



 AHELP for CIAO 3.4

flux

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Synopsis

Calculates the unconvolved photon flux for source or background datasets.

Syntax

```
sherpa> [B][P]FLUX [# [ID]] [{(<value>) | (<min>:<max>) | (<region
descriptor>)} ] \
[ {(<model component>) | (<model stack>)} ]
```

FLUX and PFLUX are equivalent commands for computing source fluxes, while BFLUX and BPFLUX are equivalent commands for computing background fluxes.

specifies the dataset over which the model is evaluated. The ID modifier is used only for computing background fluxes, and then if and only if the Sherpa state object variable multiback is set to 1, i.e., if more than one background dataset is to be associated with a single source dataset. The ID modifier may be any unreserved string (e.g., A, foo, etc.), i.e., a string that is not a parsable command.

The default is to compute photon fluxes for all appropriate datasets (i.e., those for which source/background expressions have been defined). The flux may be computed at one energy/wavelength, over a range of energies/wavelengths, or within a 2-D region, with the default being to compute the flux the total available range.

The flux may also be computed for individual model components, or for previously defined model stacks, with the default being to compute the flux using all model components in the SOURCE or BACKGROUND expression.

Description

Note that FLUX computes only photon fluxes in CIAO 3.0; to compute energy fluxes, use EFLUX, while to compute summations of observed or model counts, use DCOUNTS and MCOUNTS, respectively.

A source or background model stack must be defined before a respective flux can be computed; see the SOURCE and BACKGROUND commands. This is true even if one computes the flux of an individual model component or of models defined in a model stack. (This limitation will be removed in a future version of Sherpa.)

For 1–D data, if:

- one energy (or wavelength) <value> is given, then the photon flux at that energy (or wavelength) is returned in units of photons/cm²/sec/keV (or photons/cm²/sec/Å).
- an energy or wavelength range is given with the <min> and <max> arguments, then the total integrated photon flux over the given range is returned in units of photons/cm²/sec.
- no value or range is specified, then the total integrated photon flux over the full range of the dataset is returned in units of photons/cm²/sec.

For 1–D data, if an instrument model is not used, the units are (perhaps incorrectly) assumed to be counts, or counts per bin–width. See the Note on Units below.

For 2–D data, if a region descriptor is given, then the total integrated photon flux within that region is returned; otherwise, the integration is carried out over the entire input image.

Note on Units: in its current incarnation, Sherpa has no explicit knowledge of data or model units. The units displayed with computed fluxes are defaults, generally correct for standard analyses of 1–D PHA energy/wavelength spectra (XSPEC–like analyses). They may be incorrect for non–standard analyses, or for analyses of 2–D spatial images with exposure maps, etc. The correct units can be determined by working backwards from the data, taking into account the exposure time, the units of the instrument model, the bin units, etc.

Tip: To perform background subtraction in Sherpa, the command SUBTRACT must be issued; this is in contrast to XSPEC, which performs background subtraction automatically.

The photon flux may be computed using the Sherpa/S–Lang module functions get_flux (or get_pflux) and get_bflux (or get_bpflux)).

Example 1

Calculate the integrated photon flux over the full energy range:

```
sherpa> FLUX
Flux for source dataset 1: 0.00579108 photons/cm**2/s
```

Example 2

Calculate the integrated background photon flux over the range 2 to 10 keV:

```
sherpa> BPFLUX (2.0:10.0)
Flux for background dataset 1: 5.09639e-05 photons/cm**2/s
```

Example 3

Calculate the photon flux at a single energy (2.0 keV) for the power–law component of a source expression:

```
sherpa> SOURCE 1 = XSWABS[A] * POW[P]
sherpa> FLUX 1 (2.0) P
```

```
Flux for source dataset 1: 0.000494404 photons/cm**2/s/keV
```

Example 4

Calculate the total photon flux over the energy range 2.0 to 4.0 keV for a model stack:

```
sherpa> FOO = POW[P] + GAUSS[G]
sherpa> SOURCE 1 = XSWABS[A] * FOO
sherpa> PFLUX 1 (2:4) FOO
Flux for source dataset 1: 0.000498425 photons/cm**2/s
```

Example 5

Calculate the total flux within circles of radius 5 and 10 in a 2–D image (note, the quotes are necessary):

```
sherpa> SOURCE = GAUSS2D[G]
sherpa> FLUX 1 "CIRCLE(247,257,5)"
Flux for source dataset 1: 1614.79 counts
sherpa> FLUX 1 "CIRCLE(247,257,10)"
Flux for source dataset 1: 3142.15 counts
```

Bugs

See the [Sherpa bug pages](#) online for an up–to–date listing of known bugs.

See Also

chandra

[guide](#)

sherpa

[bye](#), [calc_kcorr](#), [dataspace](#), [dcounts](#), [dollarsign](#), [echo](#), [eflux](#), [eqwidth](#), [erase](#), [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_eprof](#), [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/flux.html>
Last modified: December 2006

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