



AHELP for CIAO 3.4

## plot\_eprof

Context: [sherpa](#)

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## Synopsis

Display a radial profile (elliptical annuli) of 2D data, fit, and residuals.

## Syntax

```
plot_eprofr( [dnum,] min, max, step )
plot_eprofr( [dnum,] modelname, min, max, step )

plot_eprofd( [dnum,] min, max, step )
plot_eprofd( [dnum,] modelname, min, max, step )

plot_eprof() is a synonym for plot_eprofr()
```

## Description

The 'image fit' command shows the data, best-fit model, and residuals for your 2D dataset. Sometimes this can be hard to interpret – in particular when dealing with low-count data as is often the case with Chandra images – and a different view of the fit may be useful. The `plot_eprofr()` and `plot_eprofd()` functions provide such a view, as they display two plots; the first is an elliptical profile of the data and best-fit model, while the second is an elliptical profile of the residual image. The residual plot created by `plot_eprofr()` has the y axis in units of counts, whilst the residual plot from `plot_eprofd()` uses counts / error.

These plots are similar to the output of 'lplot fit resid' – for `plot_eprofr()` – and 'lplot fit delchi' – for `plot_eprofd()` – for 1D data.

The functions provide a usage message if called with either no, or an incorrect set of, arguments. The `plot_rprofr()` and `plot_rprofd()` functions produce the same plots but using circular, rather than elliptical, annuli: see "ahelp plot\_rprof" for more information.

## How are the annuli chosen?

The min, max, and step arguments determine the the minimum and maximum radii of the annuli, and the width of each annulus respectively. The units of these arguments match the current setting of Sherpa's coordinate command. Unlike the `plot_rprofr()` and `plot_rprofd()` functions, the other values that control the annuli – here the center, ellipticity, and position angle – can only be taken from a model component. If the source expression contains only one model with `xpos`, `ypos`, `ellip`, and `theta` parameters then no other argument is required (other than the optional dataset number, `dnum`). Otherwise, the name of the model component must be given using the `modelname` argument.

The following examples assume that a source model has been fit to a 2D dataset.

## Example 1

```
sherpa> plot_eprofr(0,200,20)
```

This will plot up an elliptical profile of the data and model (top plot) and an elliptical profile of the residual image (bottom plot) for dataset 1. Assuming the values in `sherpa.fitplot` and `sherpa.resplot` have not been changed then the data is plotted using squares, the best-fit as the red line, and the residuals as filled circles.

The three arguments in the call give the minimum and maximum radii – here 0 and 200 respectively – and the width of each annulus (20). The units are taken to match the current coordinate settings for the dataset (see 'ahelp coord'). The source expression is assumed to contain only one component with "xpos", "ypos", "ellip", and "theta" parameters; these are used to define the center of the profile, its ellipticity, and angle.

As with the `plot_rprofr()` and `plot_rprofd()` functions, a bin will only be displayed if there are any pixels that contribute to that bin.

## Example 2

```
sherpa> plot_eprofd(0,200,20)
```

This creates the same plot as in the previous example except that the residual plot has units of "sigma" – i.e. counts divided by the error estimate – rather than counts.

## Example 3

```
sherpa> plot_eprofr(2,0,200,20)
```

This creates elliptical profiles for dataset 2.

## Example 4

```
sherpa> plot_eprof("core",0,200,20)
```

Here we explicitly list which model should be used to define the center, ellipticity, and angle of the annuli; we assume in this example that "core" is a model component such as BETA2D (i.e. that it has xpos, ypos, ellip, and theta parameters).

This is only necessary when the source expression contains more than one component with "xpos", "ypos", "ellip", and "theta" parameters.

## CHANGES

### Version 1.27

The `plot_eprof()`, `plot_eprofr()`, and `plot_eprofd()` routines are new to version 1.27 of `sherpa_utils.sl`, which was released at the same time as CIAO 3.1.

## NOTES

This script is not an official part of the CIAO release but is made available as "contributed" software via the [CIAO scripts page](#). Please see the [installation instructions page](#) for help on installing the package.

See the "Loading the functions" and "CHANGING THE PLOTS" sections of "ahelp plot\_rprof" for information on how to load the routines and to customise the plots they create.

## See Also

*chandra*

[guide](#)

*sherpa*

[bye](#), [calc\\_kcorr](#), [dataspace](#), [dcounts](#), [dollarsign](#), [echo](#), [eflux](#), [eqwidth](#), [erase](#), [flux](#), [get](#), [get\\_dcounts\\_sum](#), [get\\_dir](#), [get\\_eflux](#), [get\\_eqwidth](#), [get\\_filename](#), [get\\_flux2d](#), [get\\_flux\\_str](#), [get\\_lfactorial](#), [get\\_mcounts\\_sum](#), [get\\_pflux](#), [get\\_source\\_components](#), [get\\_verbose](#), [groupbycounts](#), [guess](#), [is](#), [journal](#), [list](#), [list\\_par](#), [mcounts](#), [numbersign](#), [paramest](#), [plot\\_rprof](#), [prompt](#), [reset](#), [run](#), [set](#), [set\\_analysis](#), [set\\_axes](#), [set\\_coord](#), [set\\_dataspace](#), [set\\_dir](#), [set\\_verbose](#), [setplot](#), [sherpa-module](#), [sherpa\\_plotfns](#), [sherpa\\_utils](#), [show](#), [simspec](#), [use](#), [version](#)

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URL:  
[http://cxc.harvard.edu/ciao3.4/plot\\_eprof.html](http://cxc.harvard.edu/ciao3.4/plot_eprof.html)  
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