Chandra X-ray Center

AHELP for CIAO 3.4   **get_axes**   Context: sherpa

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Synopsis

Module functions to get the energy/wavelength/channel grid of source and background datasets.

Syntax

```
Struct_Type | Array_Type get_axes([Integer_Type])
Struct_Type | Array_Type get_baxes([Integer_Type])

Error Return Value: NULL

Arguments:

(1) data set number (default 1)
```

Description

In Sherpa parlance, a ``dataspace'' is an N−dimensional grid defined by the independent variables of the dataset (i.e., x_i in the expression $y = f(x_0, x_1,...,x_{(N-1)})$). Simple examples include the CHANNELS array in PHA datasets and the pixel numbers along each axis of FITS images.

The get_axes() function retrieves the dataspace, or filtered data set axes of the appropriate data set (if no argument is given, the axes for data set 1 are retrieved). The units of the axes are those appropriate for the current Sherpa ANALYSIS setting. For instance, if one is working with filtered PHA data in energy−space, what is returned are the low and high bin boundaries in keV (quantities assigned by the EBOUNDS extension of the RMF). (The get_baxes() function retrieves the filtered axes for the background associated with the appropriate data set.)

What is returned is an array of structures of length equal to the number of dimensions (e.g., 2 for image data). If the data are one−dimensional, a single Struct_Type variable is returned. There are five structure fields:

- axistype: either Channels, Energy, or Wavelength.
- axisunits: either unknown, keV, or A.
- lo: the array of lower bin boundaries; is NULL if there is no bin−width information available.
- hi: the array of upper bin boundaries; is NULL if there is no bin−width information available.
- mid: NULL if bin−width information is available; otherwise it contains the unbinned axis gridpoints.

One may display data et al. on the same grid output by get_axes using the Sherpa plotting commands LPLOT DATA et al.

Example 1

```
sherpa> data example.fits
sherpa> foo = get_axes()
sherpa> print(foo[0])   # image pixels, x-axis
   axistype         =  Channels
   axisunits        =  unknown
   lo               =  Float_Type[512]
   hi               =  Float_Type[512]
   mid              =  NULL
```

Example 2

```
sherpa> data example.pha
sherpa> instrument = rsp[a](example.rmf,example.arf)
sherpa> foo = get_axes()
sherpa> print(foo[0])   # energy grid for PHA data
axistype         =  Energy
axisunits        =  keV
lo               =  Float_Type[1024]
hi               =  Float_Type[1024]
mid              =  NULL
```

Example 3

```
sherpa> data example.dat
sherpa> foo = get_axes()
sherpa> print(foo[0])   # channel grid for unbinned ASCII data
axistype         =  Channels
axisunits        =  unknown
lo               =  NULL
hi               =  NULL
mid              =  Float_Type[100]
```

Bugs

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

See Also

chandra
> guide

sherpa
> get_analysis, get_arf_axes, get_coord, get_data, get_energy_axes, get_errors, get_filter, get_filter_expr, get_fit, get_fluxed_spectrum, get_ftest, get_metadata, get_photon_axes, get_photon_energy_axes, get_photon_wave_axes, get_qvalue, get_raw_axes, get_record, get_source, get_statistic, get_stats, get_syserrors, get_wave_axes, get_weights, record, save, write

Example 1

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