![Chandra X-ray Center logo]

AHELP for CIAO 3.4 **colden** Context: proposaltools

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Synopsis

Interactive program to evaluate the neutral hydrogen column density at a given direction on the sky

Description

COLDEN can be run over the WWW using a browser, such as Netscape, or run locally using the command–line interface (CLI). The CLI version will accept a text file with a list of positions as input.

COLDEN is part of the Proposal toolkit. The toolkit is distributed with CIAO.

SUPPORTED DATASETS

There are two datasets supported: Bell and NRAO.

Bell is the Stark, et al, velocity–resolved Bell Labs survey. An early version of the spectra from 1984 is used. Please note that these have not been checked in detail against the published FITS data (ApJ Suppl. 79, p77, 1992). There are two data files, one integrated over velocity and one with the velocity–resolved spectra. Note that the Stark et al data only covers Dec > −40 degrees.

NRAO is the Dickey and Lockman 1990 (ARA&A, 28, p.215) all–sky interpolation of Stark, et al, and several other surveys. This dataset is not velocity–resolved.

AVAILABLE COORDINATE SYSTEMS

The available coordinate systems are: Equatorial or Ecliptic with Besselian Epoch (default is J2000, or specify as 'BXXXX'), Equatorial or Ecliptic with Julian Epoch (default is J2000, or specify as 'JXXXX'), or Galactic. For a detailed description of the available coordinate systems, see the ahelp file for prop–coords.

RUNNING COLDEN OVER THE WWW

COLDEN can be accessed via the URL

http://cxc.harvard.edu/toolkit/colden.jsp

General help information is available by clicking the 'HELP' button.

RUNNING COLDEN FROM THE COMMAND–LINE

The syntax for processing a file of coordinates is:

prop_colden commands:infile:outfile

The syntax for evaluating a single position is:

prop_colden data dataset eval position

See the EXAMPLES section for more information.

To run COLDEN in the interactive CLI mode, type 'prop_colden' at the Unix prompt. This enters an interactive command mode for setting program parameters. The command level prompt is Colden[Setup]>:. Within the command level, type '?' or 'help' to see a list of the available commands, and type 'list' or 'l' to display the current program settings.

INPUT COMMANDS

The most usual command sequence is 'data', 'from', and 'convert', which can be abbreviated as 'd', 'f', and 'c', respectively. The 'data' command selects the survey source, either 'Bell' or 'NRAO'. When using the Bell survey, you can select the velocity range using the command 'vlims [vlmin] [vlmax]'. The command 'vlims *' returns the velocity slice to its default (maximum) range of −550 km/s to +550 km/s. The from command defines the Input coordinate system (J2000 is the default).

The 'convert' command enters the processing level. Within the processing level, enter the Input coordinates in the appropriate format, either both coordinates on the same line separated by spaces or a comma, or the x–coordinate on one line and the y–coordinate on the next. The default format for RA and DEC is hh mm ss.ss and dd mm ss.ss. The default format for the other coordinate systems is decimal degrees.

OTHER COMMANDS

The 'p' command sets the output display mode: use 'p0' for terse, 'p1' for normal, or 'p2' for verbose display. The default output display mode is p1.

To leave the processing level and return to the command level, type 'q' or 'quit'. Type 'q' or 'quit' at the command level to exit the program.

COLDEN RESULTS

COLDEN computes three values: Galactic L2 (in decimal degrees), B2 (in decimal degrees), and NH (in units of 1e+20 per cm**2). COLDEN also provides a comment that describes the computation. The possible comments are:

- Interpolated – Value interpolated from four nearest measurement directions.
- At target – Measurement in exactly the specified column direction.
- At closest point – Measurement in observed direction closest to the specified column direction; the specified direction does not have four nearest measurement directions suitable for interpolation.

- Gain uncertain – Specified column direction is less than 0.2 deg from the equator (B1950); measurements near the equator in the Stark, et al Bell survey (ApJ Suppl. 79, p77, 1992) may suffer from large gain fluctuations.
- Too far south – No value computed –– Specified column direction is at least 40.0 deg south of the equator (B1950); the Stark, et al Bell survey (ApJ Suppl. 79, p77, 1992) used a Northern Hemisphere telescope.

Example 1

Compute the column density using equatorial coordinates and the Bell survey (the default dataset).

```
unix prompt> prop_colden
-------------------- Colden --------------------
You are now in setup mode. Type "c" to enter conversion mode,
"?" to list setup mode commands, or "q" to quit the program.
The default conversion is from B1950.

Colden[Setup]>:c

Data source: BELL
RA (B1950) Dec (B1950) Galactic coords NH (10**20 per cm**2)
-550.0 to 550.0 km/s

RA (B1950): 02 20 20.1 -00 00 23. 02 20

20.10 -00 00 23.00 165.463201 -54.914277 2.99 (Interpolated)
```

Example 2

Compute the column density using galactic coordinates and restricting the velocity range from –200 km/s to +100 km/s.

```
Colden[Setup]>:from g
Colden[Setup]>:vlims -200 +100
Colden[Setup]>:c

Data source: BELL
L            B              Galactic coords       NH
(10**20 per cm**2) -200.0 to   100.0 km/s

L:86.655
B:40.979

86.655000    40.979000      86.655000    40.979000   1.83
(Interpolated)
```

Example 3

Compute the column density for a file of coordinates, s.cat, using the syntax 'prop_colden commands:infile:outfile'. The file s.cat contains the following.

Example 1   3

```
00 01 12.3 −00 02 23.4
02 59 59.9 23 12 22.1
02 23 0 11 23 12
23 48 48.23 −2 11 14.123

Store the results in the file cd_s.cat.

unix prompt> prop_colden :s.cat:cd_s.cat
Opened input file s.cat
Opened output file cd_s.cat
unix prompt>
```

The output file, cd_s.cat, contains the following.

```
RA  (B1950)     Dec (B1950)      Galactic coords      NH (10**20 per cm**2)
                                                      −550.0 to 550.0 km/s

00 01 12.30 −00 02 23.40     98.274959  −60.330944   3.22 (Interpolated)
02 59 59.90 +23 12 22.10    158.171584  −30.327495  10.89 (Interpolated)
02 23 00.00 +11 23 12.00    156.570708  −45.015506   7.80 (Interpolated)
23 48 48.23 −02 11 14.12     90.686763  −60.962940   3.62 (Interpolated)
```

Example 4

Use the eval command to evaluate a single position using the NRAO dataset. The general syntax is: 'prop_colden data dataset eval position'. eval runs the colden convert command using the specified input and then exits.

```
unix prompt> prop_colden data nrao eval 14 11 30 20 11 10

14 11 30.00 +20 11 10.00     16.506969    69.830334    2.47
(Interpolated)
```

See Also

proposaltools
> dates, obsvis, pimms, precess, prop−coords, prop−time, prop−tools

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URL:
http://cxc.harvard.edu/ciao3.4/colden.html
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