Chandra X-ray Center

AHELP for CIAO 3.4   **describe**   Context: guide

Jump to: Description Examples Parameters Bugs See Also

Synopsis

Describe is a GUIDE command that prints out detailed information about either one or two energy levels and, if two levels are input, any atomic transitions between them.

Syntax

```
describe(Z, ion, level1, [level2])
```

Description

`describe' lists the available atomic data about one or two energy levels, as well as radiative and collisional transitions between them. describe is a GUIDE routine, which must be initialized using the require("guide") command in chips or sherpa. GUIDE uses the optional ATOMDB database, and this command will fail if the ATOMDB is not available on your system. Energy levels begin at 1 for the ground state of the ion. describe is frequently used after identifying a line with the GUIDE identify command. There is also a GUIDE thread showing how to use GUIDE with grating data to identify and describe emission lines.

Example 1

```
sherpa> require("guide")
GUIDE Initialized using ATOMDB v1.3.0
sherpa> describe(8,7,1,7)
Ion O VII, energy level 1 ---
electron configuration : 1s^2~^1S_{0}
energy above ground (eV) : 0.000000
Quantum state : n=1, l=N/A, s=0, degeneracy=1
Energy level data source : 1983ADNDT..29..467S
Photoionization data source : 1986ADNDT..34..415C
-------------------------------------------
Ion O VII, energy level 7 ---
electron configuration : 1s2p~^1P_{1}
energy above ground (eV) : 574.187012
Quantum state : n=2, l=1, s=0, degeneracy=3
Energy level data source : 1983ADNDT..29..467S
Photoionization data source : 1986ADNDT..34..415C
-------------------------------------------
Ion O VII, 1 – 7 interactions ---
Electron collision rate from 1 -> 7 : nonzero.
Reference bibcode : 1989ADNDT..42..313K
Wavelength (lab/observed) (Angstrom) : 21.601503 +/- 0.007000
```

```
Wavelength (theory) (Angstrom) : 21.629999
Transition rate/Einstein A (s^-1) : 3.303330e+12
Wavelength (lab/observed) reference : 1988CaJPh..66..586D
Wavelength (theory) reference : 1983ADNDT..29..467S
Transition rate reference : 1987JPhB...20.6457F
```

Lists all information available in the APED about the O VII resonance transition between the ground state and the 6th excited state. The references are given in the ADS bibcode format, which is used by the NASA Astrophysics Data System (ADS).

Example 2

```
chips> require("guide")
GUIDE Initialized using ATOMDB v1.3.0
describe(26,17,10)
Ion Fe XVII, energy level 10 ---
electron configuration : 2s^22p^5(^2P)3p~^3P_{2}
energy above ground (eV) : 762.811462
Quantum state : n=3, l=1, s=N/A, degeneracy=5
Energy level data source : 1997UNPUB.Liedahl.L
Photoionization data source : 1986ADNDT..34..415C
```

Lists all information available in the APED about the Fe XVII 9th excited level. Since only one level is given, no transition data is printed.

Parameters

name	type	ftype	min	max	reqd
Z	integer	input	1	28	yes
Ion	integer	input	1	28	yes
EnergyLevel1	integer	input			yes
EnergyLevel2	integer	input			no

Detailed Parameter Descriptions

Parameter=Z `(integer required filetype=input min=1 max=28)`

The atomic number for the element of interest.

Parameter=Ion `(integer required filetype=input min=1 max=28)`

The ion number (starting at 1 for the neutral ion) for the ion of interest.

Parameter=EnergyLevel1 `(integer required filetype=input)`

The first energy level (starting at 1 for the ground state) of interest.

Parameter=EnergyLevel2 `(integer not required filetype=input)`

The second energy level (starting at 1 for the ground state) of interest. If present, transitions between the two levels are printed, along with information about each level. The order of the two energy levels is not significant.

Bugs

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

See Also

guide

      identify, ionbal, mdl2latex, strong