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 Colabatory 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.
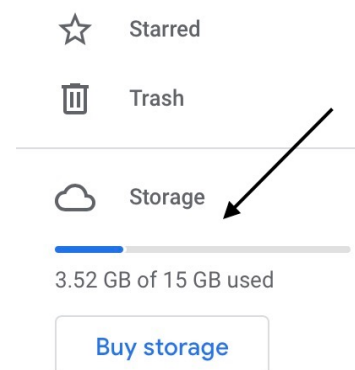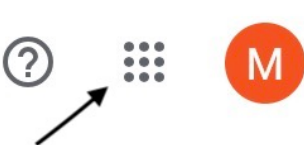
3) Once in Drive, on the left side menu, there is a section called "Storage" which will show how much space you have available. If you have insufficient storage in your Google account, we suggest creating a new account rather than purchasing storage. Note that if you hit the limit of storage, it will 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.

Disk Models:

Setup Notebook: https://colab.research.google.com/drive/1-wdGBmdSEsH7lKvnhNps_Lo025-RoI1f?usp=sharing

Hands-on Activities Notebooks:

HH30: https://colab.research.google.com/drive/1nNZuSEXps1VRi4ZO3Tz_JECMF0aVroQA?usp=sharing

HLTau: https://colab.research.google.com/drive/1-WnGWPJBGnURks_QC9O6q-a_PakYeFtF?usp=sharing

HR4796: https://colab.research.google.com/drive/1HtNT79m1VclUOpYP22NKZmZwXb4iRI7f?usp=sharing

PDS70: https://colab.research.google.com/drive/1aB3xg1Ox1P12YP26THAzeRXIhZeAsWQg?usp=sharing

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

Young Planets Spectroscopy:

Setup Notebook: https://colab.research.google.com/drive/1bC4X52qEqhUENzl8nEnIk7cxQBFQdo2d?usp=sharing

Hands-on Activities Notebooks:

1_Spectroscopy: https://colab.research.google.com/drive/1huCBNI8wDF5v7QhBzbWeOB77mxRxwZio?usp=sharing

2_HotVsCold: https://colab.research.google.com/drive/16NiSxISW_rsSuj5ak0mG5Te28OffgXgR?usp=sharing

3_Chemistry: https://colab.research.google.com/drive/14l-B6rA7DNuu3A8i4stuPo4TZBy4tRpo?usp=sharing

4_Clouds: https://colab.research.google.com/drive/1hmaMbxN9mQCjarbkI4y_bDJWF_GJ5nnr?usp=sharing

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.
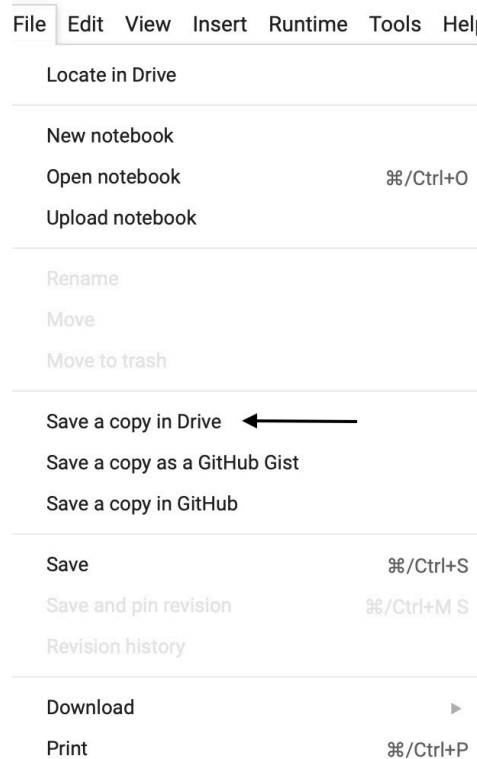
Basics of Thermal Emission:

https://colab.research.google.com/drive/1dNllfqVcnBuk9hulgi81g0f995cjDACF?usp=sharing

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) 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.
2) From the browser where you have logged into your Google account, put in the URL of the notebook (see above).

3) The notebook will open in your browser. You should see your profile/initial on the upper right side of the page. If you see "Sign in", log into your Google account.
4) Under the name of the notebook, there will be "File, Edit, View" etc. Click on "File" and then select "Save a Copy in Drive".

File Edit View Insert Runtime Tools Help

    Locate in Drive

    New notebook
    Open notebook   ⌘/Ctrl+O
    Upload notebook

    Rename
    Move
    Move to trash

    Save a copy in Drive   ←
    Save a copy as a GitHub Gist
    Save a copy in GitHub

    Save   ⌘/Ctrl+S
    Save and pin revision   ⌘/Ctrl+M S
    Revision history

    Download   ▶
    Print   ⌘/Ctrl+P

5) You will be prompted to open the notebook in a new tab or window, and the notebook name will be prefaced with "Copy of". You can rename the notebook by clicking on the name. The notebooks will be saved in your Google Drive https://drive.google.com/drive/my-drive in a directory called "Colab Notebooks".
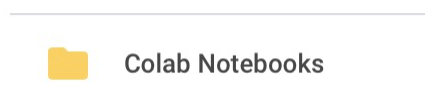
📁 Colab Notebooks

6) Close the notebook browser windows.
7) Repeat this process to save all the Google Colab notebooks to your Google Drive.

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.