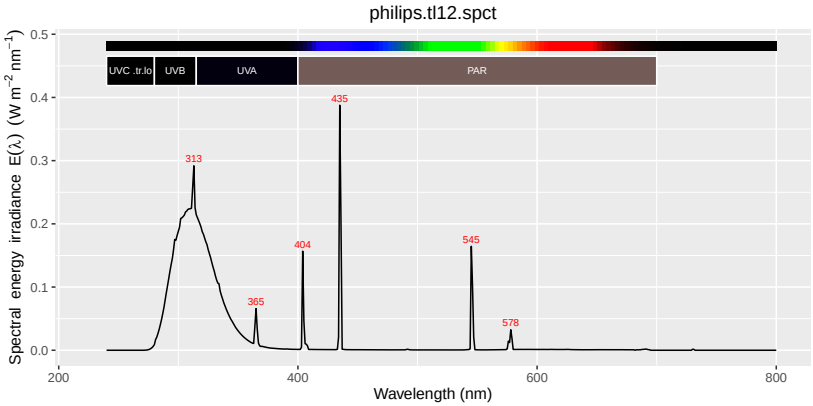
3 UV-B lamp spectra

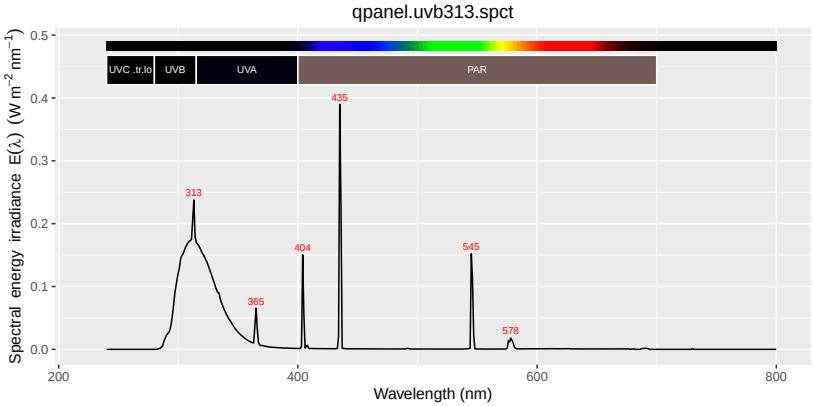
```
plot(philips.tl01.bentham.spct)
plot(philips.tl12.bentham.spct)
```



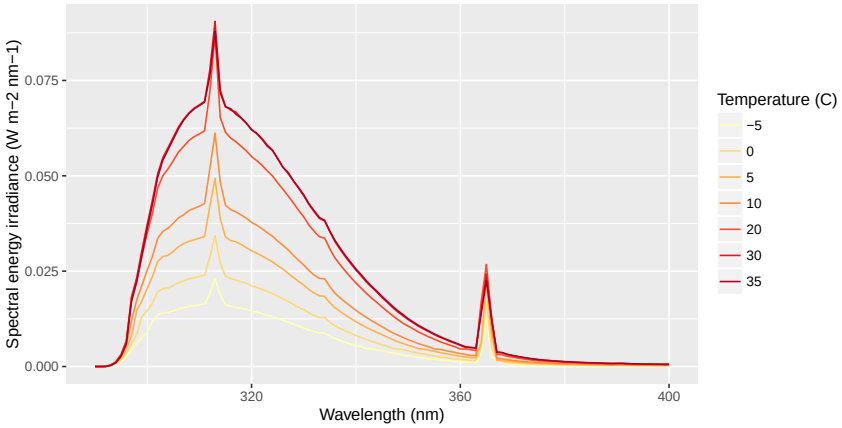


```
plot(philips.tl12.spct)
plot(qpanel.uvb313.spct)
```

