

Cloudy

- ◆ **Accurate simulation of physical processes at the atomic & molecular level**
 - “universal fitting formulae” to atomic processes fail when used outside realm of validity, and are not used
- ◆ **Assumptions:**
 - energy is conserved
 - (usually) atomic processes have reached steady state
- ◆ **Limits:**
 - $2.7 \text{ K} < T < 10^{10} \text{ K}$
 - No limits to density (low density limit, LTE, STE)
 - Radiation field 10 m to 100 MeV

Cloudy & Associates

Photoionization Simulations for the Discriminating Astrophysicist Since 1978

[Login](#) | [Preferences](#) | [Help/Guide](#) | [About Trac](#)

Wiki
Timeline
Roadmap
Browse Source
View Tickets
Search

[Start Page](#) | [Index](#) | [History](#) | [Last Change](#)

Welcome to the Cloudy home page!

Cloudy is a spectral synthesis code designed to simulate conditions in interstellar matter under a broad range of conditions.

Please post question or problems on the Cloudy [discussion board](#). Updates to Cloudy will be announced on that board.

Summer school on Cloudy, and the physics and spectroscopy of the interstellar medium Summer 2012 in Lexington. More details on the [Summer School](#) page.

Getting started with Cloudy

[StepByStep](#) instructions for downloading and installing the release version.

[StellarAtmospheres](#) in Cloudy are now very flexible. They are described on this web site rather than in Hazy.

[KnownProblems](#) are described on this page.

[HotFixes](#) are small corrections to the source that fix problems discovered after the current stable version was released.

Frequently asked questions are on the [FaqPage](#)

More information about Cloudy

The [RevisionHistory](#) pages list changes and new features in past, current and the next versions.

Old versions of Cloudy are on the [CloudyOld](#) page

The [DownloadLinks](#) page gives links to download the code

The [RoadMap](#) page outlines planned future development

Acknowledgments for help with Cloudy are on the [AcknowledgmentsPage](#)

https://www.nublado.org/

Cloudy & Associates

Photoionization Simulations for the Discriminating Astrophysicist Since 1978

Login | Preferences | Help/Guide | About Trac

Wiki
Timeline
Roadmap
Browse Source
View Tickets
Search

[Start Page](#) | [Index](#) | [History](#) | [Last Change](#)

Welcome to the Cloudy home page!

Cloudy is a spectral synthesis code designed to simulate conditions in interstellar matter under a broad range of conditions.

Please post question or problems on the Cloudy [discussion board](#). Updates to Cloudy will be announced on that board.

Summer school on Cloudy, and the physics and chemistry of the interstellar medium Summer 2012 in Lexington. More details on the [Summer School](#) page.

Getting started with Cloudy

[StepByStep](#) instructions for downloading and installing the release version.

[StellarAtmospheres](#) in Cloudy are now very flexible. They are described on this web site rather than in Hazy.

[KnownProblems](#) are described on this page.

[HotFixes](#) are small corrections to the source that fix problems discovered after the current stable version was released.

Frequently asked questions are on the [FaqPage](#)

More information about Cloudy

The [RevisionHistory](#) pages list changes and new features in past, current and the next versions.

Old versions of Cloudy are on the [CloudyOld](#) page

The [DownloadLinks](#) page gives links to download the code

The [RoadMap](#) page outlines planned future development

Acknowledgments for help with Cloudy are on the [AcknowledgmentsPage](#)

https://www.nublado.org/

Cloudy & Associates

Photoionization Simulations for the Discriminating Astrophysicist Since 1978

Login | Preferences | Help/Gu

Wiki
Timeline
Roadmap
Browse Source
View Tickets

[Start Page](#) | [Index](#) | [Histo](#)

Introduction to installing Cloudy

This page contains step by step instructions for installing the current stable version of Cloudy. *Hazy*, the code's documentation, the download.

Each version of the code has a set of pages giving updates. The [HotFixes](#) page lists corrections that need to be made to the do source. These are bug fixes that were not included in the version of the code available for download and used to generate the test suite. So the hot fixes should be applied after the test suite has been run and your system validated. A [KnownProblem](#) known problems with that version of the code. The [RevisionHistory](#) page lists improvements.

