

# Allegro User's Guide

The complete Allegro User's Guide resides on [this webpage](#), however, some information may be outdated, which we hope to clarify in this document.

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## General notes

- Use one of the following Allegro computing node: **helada, tulor, miscanti**
- It should be stated in an email which node was assigned to you
- The path to your home directory where we put your projects is `$ALLEGRO/home/your_username`
  - See below: [Create a shortcut to your home directory](#)
- Once you enter your project you will see two folders: 'analysis' and 'archive'. Inside 'analysis' you will see the users associated with that project – this will include some of the Allegro staff as well as your name. Inside the 'archive' folder you will find the dataset you requested, but it is kept there for back-up, so please do not work in that directory. Instead, make a copy of the data from the archive folder into your analysis folder. This ensures that we always have an unchanged version of the original dataset as backup. If your data is very big (over 1 TB) discuss this copying step with Allegro staff. Feel free to organize your analysis folder however you would like. To copy the data:  
`> cp -RL path_to_archive_data path_to_your_analysis_folder`
- Be mindful of your CPU usage as others may need to use the machine as well. You can check your usage by typing 'top' or better 'htop' to get an overview of the load. The rule of thumb is for the load average to not exceed the number of CPUs available (32 for **helada**, 40 for **tulor**, 48 for **miscanti**). You can use the 'nice' command to set the priority of any process (like CASA) from 0 (highest priority) to +19 (lowest priority). **We recommend using a priority of 10 or higher for large tasks like running CASA** unless your task has an urgency:
  - In (ba)sh shell: `> nice -n 10 <command>`
  - In (t)csh shell: `> nice +10 <command>`

If you need more computing power, please contact us directly to discuss options.

- Be mindful of the disk space you use and **please delete data you no longer need**. It is expected that you clean up intermediate data products as you work.

- To delete files from the allegro computers, use the `rm` command in the terminal and not the 'Trash' icon in the graphical user interface. Note that the `rm` command is not reversible.

## Logging in to Allegro computers

The Allegro computers are not visible from outside of the Leiden Observatory network. Therefore if you are logging in from outside, you need to tunnel through `almaportal`:

```
your_machine> ssh -X your_username@almaportal.strw.leidenuniv.nl
```

```
ssh> ssh allegro_machine
```

where the `allegro_machine` you should use is `'helada'` or `'tulor'` or `'miscanti'`

You can speed up logging into `helada` with an `ssh` config file on the machine you are connecting from. If you are a mac or linux user this can be found at `~/.ssh/config` (if it does not exist, create one). Copy these lines to the file:

```
Host *
  ForwardX11 yes

Host almaportal
  HostName almaportal.strw.leidenuniv.nl
  User your_username

Host helada
  HostName helada.strw.leidenuniv.nl
  User your_username
  ProxyCommand ssh almaportal -W %h:%p
```

Once this is in your config file, you can `ssh` into `helada` directly with the command

```
your_machine> ssh helada
```

from your machine.

## Copying files to your local machine

Once you have your `~/.ssh/config` file set up as described in the previous section, you can directly copy files from the Allegro computers to your local machine via

```
your_machine> scp helada:/file/path /local/file/path/.
```

This is only for your scripts and small files; Always ask Allegro staff to download your data files.

## Create a shortcut to your home directory

We have generated a script that sets up all the environment variables (most importantly the environment variable ALLEGRO) to use the software, find programs, etc, to facilitate the work with the Allegro computers. It also displays any important information about changes in the system, scheduled reboots, etc, when logging into any of the Allegro computers.

To have access to this script, you need to modify your shell rc-file (if the file does not exist, create it). To know what shell you are running, type 'echo \$shell' in the terminal. The STRW shells are by default (t)csh.

for (t)csh users: open ~/.tcshrc with your favourite editor and add  
***alias allegro-setup 'source /almastorage/allegro/bin/allegro-user-setup.csh'***

for (ba)sh users: open ~/.bashrc with your favourite editor and add  
***alias allegro-setup 'source /almastorage/allegro/bin/allegro-user-setup.sh'***

After adding this to your rc file you need to run

```
allegro_machine> source ~/.tcshrc
```

Before starting, run:

```
allegro_machine> allegro-setup
```

Everytime you open a new shell you need to run `allegro-setup`. The other steps only need to be done once.

Now you can find your home directory and all your projects at the following path:

```
$ALLEGRO/home/your_username
```

## Setting up a VNC if you're working outside of the STRW

Step 1: Create a vnc server on the ALLEGRO machines

From your own machine, connect to the SSH machine at the STRW

```
your_machine> ssh -X your_username@almaportal.strw.leidenuniv.nl
```

From here, do another ssh to the Allegro machine you want to connect to and work remotely (e.g. helada):

```
almaportal> ssh allegro_machine
```

Start a vnc\_server client:

```
helada> vncserver
```

If you don't have vnc password already set, then you will be prompted to create a new vnc password (if you would like to set a new one you can do `rm .vnc/passwd` before starting the vnc server).