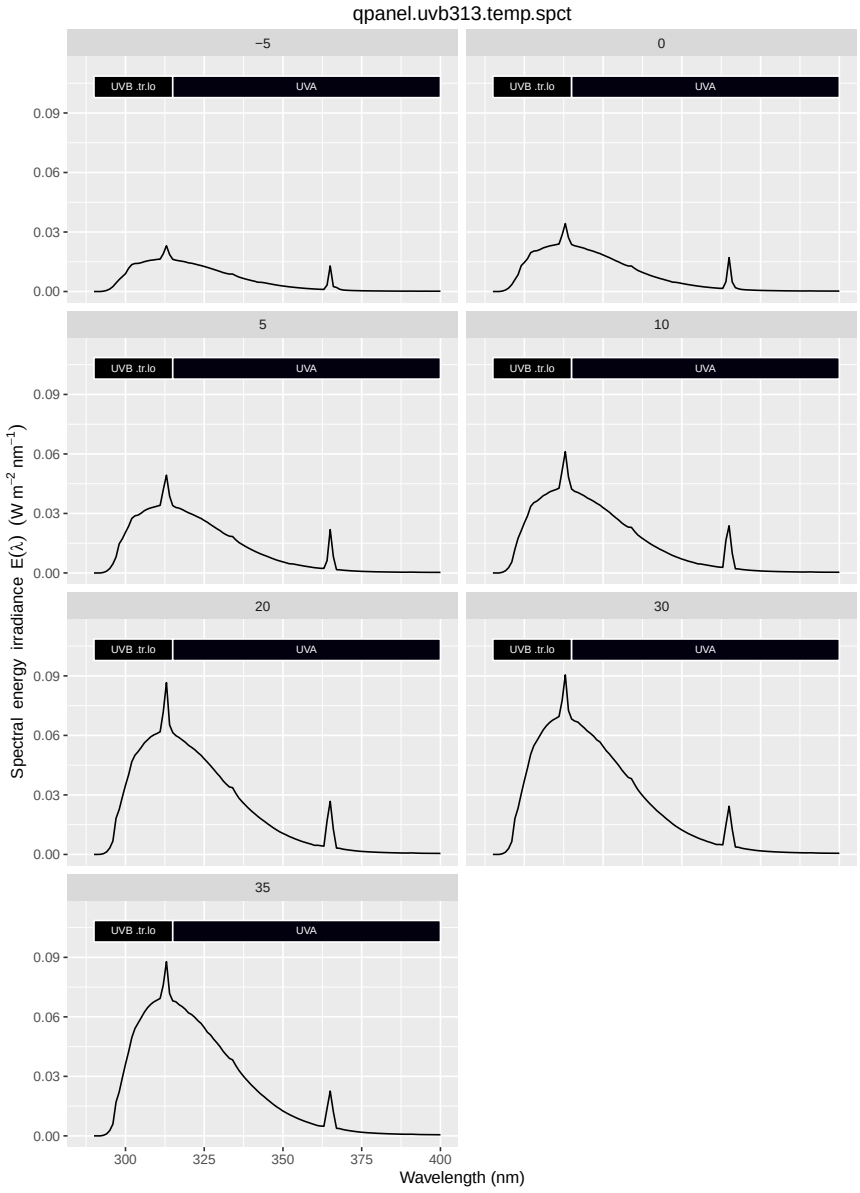





```
fig_temp <- ggplot(data=qpanel.uvb313.temp.spct,
                   aes(x=w.length, y=s.e.irrad, colour=factor(temperature))) +
                scale_colour_brewer(type="seq", palette="YlOrRd")
fig_temp <- fig_temp + geom_line() +
  labs(x="Wavelength (nm)", y="Spectral energy irradiance (W m-2 nm-1)",
       colour="Temperature (C)")
print(fig_temp)
```

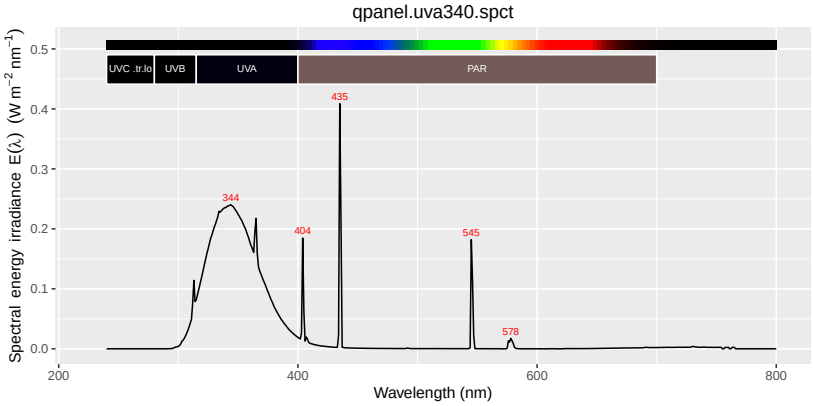

Spectral energy irradiance (W m−2 nm−1)
0.075
0.050
0.025
0.000
320
360
400
Wavelength (nm)
Temperature (C)
−5
0
5
10
20
30
35

```r
qpanel.uvb313.temp.spct$temperature <- factor(qpanel.uvb313.temp.spct$temperature)
plot(qpanel.uvb313.temp.spct, annotations = c("boxes", "labels", "title")) +
  facet_wrap(~temperature, ncol = 2)
```