Cite the code by giving the version number and a reference to the last major review of Cloudy, Ferland et al. (1998; PASP, 11C available [here](#)). An example would be "We used version 05.07b of Cloudy, last described by Ferland et al. (1998)". Then, when someone wants to know how an answer was obtained, the version used to obtain it can be retrieved from the old version web site. The **print citation** command will print the correct citation for the version you are using.

Setting up this version

1. **Download** the code, data, and documentation. This creates several directories, Each contains a readme.htm file describing that directory.
2. **EditPath** - instructions for how to specify where the data files are located. **Important!** The code will not run if it cannot find
3. **CompileCode** - how to compile the code using a variety of compilers.
4. **RunCode** - This explains how to execute the code and run a smoke test.
5. **MpiParallel** describes how to use the optimize and grid commands on a parallel cluster, using either MPI or a makefile.
6. **CompileStars** - You must compile some stellar data files if you want to use the some of the table star command to include re continua.
7. **TestSuite** is a large number of test cases that you should run to confirm that all is well. This is a critical step since it will che your compiler. That directory also contains a group of programs that show how to call the code as a subroutine.

Cloudy & Associates
Photoionization Simulations for the Discriminating Astrophysicist Since 1978

Search [input type="text"]

Login | Preferences | Help/Guide | About/Trac

Wiki | Timeline | Roadmap | Browse Source | View Tickets | Search

Start Page | Index | History | Last Change

Welcome to the Cloudy home page!

Cloudy is a spectral synthesis code designed to simulate conditions in interstellar matter under a broad range of conditions. Please post question or problems on the Cloudy [discussion board](#). Updates to Cloudy will be announced on that board.

Summer school on Cloudy, and the physics and spectroscopy of the interstellar medium Summer 2012 in Lexington. More details on the [Summer School](#) page.

Getting started with Cloudy

[StepByStep](#) instructions for downloading and installing the release version.

[StellarAtmospheres](#) in Cloudy are now very flexible. They are described on this web site [more](#) than in Hazy.

[KnownProblems](#) are described on this page.

[HotFixes](#) are small corrections to the source that fix problems discovered since the current stable version was released.

Frequently asked questions are on the [FaqPage](#)

More information about Cloudy

The [RevisionHistory](#) pages list changes and new features in past, current and the next versions.

Old versions of Cloudy are on the [CloudyOld](#) page

The [DownloadLinks](#) page gives links to download the code

The [RoadMap](#) page outlines planned future development

Acknowledgments for help with Cloudy are on the [AcknowledgmentsPage](#)

<https://www.nublado.org/>

Where to go for help

- ◆ https://groups.yahoo.com/neo/groups/cloudy_simulations/info

Cloudy - plasma simulations
 Public Group, 319 members

Conversations | Photos | Files | About | More | Membership | Management

Welcome to Cloudy - plasma simulations! [New Topic](#)

1 member, 1 message added in the last 7 days

New Messages [See All](#)

Re: Solving Ionization Equations [1 Attachment]
 Dear Constantine On Fri, Aug 8, 2014 at 10:22 AM, constantineguth@yahoo.com ...
 coupled differential equations. One possible approach is outlined in Problem
 desaprobad0 7 days ago

Solving Ionization Equations
 Dear Sir or Madama, I have been trying to solve the ionization equations for a pure
 hydrogen nebula given by 2.12 and 2.18 in Osterbrock and Ferland's work.
 constantineguth 9 days ago

Trending Topics

- charge transfer rate...
- SAVE TOTAL OPACITY
- About the Constant Pressure
- Implementing Haardt-Madau 12
- save optical depths

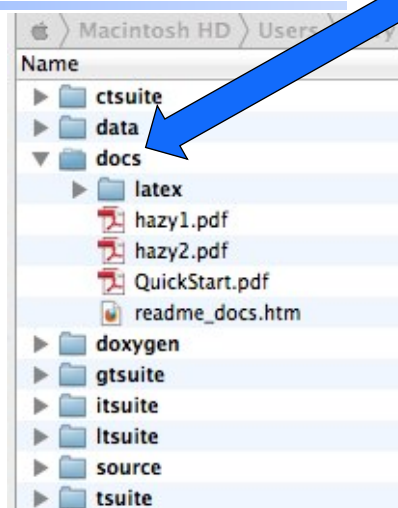
Members of this group also

Lunar Observing
 Public Group, 1594 members
 This is the list where astrophysicists...

