Chandra X-ray Center

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AHELP for CIAO 3.4

xspecabundan

Context: sherpa

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Synopsis

Performs the XSPEC command abund.

Syntax

```
sherpa> XSPEC ABUNDAN {<arg> | FILE <filename>}

where <arg> is one of the options listed in the table below.
```

Description

This commands sets the elemental abundance table used in XSPEC plasma−code models. (It does not set abundances for xswabs.)

Allowed Arguments

Name	Description
angr	default value; Anders E. & Grevesse N. (1989, Geochimica et Cosmochimica Acta 53, 197)
feld	Feldman U. (1992, Physica Scripta 46, 202)
aneb	Anders E. & Ebihara (1982, Geochimica et Cosmochimica Acta 46, 2363)
grsa	Grevesse, N. & Sauval, A.J. (1998, Space Science Reviews 85, 161)
wilm	Wilms, Allen & McCray (2000, ApJ 542, 914)
lodd	The solar photospheric abundances in Lodders, K (2003, ApJ 591, 1220)
file <filename>	<filename> is an ASCII file containing 30 lines with one number on each line.

When using the command, the argument can be shortened as long as it remains unique; see Example 3 below.

All abundances are number relative to H.

Tables for xspecabundan Arguments

Element	angr	feld	aneb	grsa	wilm	lodd
H	1.00e+0	1.00e+0	1.00e+0	1.00e+0	1.00e+0	1.00e+0
He	9.77e−2	9.77e−2	8.01e−2	8.51e−2	9.77e−2	7.92e−2
Li	1.45e−11	1.26e−11	2.19e−9	1.26e−11	0.00	1.90e−9
B	1.41e−11	2.51e−11	2.87e−11	2.51e−11	0.00	2.57e−11

Be	3.98e−10	3.55e−10	8.82e−10	3.55e−10	0.00	6.03e−10
C	3.63e−4	3.98e−4	4.45e−4	3.31e−4	2.40e−4	2.45e−4
N	1.12e−4	1.00e−4	9.12e−5	8.32e−5	7.59e−5	6.76e−5
O	8.51e−4	8.51e−4	7.39e−4	6.76e−4	4.90e−4	4.90e−4
F	3.63e−8	3.63e−8	3.10e−8	3.63e−8	0.00	2.88e−8
Ne	1.23e−4	1.29e−4	1.38e−4	1.20e−4	8.71e−5	7.41e−5
Na	2.14e−6	2.14e−6	2.10e−6	2.14e−6	1.45e−6	1.99e−6
Mg	3.80e−5	3.80e−5	3.95e−5	3.80e−5	2.51e−5	3.55e−5
Al	2.95e−6	2.95e−6	3.12e−6	2.95e−6	2.14e−6	2.88e−6
Si	3.55e−5	3.55e−5	3.68e−5	3.55e−5	1.86e−5	3.47e−5
P	2.82e−7	2.82e−7	3.82e−7	2.82e−7	2.63e−7	2.88e−7
S	1.62e−5	1.62e−5	1.89e−5	2.14e−5	1.23e−5	1.55e−5
Cl	1.88e−7	1.88e−7	1.93e−7	3.16e−7	1.32e−7	1.82e−7
Ar	3.63e−6	4.47e−6	3.82e−6	2.51e−6	2.57e−6	3.55e−6
K	1.32e−7	1.32e−7	1.39e−7	1.32e−7	0.00	1.29e−7
Ca	2.29e−6	2.29e−6	2.25e−6	2.29e−6	1.58e−6	2.19e−6
Sc	1.26e−9	1.48e−9	1.24e−9	1.48e−9	0.00	1.17e−9
Ti	9.77e−8	1.05e−7	8.82e−8	1.05e−7	6.46e−8	8.32e−8
V	1.00e−8	1.00e−8	1.08e−8	1.00e−8	0.00	1.00e−8
Cr	4.68e−7	4.84e−7	4.93e−7	4.68e−7	3.24e−7	4.47e−7
Mn	2.45e−7	2.45e−7	3.50e−7	2.45e−7	2.19e−7	3.16e−7
Fe	4.68e−5	3.24e−5	3.31e−5	3.16e−5	2.69e−5	2.95e−5
Co	8.60e−8	8.60e−8	8.27e−8	8.32e−8	8.32e−8	8.13e−8
Ni	1.78e−6	1.78e−6	1.81e−6	1.78e−6	1.12e−6	1.66e−6
Cu	1.62e−8	1.62e−8	1.89e−8	1.62e−8	0.00	1.82e−8
Zn	3.98e−8	3.98e−8	4.63e−8	3.98e−8	0.00	4.27e−8

This information is taken from the XSpec User's Guide. Version 11.3.1.x of the XSpec models is supplied with CIAO 3.2.

Example 1

Run the XSPEC command abund, setting abundances to Feldman:

```
sherpa> XSPEC ABUNDAN FELD
    Abundances set to Feldman
```

Example 2

Reset the abundances to the default value:

```
sherpa> XSPEC ABUNDAN ANGR
    Abundances set to Anders & Grevesse
```

Example 3

The argument can be shortened as long as it remains unique.

```
sherpa> XSPEC ABUNDAN W
```

```
    Abundances set to Wilms et al.
sherpa> XSPEC ABUNDAN F
    Abundances set to Feldman
sherpa> XSPEC ABUNDAN G
    Abundances set to Grevesse & Sauval
```

In the case of the two arguments that begin with "AN", "ANGR" takes precedence over "ANEB" if only the first or second letter is given:

```
sherpa> XSPEC ABUNDAN A
    Abundances set to Anders & Grevesse
sherpa> XSPEC ABUNDAN AN
    Abundances set to Anders & Grevesse
sherpa> XSPEC ABUNDAN ANE
    Abundances set to Anders & Ebihara
```

Example 4

Read custom abundances from a file:

```
sherpa> XSPEC ABUNDAN FILE abund.txt
    Abundances set to those read from file
```

Bugs

For a list of known bugs and issues with the XSPEC models, please visit the XSPEC bugs page.

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