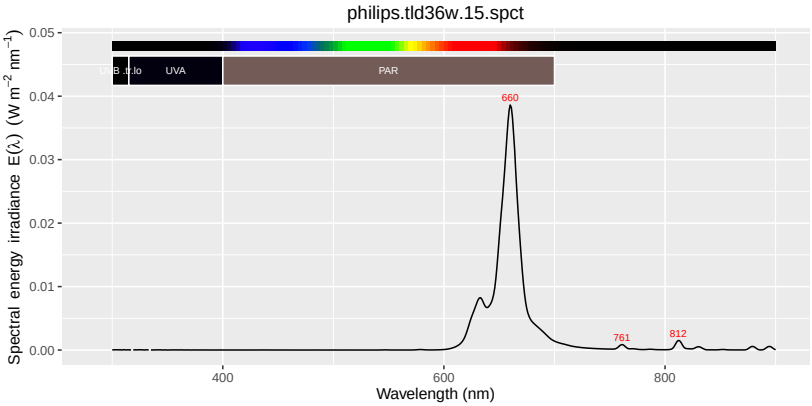
4 UV-A lamp spectra

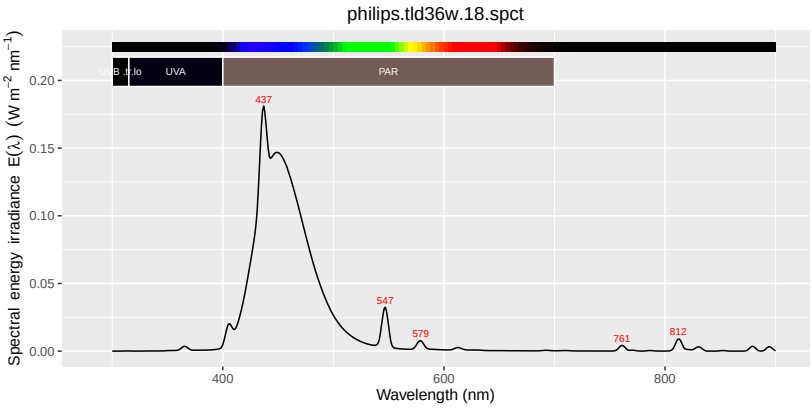
```
plot(qpanel.uva340.spct)
```



5 Narrow spectrum VIS lamps

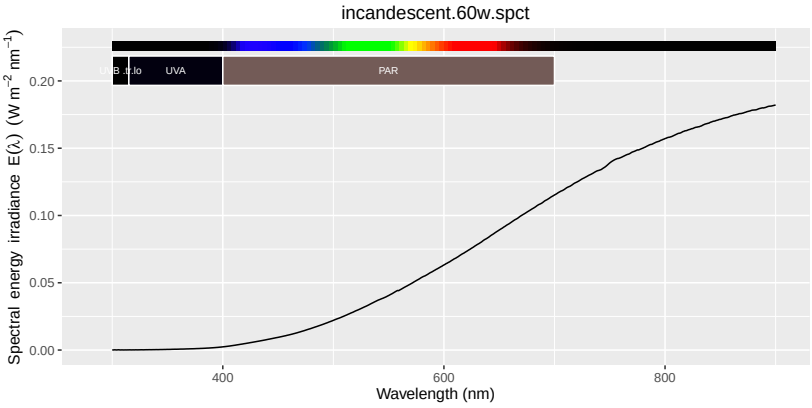
```
plot(philips.tld36w.15.spct)
plot(philips.tld36w.18.spct)
```

