getew_xy

Automatic determination of the EW of a spectral line by fitting Gaussian and Voigt profiles. The fits are forced to match the continuum at 1.0 and, in the case of a Voigt profile, the center of the line at is fixed to the position determined by the Gaussian fit.

Syntax

GETEW_XY,x,y,ew,a=a,b=b,noplot=noplot,cont=cont,restrict=restrict, [yerror=yerror, ...plus any plotting keywords]

Return Values

ew - dblarr(2) Equivalent width determined from the Gaussian and the Voigt fits (angstroms). A zero value is returned when the measurement could not be performed.

Arguments

x - (float or double array) Vector with wavelengths

y - (float or double array) Vector with normalized flux

Keywords

- a (float array) – Gaussian parameters $f = a(0) * exp(-((x - a(1))/a(2))^2./2) + a(3)$
- b (float) – Voigt profile parameters $f = b(0) * voigt(b(2), (x - b(1)) * b(1)^2/b(3)) + b(4)$
- cont – when switched on, the continuum location becomes a fitting parameter (otherwise fixed to 1.0)
- restrict – when on, the initial search for the line center (mideshift_xy) is restricted to 'restrict' from the mean of x (same units as in x)

- yerror – std. deviation between data and model in the area used for least-squares fitting. As ew, this is a 2-element array, with the first element for the Gaussian fit and the second for the Voigt fit
- Extra keywords are passed along to plot (e.g. yrange, charsize, etc.)

Discussion

This routine is intended for measuring, in an automated fashion, the equivalent width of an absorption line in a spectrum. The Gaussian fit is robust, but the same is not true for the Voigt fittings, so close supervision is needed for the latter option.

The numerical integration of the fits goes on only out to the limits of the input wavelength window. The only points taken into account in the fit are those from the line center up to the first place where the slope changes sign (to avoid blends).

The IDL intrinsic routine curvefit.pro, which is used by this procedure, will sometimes crash when there are not enough points to fit. Modifying curvefit.pro so that routine will exit more graciously when problems are found is recommended for batch applications.

Version History

Carlos Allende Prieto, UT, coded in Oct 2001

CAP , UT, April 2006, Voigt fitting enabled, 'height' and 'continuum' are included as fitting parameters, and so is 'center' for the Gaussian case. Keywords 'cont' and 'restrict' added

CAP , UT, February 2009, yerror keyword added

CAP , IAC, July 2011, accepted extra keywords for 'plot'