















Documentation Also on web share under "docs" folder THE 2017 RELEASE OF CLOUDY Review C. J. Ferland¹, M. Chatzikos¹, F. Guzmán¹, M. L. Lykins¹, P. A. M. van Hoof², R. J. R. Willians³, N. P. Abd⁴, N. R. Badnell², F. P. Keenan⁶, R. L. Porter⁷, P. C. Stancil⁷





Quick Start Guide to CLOUDY C17
> 🗍 Introduction
> 🔲 Two very simple models
> 🔲 Geometry
> 🔲 Composition and density
> 🔲 The incident radiation field
> 🔲 Other commands
> 🔲 The code's predictions
> 🔲 Example calculations
> 🔲 How to make this plot
> 🔲 Veusz Cookbook

Cloudy QSG Chapter 1
 Accurate simulation of physical processes at the atomic & molecular level
 Physical processes treated from first principles, not with sub-grid physics or simple fitting formulae
Assumptions:
 – energy is conserved
- (usually) atomic processes have reached steady state
Limits:
– Kinetic temperature 2.7 K < T < 10 ¹⁰ K
 No limits to density (low density limit, LTE, STE) for 1 and 2 electron atoms
– Radiation field 30 m to 100 MeV

Simultaneous solution of

- Gas ionization
- From ionization balance equations
- Chemistry

 Large chemical network based on UMIST
- Gas kinetic temperature
- Heating and cooling
- Level populations and emission
- Grain physics
 Charging, CX, photoejection, quantum heating
- The observed spectrum
- Radiative transport

Cloudy is a microphysics code

- Emphasis is on doing the atomic and molecular physics from first principles
- If we get the microphysics right, the macrophysics will take care of itself
- Many codes have dynamics, shocks, or 3D, as an emphasis, sometimes using Cloudy to get the microphysics

Osterbrock & Ferland Astrophysics of Gaseous Nebulae

- There were three versions, this is the 3rd
 Don called this "AGN3"
- Any version is OK
- PDFs of chapters we will use are in the docs folder of the web share



Cloudy version C17.01

- We set this up, ran a model, and created plots, as our homework last week
- The last three major Cloudy reviews are also in the docs folder of the web share







Photoionization Simulations for the Discriminating Astrophysicist Since 1978				Search		
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Velcome to the Cloudy home page!	Start P	age Inde	x History	Last Chang		
Cloudy is a spectral synthesis code designed to simulate conditions in interstellar matter under a broad r general use under an open source License.	ange of cond	ditions. I	t is provid	ed for		
Please post question or problems on the Cloudy indiscussion board. Updates to Cloudy will be announce	d on that bo	ard.				
C17.00, is released. \Rightarrow This paper discusses what is new. Follow the StepByStep instructions for downl straight to the DownloadLinks page to obtain it. NewC17 explains improvements and changes.	oading and i	nstalling	the code,	or go		
loudy ⊡Workshops Summer 2017						
Queen's University Belfast: 31 July - 4 August 2017 We are pleased to announce the Cloudy Works School of Mathematics and Physics at Queen's University Belfast. For more information, or to register, vi	shop 2017, w isit sit sit	/hich will	l be held ir stration o	n the pen		
The Guillermo Hare advanced school on modelling the ionized universe will be held at IRAGE (Institu- Exterdinas, Tomatina, Puebla, Nexolo (from July) at or 10th, 2017. The school will provide a compret approach to the modelling of ionized gas in different environments, from AGB stars to active galacitour, neserchers, mainthe MP bit subcets and parkides. The first week will conside 10 a Cloudy noncirclosing led by insertions, and the school of the	to Nacional o hensive, stat :lei, to an au Gary Ferland M), Gary Fer AM), and Mó	de Astrof :e-of-the idience o J. The se rland (Ur nica Rod	física, Ópti -art, hand f up to 40 cond week tiversity of ríguez (IN	ca y s-on young ; will delv AOE). Thi		
ietting started with Cloudy						
The VideoPage has a video showing how to build and run Cloudy.						
StepByStep instructions for downloading and installing the release version, and running the code on various platforms.						
Or you can go straight to the DownloadLinks page.						
StellarAtmospheres in Cloudy are now very flexible. They are described on this web site rather than in H	lazy.					
Kenne Parkings and departing on this and						

HotFixes are small corrections to the source that fix problems discovered after the current stable version was released.

https://www.nublado.org/







Cloudy - plasma simulations			
Conversations Decision Photos The Files Decision About More V			
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ttroducing Gaussian noise to ato ection 3.3 of the 2013 release paper states that the code includes the ability to randomly add Gaussian noise some parameters. I like to apply this to cooper · 1 post · 2.55 PM			
evel populations ear Prot. Ferand, Many thanks for the reply. Fil look forward to the next version Cloudy. Best regards, mmlaeva.gao * 4 posts - Jun 13			
imulation warning: Transfer ionization reached 900% o hank you again for the explanations) I will check that Cheers Vital tat.fernandez * 3 posts - Jun 9			
ill is not ionized by increasing ionization p ear all, have constructed a series of Cloudy models using the following script: hden 2.0 ionization parameter -5 vary grid range from -5 to 2 step 0.1			