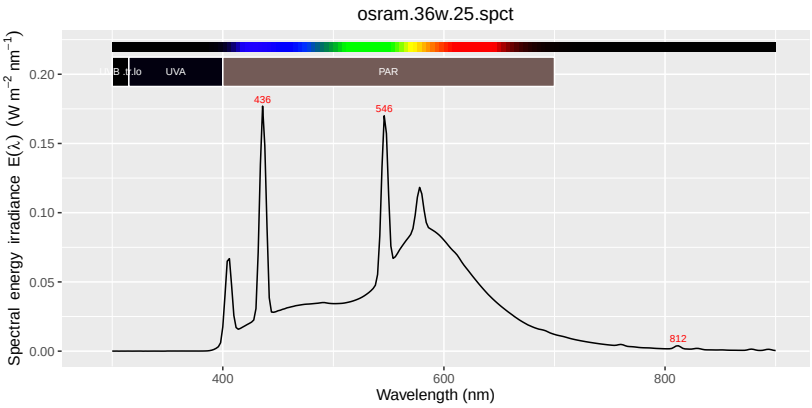


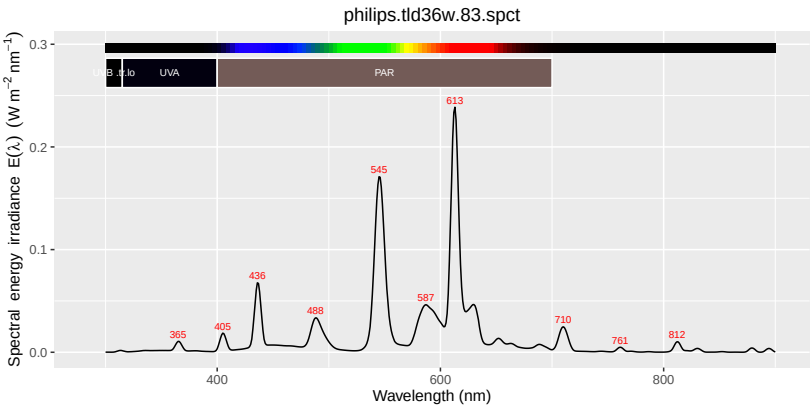


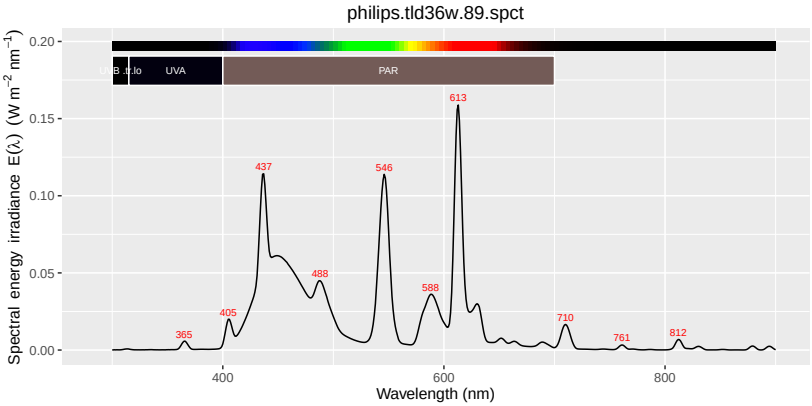
6 Broad VIS lamps

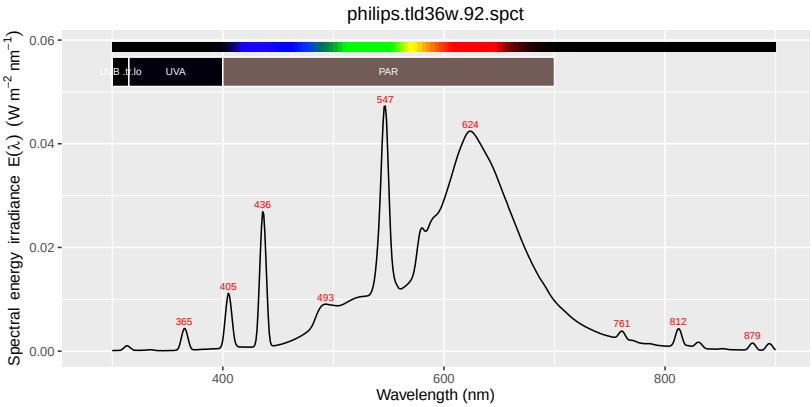
```
plot(incandescent.60w.spct)
plot(osram.36w.25.spct)
plot(philips.tld36w.83.spct)
plot(philips.tld36w.89.spct)
plot(philips.tld36w.92.spct)
plot(philips.tld36w.865.spct)
plot(philips.tl136w.950.spct)
plot(philips.pls11w.827.spct)
plot(sylvania.215w.vho.spct)
```