Topics (List as Individual Messages)	Messages	Latest Post
C10.00 Segmentation Fault with GCC 4.6.2 Hello, After upgrading to Fedora16 and the new GCC 4.6.2 C10.00 compiles with no complaints, but segfaults on every model including the smoke test. I have been...	7	Jun 1, 2012 2:02 pm Peter van Hoof peter_van_hoof
compile grain failed. I was trying to compile a new grain with optical constant data, but the extrapolation failed with a message 'something went wrong' in the .out file. What I...	1	May 30, 2012 12:28 pm af1815
Molecular Hydrogen Reaction Rates Hello, I have been using Cloudy to look at the molecular hydrogen fraction of the ISM at various densities, temperatures etc., however I have run into some...	3	May 30, 2012 11:00 am Gary J. Ferland gary_ferland
PROBLEM DISASTER PROBLEM DISASTER This is in the middle of some experiments, but since the log file has the request to report the problem -- the input file and the log file are here: ...	1	May 19, 2012 12:59 pm notkochanek
Understanding Compton effects Hi, I'm currently working to extend the capabilities of Knox Long's Python radiative transfer code into the X-ray regime. As part of this I'm putting Compton...	3	May 9, 2012 2:47 pm Nicholas Higginbottom nick_soton
Re: beginner	1	May 8, 2012

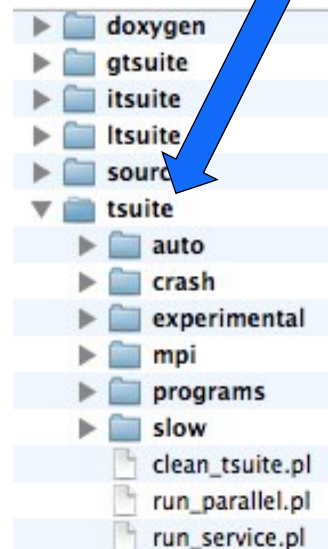
Documentation

- ◆ Quick start guide
- ◆ Hazy 1, all commands
- ◆ Hazy 2, description of output, comparison with observations
- ◆ Hazy 3, not compiled, badly out of date, some physics on described there



The test suite

- ◆ **Fully tests the code after any changes**
 - “Monitors” allow automatic comparison of current with previous results
- ◆ **Provides examples of how to use Cloudy**
 - But may include extraneous commands for testing
- ◆ **Useful examples of how to set up a simulation**



Running cloudy

- ◆ “run” file contains
path-to-cloudy.exe -r \$1 2>\$1.err
- ◆ File “model.in” contains input, then
- ◆ Run model &
- ◆ Produces output “model.out”

Minimum to run Cloudy

- ◆ **Must specify**
 - SED – shape of the radiation field
 - Flux of photons per unit area
 - Gas density
- ◆ **May specify**
 - Gas composition, grains (solar by default)
 - Gas equation of state
 - Stopping criterion

Parameters – the SED

- ◆ **Quick start guide Chapter 5**
- ◆ **Hazy 1, Chapters 4, 6**

- ◆ **Can be specified as a fundamental shape such as a blackbody**

- ◆ **Generally entered as table of points**

SED brightness – the intensity case

- ◆ Specify $\phi(H)$ – photons per unit area

- The “intensity case”
- predicts emission per unit area
- Inner radius of cloud does not need to be specified



SED brightness – the luminosity case

- ◆ Specify $Q(H)$ – photon luminosity

- Inner radius of cloud must be specified, since $\phi(H) = Q(H) / 4\pi r^2$
- predicts emission line luminosities



Cloud density

- ◆ **“hden” command**
- ◆ **Constant density by default**
- ◆ **Other equations of state possible**

Composition

- ◆ **Solar, no grains, by default**
- ◆ **Other standard mixes possible**