

## flux: calculate fluxes

Calculate the flux of the current model between certain limits.

**Syntax:**        **flux** [<lowEnergy> [ <hiEnergy>]] [err <number> <level> | noerr]

where <lowEnergy> and <hiEnergy> are the values over which the flux is calculated. Initial default values are 2 to 10 keV.

The flux is given in units of photons  $\text{cm}^{-2} \text{s}^{-1}$  and ergs  $\text{cm}^{-2} \text{s}^{-1}$ . The energy range must be contained by the range covered by the current spectra (which determine the range over which the model is evaluated). Values outside this range will be reset automatically to the extremes. Note that the energy values are two separate arguments, and are NOT connected by a dash. (see parameter ranges in the freeze command).

The flux will be calculated for all loaded spectra. If no spectra are loaded (or none of the loaded spectra have a response), the model is evaluated over the energy range determined by its dummy response. (In XSPEC12, models are automatically assigned default dummy responses when there is no data, so the dummyrsp command need not be given.) If more than 1 model has been loaded, whichever model the user has specified to be the active one for a given source is the one used for the flux calculation.

The results of a flux command may be retrieved by the “tclout flux <n>” command where n is the particular spectrum of interest. If the flux was calculated for the case of no loaded spectra, the results can be retrieved by “tclout flux” with the <n> argument omitted.

The err/noerr switch sets whether errors will be estimated on the flux. The error algorithm is to draw parameter values from the distribution and calculate a flux. <number> of sets of parameter values will be drawn. The resulting fluxes are ordered and the central <level> percent selected to give the error range. The parameter values distribution is assumed to be a multivariate Gaussian centered on the best-fit parameters with sigmas from the covariance matrix. This is only an approximation in the case that fit statistic space is not quadratic.

There is also a model component cflux which can be used to estimate fluxes and errors for part of the model. For instance, defining the model as wabs(pow + cflux(ga)) provides a fit parameter which gives the flux in the gaussian line.

Examples:

The current data have significant responses to data within 1.5 to 18 keV.

```
XSPEC12> flux
//Calculate the current model flux over the default range.
XSPEC12> flux 6.4 7.0
//Calculate the current flux over 6.4 to 7 keV
XSPEC12> flux 1 10
//The flux is calculated from 1.5 keV (the lower limit of the
//current response's sensitivity) to 10 keV.
```