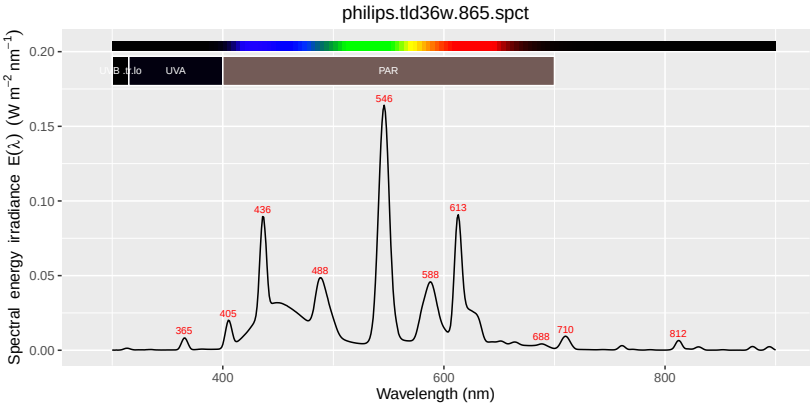

incandescent.60w.spct
UVA
PAR
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
0.00
0.05
0.10
0.15
0.20
400
600
800
Wavelength (nm)

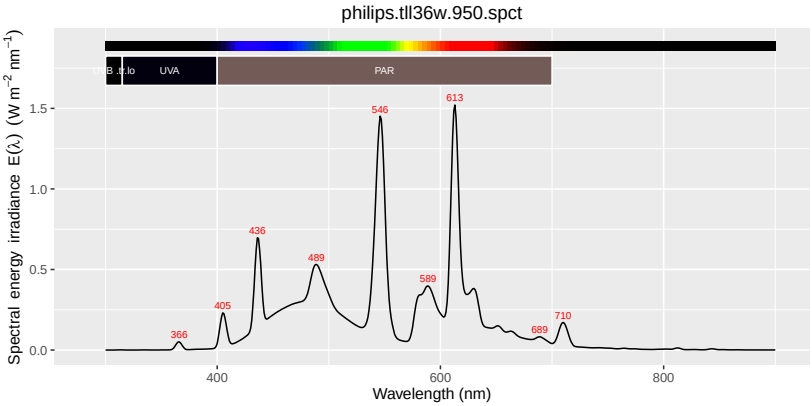

osram.36w.25.spct
UVA
PAR
436
546
812
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
0.00
0.05
0.10
0.15
0.20
400
600
800
Wavelength (nm)

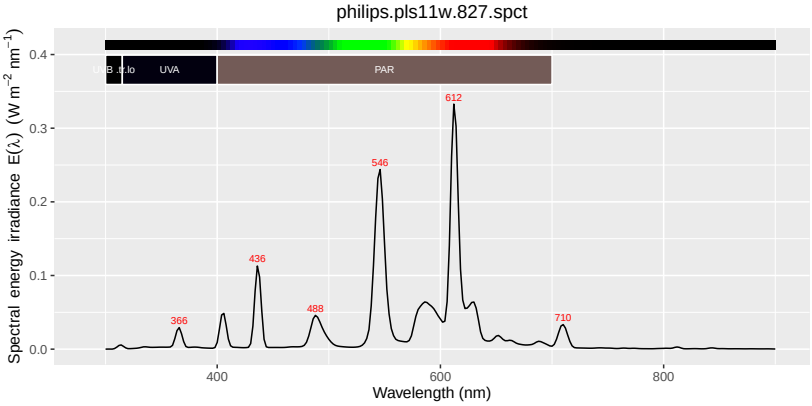

philips.tld36w.83.spct
UVA
PAR
365
405
436
488
545
587
613
710
761
812
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
0.0
0.1
0.2
0.3
400
600
800
Wavelength (nm)

