

2021 Sagan Summer Workshop

Circumstellar Disks and Young Planets

Google Colab Getting Started Guide

For the workshop hands-on sessions, participants can choose to run the exercises from their own installation of Python or use Google Colaboratory notebooks. These instructions are for the Google Colaboratory notebooks.

Google Colaboratory allows you to execute Python in a browser without configuring Python in your local system. The Python code is run from a notebook environment similar to Jupyter notebooks with execution and text cells. For a general introduction to Colaboratory, see:

What is Colaboratory?

<https://colab.research.google.com/notebooks/intro.ipynb>

Overview of Colaboratory Features

https://colab.research.google.com/notebooks/basic_features_overview.ipynb

Workshop Colaboratory Instructions

You will need:

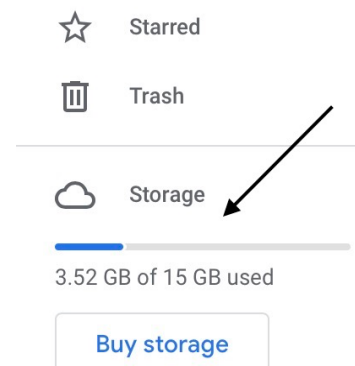
- A Google account: <https://www.google.com/account/about/>
- 10 GB storage available in Google Drive for the files that will be downloaded for the hands-on sessions (the Young Planets Spectroscopy hands-on session is the primary need for the disk space; the Disk Models needs only about 1.2 GB). *Note that Google accounts come with 15 GB of free storage, but if your personal account has insufficient storage left, then you can create a new Google account.*

Verify that you have at least 10GB storage available:

- 1) Log into your Google account
- 2) Navigate to Google Drive - either follow this link: <https://drive.google.com/drive/my-drive> OR from your account click on the dot navigation and then click on the Drive icon.



- 3) Once in Drive, on the left side menu, there is a section called "Storage" which will show how much space you have available. If you have insufficient storage in your Google account, we suggest creating a new account rather than purchasing storage. Note that if you hit the limit of storage, it will affect your email usage, so it is better to create a new account if you already have 5 GB used.



Copy the Google Colaboratory Notebooks to your account:

You will copy Google Colaboratory Notebooks to your Google Drive. You only need to save the notebooks (Setup and Hands-on Activities) for the hands-on session(s) you will be attending.

[NOTE: the notebooks links have been updated to their permanent archive location]

All notebooks can be downloaded via the zip or tar format file or downloaded individually below.

Tar format: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/ssw2021_colab_notebooks.tar.gz

Zip format: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/ssw2021_colab_notebooks.zip

Disk Models:

Setup Notebook: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/DiskModels_Colab_Setup.ipynb

Hands-on Activities Notebooks:

HH30: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/HH30_Models_Colab.ipynb

HLTau: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/HLTau_Models_Colab.ipynb

HR4796: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/HR4796_Models_Colab.ipynb

PDS70: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/PDS70_Models_Colab.ipynb

You will use one notebook for each disk that will be studied during this hands-on session.

Young Planets Spectroscopy:

Setup Notebook: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/YoungPlanetsSpectroscopy_Colab_Setup.ipynb

Hands-on Activities Notebooks:

1_Spectroscopy: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/1_Spectroscopy_Colab.ipynb

2_HotVsCold: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/2_HotVsCold_Colab.ipynb

3_Chemistry: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/3_Chemistry_Colab.ipynb

4_Clouds: https://catcopy.ipac.caltech.edu/ssw2021/hands-on/4_Clouds_Colab.ipynb

The first two notebooks (1_Spectroscopy, 2_HotVsCold) will be used on Wednesday and Thursday, respectively, while the other two (3_Chemistry.ipynb, 4_Clouds.ipynb) are optional.

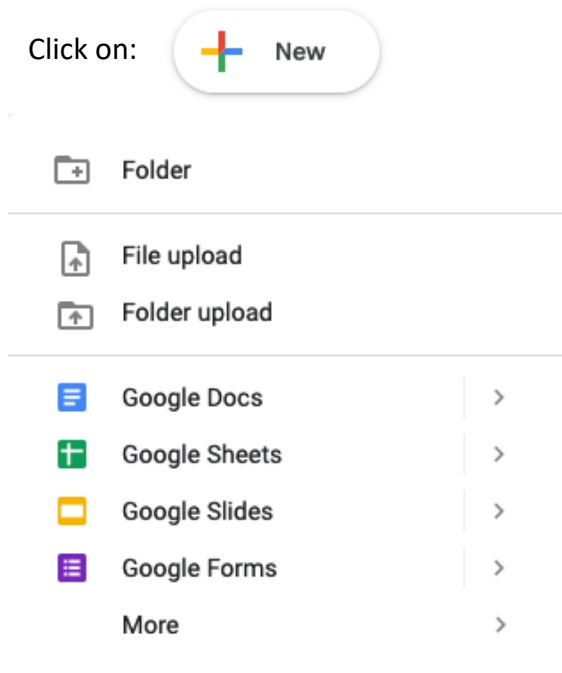
Basics of Thermal Emission:

https://catcopy.ipac.caltech.edu/ssw2021/hands-on/Basics_of_Thermal_Emission_Colab.ipynb

The “Basics of Thermal Emission” is an optional tutorial; it walks you through computing a thermal emission spectrum (it has two parts, one on thermal emission from exoplanets and one on brown dwarfs), and it may be helpful if you are not familiar with thermal emission spectra.

Follow these steps to copy the Notebooks to your Google Drive:

- 1) Download all the notebooks via the tar or zip file. You can also download individual notebooks from the individual links as a file from the browser (save with Cmd-s or Ctrl-s) using the name as given in the link (DiskModels_Colab_Setup.ipynb, HH30_Models_Colab.ipynb, etc.). If your browser suggests appending “.txt”, accept the original filename extension of .ipynb instead.
- 2) Log into your Google account with the available storage – make sure you have signed out of all other Google accounts if you have logged into more than one.
- 3) Navigate to your Google Drive, <https://drive.google.com/drive/my-drive> and create a folder called “Colab Notebooks” if it does not already exist:



Then select “Folder” and create the “Colab Notebooks” folder.

- 4) Upload your saved notebooks (.ipynb files) into the Colab Notebooks directory by selecting “File upload” from the “New” menu.

Launching the Google Notebook

- 1) Login in to your Google account where you have saved the notebooks.
- 2) Go to your Google drive: <https://drive.google.com/drive/my-drive>
- 3) Click on Colab Notebooks directory
- 4) Click on the Google notebook.

Running the Notebooks

For the setup notebooks, you should run the entire notebook at once:

- 1) Click on the Runtime menu item
- 2) Select Run all

For the hands-on activities notebooks, you should step through each cell individually by clicking on the right-facing triangle to the left of each cell (▶). Be sure to run all the initialization cells before the exercise cells.

Useful Colab Top Menu items

- File -> Save Saves the file to your Google Drive
- Edit -> Clear all outputs Clears the output from all cells
- Runtime -> Run all Run all the cells. Can be run multiple times.
- Runtime -> Factory Reset Runtime Completely resets the notebook back to its original state and only useful if the notebook gets into an odd state. It does not affect the files that have been downloaded to your drive.
- Table of contents – the 3 orange horizontal lines at the top left; clicking on them shows/hides the Table of contents.
- Closing the browser window stops the Colab instance.