

plot: make a plot

Make one or more plots to the current plot device (see `setplot device`).

Syntax: **plot** <plot type> [<plot type>] [<plot type>] ...

<plot type> is a keyword describing the various plots allowed. Up to six plot panes can be put on a single page by combining multiple <plot type> options. For example:

```
plot data resid ratio model
```

will produce a 4-pane plot. However contour plots may not be combined with other plots in this manner. When a certain plot type takes additional arguments (eg. `chain`, `model`), simply list them in order prior to specifying the next plot type:

```
plot chain 3 4 data ufspec
```

In multi-pane plots, XSPEC will determine if two consecutive plot types may share a common X-axis (e.g. `plot data delchi`, or `plot counts ratio`). If so, the first pane will be stacked directly on top of the second. (Note that the small subset of multi-pane plots that were allowed in earlier versions of XSPEC all belonged in this category.)

For changing plot units, see `setplot energy` and `setplot wave`. Also see `iplot` for performing interactive plots.

background

Plot only the background spectra (with folded model, if defined). To plot both the data and background spectra, use `plot data` with the `setplot background` option.

chain

Formerly named `plot mcmc`, plot a Monte Carlo Markov chain.

```
plot chain <par1> [<par2>]
```

Chains must be currently loaded (see `chain` command), and <par1> and <par2> are parameter identifiers of the form [`<model name>`]:*n* where *n* is an integer, specifying the parameter columns in the chain file to serve as the X and Y axes respectively. To select the fit-statistic column, enter '0' for the <par> value. If <par2> is omitted, <par1> is simply plotted against row number.

chisq

Plot contributions to `chisq`. The contribution is plotted +ve or -ve depending on whether the residual is +ve or -ve.

contour

Plot the results of the last `steppar` run. If this was over one parameter then a plot of statistic versus parameter value is produced while a `steppar` over two parameters results in a fit-statistic contour plot.

```
plot contour [ <min fit stat> [ <# levels> [ <levels>]]]
```

where <min fit stat> is the minimum fit statistic relative to which the delta fit statistic is calculated, <# levels> is the number of contour levels to use and <levels> := <level1> ... <levelN> are the contour levels in the deltafit statistic. contour will plot the fit statistic grid calculated by the last steppar command (which should have gridded on two parameters). A small plus sign “+” will be drawn on the plot at the parameter values corresponding to the minimum found by the most recent fit.

The fit statistic confidence contours are often drawn based on a relatively small grid (i.e., 5x5). To understand fully what these plots are telling you, it is useful to know a couple of points concerning how the software chooses the location of the contour lines. The contour plot is drawn based only on the information contained in the sample grid. For example, if the minimum fit statistic occurs when parameter 1 equal 2.25 and you use steppar 1 1.0 5.0 4, then the grid values closest to the minimum are 2.0 and 3.0. This could mean that there are no grid points where delta-fit statistic is less than your lowest level (which defaults to 1.0). As a result, the lowest contour will not be drawn. This effect can be minimized by always selecting a steppar range that causes XSPEC to step very close to the true minima.

For the above example, using steppar 1 1.25 5.25 4, would have been a better selection. The location of a contour line between grid points is designated using a linear interpolation. Since the fit statistic surface is often quadratic, a linear interpolation will result in the lines being drawn inside the true location of the contour. The combination of this and the previous effect sometimes will result in the minimum found by the fit command lying outside the region enclosed by the lowest contour level.

Examples:

```
XSPEC12> steppar 2 0.5 1. 4 3 1. 2. 4
//create a grid for parameters 2 and 3
XSPEC12> plot contour
//Plot out a grid with three contours with
// delta fit statistic of 2.3, 4.61 and 9.21
XSPEC12> plot cont,,4,1.,2.3,4.61,9.21
//same as above, but with a delta fit statistic = 1 contour.}
```

counts

Plot the data (with the folded model, if defined) with the y-axis being numbers of counts in each bin.

data

Plot the data (with the folded model, if defined).

delchi

Plot the residuals in terms of sigmas with error bars of size one.

dem

Plot the relative contributions of plasma at different temperatures for multi-temperature models. This is not very clever at the moment and only plots the last model calculated.

eemodel

Plot the current incident model spectrum in $E^2f(E)$ (Note: This is NOT the same as an “unfolded” spectrum.) or, if wavelength plotting has been set, $\lambda^2f(\lambda)$. The contributions of the various additive components also are plotted.

eeufspec

Plot the unfolded spectrum and the model in $E^2f(E)$ or, if wavelength plotting has been set, $\lambda^2f(\lambda)$. The contributions to the model of the various additive components are also plotted. This corresponds to the ν - f_ν plot beloved of AGN researchers. WARNING ! This plot is not model-independent and your unfolded model points will move if the model is changed.

efficien

Plot the total response efficiency versus incident photon energy.

emodel, eemodel

Plot the current incident model spectrum in $Ef(E)[E^2f(E)]$ (Note: This is NOT the same as an unfolded spectrum.) or, if wavelength plotting has been set, $\lambda f(\lambda), \lambda^2f(\lambda)$. The contributions of the various additive components also are plotted.

eufspec, eeufspec

Plot the unfolded spectrum and the model in $Ef(E), [E^2f(E)]$ or, if wavelength plotting has been set, $\lambda f(\lambda), \lambda^2f(\lambda)$. The contributions to the model of the various additive components also are plotted. WARNING ! This plot is not model-independent and your unfolded model points will move if the model is changed.

icounts

Integrated counts and folded model. The integrated counts are normalized to unity.

insensitiv

Plot the insensitivity of the current spectrum to changes in the incident spectra (experimental).

lcounts

Plot the data (with the folded model, if defined) with a logarithmic y-axis indicating the count spectrum

ldata

Plot the data (with the folded model, if defined) with a logarithmic y-axis.

margin

Plot the probability distribution from the results of the most recently run `margin` command. (Must be a 1-D or 2-D distribution.)

model

Plot the current incident model spectrum (Note: This is NOT the same as an unfolded spectrum.) The contributions of the various additive components also are plotted. If using a named model, the model name should be given as an additional argument.

ratio

Plot the data divided by the folded model.

residuals

Plot the data minus the folded model.

sensitivity

Plot the sensitivity of the current spectrum to changes in the incident spectra (experimental).

sum

A pretty plot of the data and residuals against both channels and energy.

ufspec

Plot the unfolded spectrum and the model. The contributions to the model of the various additive components also are plotted. **WARNING !** This plot is not model-independent and your unfolded model points will move if the model is changed. The data points plotted are the model values multiplied by the ratio of the data values to the model multiplied by the response.