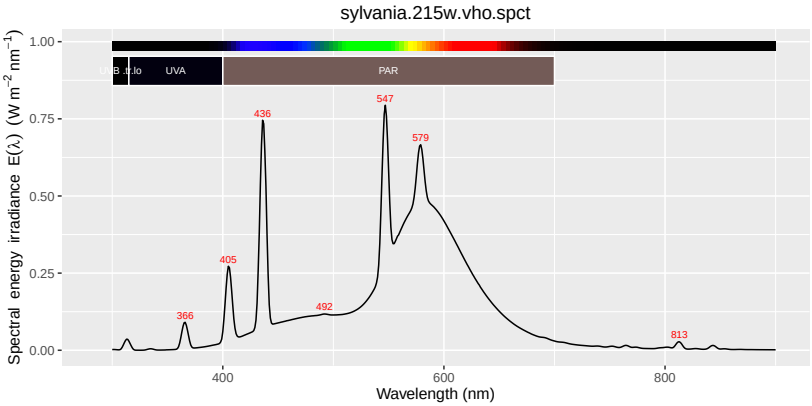

philips.tld36w.89.spct
UVB
UVA
PAR
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
0.20
0.15
0.10
0.05
0.00
365
405
437
488
546
588
613
710
761
812
400
600
800
Wavelength (nm)


philips.tld36w.92.spct
UVB
UVA
PAR
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
0.06
0.04
0.02
0.00
365
405
436
493
547
624
761
812
879
400
600
800
Wavelength (nm)


philips.tld36w.865.spct
UVB
UVA
PAR
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
0.20
0.15
0.10
0.05
0.00
365
405
436
488
546
588
613
688
710
812
400
600
800
Wavelength (nm)



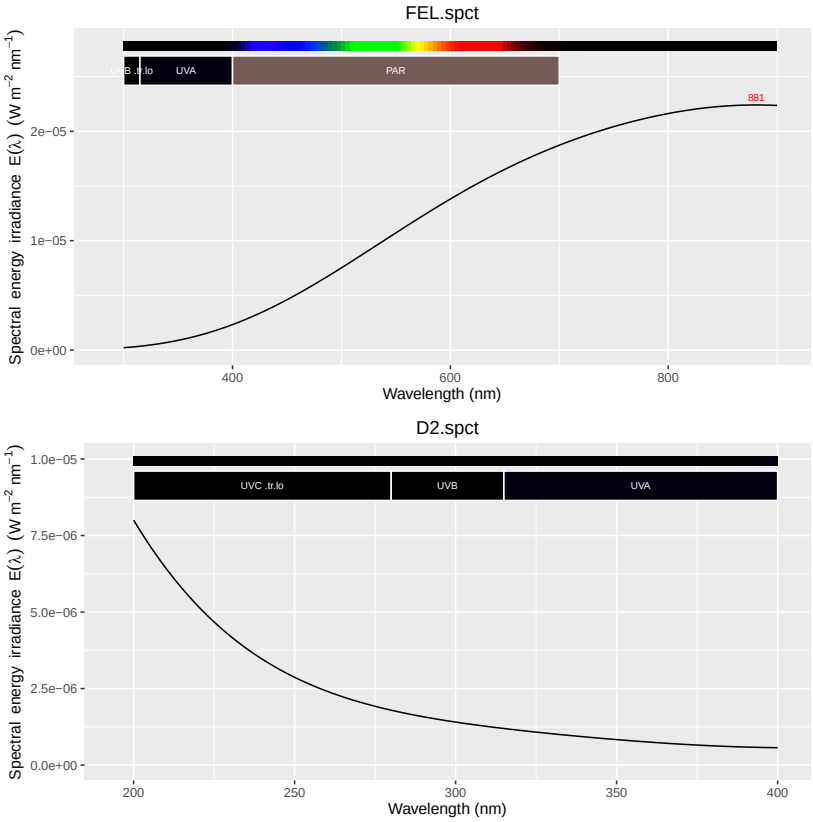




7 Calibration lamps

```
FEL.spct <- FEL_spectrum(300:900)
D2.spct <- D2_spectrum(200:400)
plot(FEL.spct)
```

```
plot(D2.spct)
```


FEL.spct
UVB .tr.lo
UVA
PAR
881
2e−05
1e−05
0e+00
400
600
800
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
Wavelength (nm)
D2.spct
UVC .tr.lo
UVB
UVA
1.0e−05
7.5e−06
5.0e−06
2.5e−06
0.0e+00
200
250
300
350
400
Spectral energy irradiance E(λ) (W m^{-2} nm^{-1})
Wavelength (nm)