Chandra X-ray Center

AHELP for CIAO 3.4

analysis

Context: sherpa

Jump to: Description Example Bugs See Also

Synopsis

Specifies whether to analyze datasets in energy, wavelength, or channel space.

Syntax

```
sherpa> ANALYSIS [<dataset range> | ALLSETS] \
[{ ENERGY | WAVELENGTH | CHANNELS | BINS }]

where <dataset range> = #, or more generally #:#,#:#,..., such that #
specifies a dataset number, and #:# represents an inclusive range of
datasets; one may specify multiple inclusive ranges by separating them
with commas. The default for ANALYSIS is all datasets (ALLSETS).

The WAVELENGTH argument may be shortened to WAVE.

The analysis setting for each specified dataset is shown if the final
argument is omitted, e.g. "ANALYSIS ALLSETS".
```

Description

The analysis setting is automatically determined when data are read in. This setting can be altered with the ANALYSIS command. In general, the analysis setting for non−PHA data is CHANNELS (synonymous with BINS), while for general PHA files it is ENERGY. When the columns BIN_LO and BIN_HI are detected in a Type II PHA file (such as can be the case for files containing Chandra grating data), these are assumed to contain wavelength information and the analysis is set to WAVELENGTH.

PHA datasets for which there is an INSTRUMENT model set may be analyzed in either ENERGY or WAVE space. Setting ANALYSIS to WAVE or ENERGY has no effect until an ARF and/or an RMF are read in and an INSTRUMENT is specified.

If the ANALYSIS setting is changed after the model components and their parameter values and ranges have been set, issue the GUESS command to reset the initial values and ranges.

Some models, such as certain XSPEC models, expect that the x−values will always be energy bins. When the analysis setting is using non−energy bins (e.g., WAVE) and an XSPEC model is defined, Sherpa converts the bins to energy before sending them to the XSPEC model. After the XSPEC model finishes, Sherpa converts back to

the original units. Sherpa also scales the model values appropriately (e.g., if counts/keV came out of the XSPEC model, and Sherpa is working with wavelength bins, then Sherpa scales the output of the XSPEC model to counts/Angstrom).

Example

Read in Chandra grating data and a grating RMF. Analyze the O VIII Lyman alpha line at 18.97 Angstroms in energy space, in the dataset (# 9) containing MEG −1 order counts:

```
sherpa> DATA data_pha2.fits
The inferred file type is PHA Type II.  If this is not what you want, please
specify the type explicitly in the data command.
Warning: could not find SYS_ERR column
WARNING: statistical errors specified in the PHA file.
        These are currently IGNORED.  To use them, type:
        READ ERRORS "<filename>[cols CHANNEL,STAT_ERR]" fitsbin
WARNING: backgrounds UP and DOWN are being read from this file,
        and are being combined into a single background dataset.
WARNING: multiple datasets have been input.
        The next available dataset number is 13.
sherpa> PARAMPROMPT OFF
sherpa> RSP[a]
sherpa> a.rmf = meg1.rmf
sherpa> a.arf = meg1.arf
sherpa> INSTRUMENT 9 = a
sherpa> IGNORE 9 ALL
sherpa> NOTICE 9 WAVE 18.8:19.2
sherpa> SOURCE 9 = CONST[co] + GAUSS[g]
sherpa> FIT 9
 LVMQT: V2.0
 LVMQT: initial statistic value = 42730.9
 LVMQT: final statistic value = 21.8345 at iteration 74
            co.c0   0.000378496
             g.fwhm   0.00194331
             g.pos   18.9812
             g.ampl   1.53444
sherpa> SHOW g
gauss1d[g]  (integrate: on)
    Param    Type       Value          Min         Max                   Units
    -----    ----       -----          ---         ---                   -----
 1    fwhm thawed 1.9433e-03 6.8361e-04      6.8361
 2     pos thawed      18.9812     18.7975    19.1975
 3    ampl thawed       1.5344 1.3713e-03    13.7131
sherpa> ANALYSIS 9 ENERGY
sherpa> GUESS SOURCE 9
sherpa> FIT 9
 LVMQT: V2.0
 LVMQT: initial statistic value = 43170.1
 LVMQT: final statistic value = 21.7635 at iteration 66
            co.c0   0.0112294
             g.fwhm   0.000107187
             g.pos   0.653184
             g.ampl   27.7522
sherpa> SHOW g
gauss1d[g]  (integrate: on)
    Param    Type       Value          Min         Max                   Units
    -----    ----       -----          ---         ---                   -----
```

```
1    fwhm thawed 1.0719e-04 2.3488e-05     0.2349
2     pos thawed     0.6532      0.6457     0.6594
3    ampl thawed     27.7522 3.9868e-02   398.6771
```

Bugs

See the Sherpa bug pages online for an up−to−date listing of known bugs.

See Also

sherpa

get_groups, ignore, notice, set_filter, set_groups, set_ignore, set_ignore2d, set_ignore_all, set_ignore_bad, set_notice, set_notice2d, set_notice_all

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Bugs