

getphot_xy

Calculating synthetic photometry for the SDSS system (ugriz) ; from an input spectrum

Syntax

```
getphot_xy,x,y,u,g,r,i,z[,plot=plot,trap=trap,spl=spl,fuv=fuv,nuv=nuv,red=red]
```

Return Value

u float u magnitude

g float g magnitude

r float r magnitude

i float i magnitude

z float z magnitude

Arguments

x (float array) Array of wavelengths (\AA)

y (float array) Array of fluxes (F_λ in $\text{erg/cm}^2/\text{s}/\text{\AA}$)

Keywords

- trap changes the integration method from a 5-point Newton-Cotes formula to the composed trapezoidal rule
- spl changes the interpolation of the filter responses to splines instead of linear
- nuv GALEX band is output on request
- fuv GALEX band output on request
- red - adds some amount of reddening (std. R=3.1 curve, see Fitzpatrick 1999, PASP, 111, 63; astro-ph/9809387)

1 Discussion

The integration follows, for example, Fukugita et al. (1996). The response are for photon detectors, so the calculation of the magnitudes is

$$m = -2.5 \log \frac{num}{den} - 48.60 \quad (1)$$

where

$$num = \int f_\nu S_\nu d(\log(\nu)) \propto \int f_\nu \frac{S_\nu}{\lambda} d\lambda \quad (2)$$

and

$$den = \int S_\nu d(\log(\nu)) \propto \int \frac{S_\nu}{\lambda} d\lambda. \quad (3)$$

and S_ν are the filter responses.

The code uses `int_tabulated` (an IDL intrinsic) by default, but the trapezoidal rule can be used as well (`trapz.pro`). The de-reddening routine, `fm_unred.pro`, is part of `idlutils` and the `astro` IDL library.

The code requires for working a set of data files with the response for the SDSS (and GALEX, if the keywords `fuv/nuv` are used) passbands. These can be downloaded from http://leda.as.utexas.edu/stools/data/sdss_galex_response.tar.gz, and users need to modify the `rpath` variable in the source code to point to the right place.

Version History

C. Allende Prieto, UT, Aug 2002

" Feb 2004 - changed to handle the lack of model fluxes graciously

May 2005 - changed to interpolate the responses instead of the fluxes; keywords `trap` and `spl` added

June 2008 - adapted from `getphot.pro`

October 2008 - added `nuv/fuv` keywords

April 2010 - avoid returning a modified `y` array

October 2011 – added `red` keyword

2 references

Fukugita, M., Ichikawa, T., Gunn, J. E., et al. 1996, AJ, 111, 1748