

- **lumin: calculate luminosities**

Calculate the luminosity of the current model for a given redshift and rest frame energy range.

Syntax: **lumin** [`<lowEnergy>`] [`<hiEnergy>`] [`<redshift>`] [`err <number> <level>`]
 `|noerr]`

where `<low Energy>` and `<hi Energy>` are the rest frame energies over which the luminosity is calculated and `<redshift>` is the source redshift. Initial default values are 2 to 10 keV for 0 redshift. The luminosity is given in units of ergs/s. The energy range redshifted to the observed 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 automatically reset 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 description).

The lumin 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 `dummysp` 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 lumin calculation.

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

The `err/noerr` switch sets whether errors will be estimated on the luminosity. The error algorithm is to draw parameter values from the distribution and calculate a luminosity. `<number>` of sets of parameter values will be drawn. The resulting luminosities 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.

Examples:

The current data have significant response to data within 1 to 18 keV.

```
XSPEC> lumin,,,0.5
//Calculate the current model luminosity over the default range for z=0.5
XSPEC> lumin 6.4 7.0
//Calculate the current luminosity over 6.4 to 7 keV.
```