This will display some information about the server, including the following line:

```
New 'helada:1 (your_username)' desktop is helada:1
```

**Make note of the server number listed as allegro\_machine:NUMBER (e.g. helada:1)**

You can also find the **server number** and to see how many vnc sessions you are running in this way:

```
helada> vncserver -list
```

(optional) You can customize your vnc window:

```
helada> vncserver :NUMBER -depth 24 -cc 4 -geometry 1920x1080  
-AlwaysShared
```

## Step 2: open VNC from your computer

Create a tunnel from your own machine (all written together on one line):

```
your_machine> ssh -L 59NUMBER:allegro_machine:59NUMBER  
your_username@almaportal.strw.leidenuniv.nl
```

Note: NUMBER is a two digit code and it corresponds to your **server number** above. If NUMBER is 2, this corresponds to 02. The "allegro\_machine" is the Allegro machine you want to connect to, e.g. `helada`

## Step 3: open a VNC viewer

You need VNC viewer downloaded on your computer ([Download VNC Viewer by RealVNC®](#)). Open the VNC viewer and enter the VNC server address. This would be `localhost:NUMBER` (something like `localhost:02`) using your **server number**. You will also need to enter your vnc password (Not your user password!)

Note if you get an error that looks like “authentication failed” when entering your vnc password this has to do with your vnc password and not the password of your user account. If you have forgotten your vnc password you can reset this by deleting the vnc password:

- `rm .vnc/passwd`

You then need to start a new vnc server:

- `vncserver`

This will prompt you to enter a vnc password. You can now repeat the login process in your vnc viewer with this new password.

\* Important: You only need to do Step 1 once! Once the server is created, the next time you want to connect to the machines you only have to do Step 2 and in Step 3, the VNC Viewer will have remembered your last connection so you just need to double click on the connection of your choice.

## Options

- Adapt screen resolution:
  - Inside your VNC session, open a terminal and type: `xrandr -s 1920x1080`
- Kill your vnc server:
  - Once you have logged into the allegro machine where the server is running, type `vncserver -kill :NUMBER`

## CASA Setup

To gain access to all the CASA versions available on the Allegro machines, you need to run the Allegro setup script. Beforehand, we recommended to add this to your shell’s startup file (rc file in /home/<username>) so that it runs automatically when logging into Allegro machines, but it is found to interfere with other Sterrewacht logins. The setup script is available for both (t)csh and (ba)sh shells (tcsh is the default). To know what shell you are running, type ‘echo \$shell’ in the terminal.

- for (ba)sh users, run:  
`source /almastorage/allegro/bin/allegro-user-setup.sh`
- for (t)csh users, run:  
`source /almastorage/allegro/bin/allegro-user-setup.csh`

Note that this needs to be done for every new shell you open on the Allegro server that you’re working on. To simplify this, you can add an alias at the end of your shell’s rc file ( ) as follows (all on one line):

```
alias allegro-setup
'source/almastorage/allegro/bin/allegro-user-setup.(c)sh'
```

Note that once you have added these lines to your rc-file you need to either start a new terminal or type 'source ~/.bashrc' or 'source ~/.cshrc' for the changes to be applied in your current session.

To find which CASA versions are available on our machines, you can type *casapy* and press the tab button on your keyboard.

## CASA 5 and before

The latest version of CASA that uses Python 2 can be opened by typing `casapy-580` in the terminal. You can use the 'nice' command to set the priority of any process (like CASA) from 0 (highest priority) to +19 (lowest priority). We recommend using a priority of 10 or higher for large processes unless your task has an urgency:

- In (ba)sh shell: `> nice -n 10 casapy-580`
- In (t)csh shell: `> nice +10 casapy-580`

## CASA 6 and later

The latest CASA version on the Allegro machines is CASA 6.4.1. To open the latest CASA 6 version, use the following command:

```
> env -u PYTHONPATH -u LD_LIBRARY_PATH casapy-641p
```

You can use the 'nice' command to set the priority of any process (like CASA) from 0 (highest priority) to +19 (lowest priority). We recommend using a priority of 10 or higher for large processes unless your task has an urgency:

- In (ba)sh shell: `> nice -n 10 env -u PYTHONPATH -u LD_LIBRARY_PATH casapy-641p`
- In (t)csh shell: `> nice +10 env -u PYTHONPATH -u LD_LIBRARY_PATH casapy-641p`

Add `--pipeline` to the end of your command to have access to the CASA pipeline

## AnalysisUtils in CASA 6

Type the following lines in your CASA 6 session:

- `sys.path.append('/almastorage/allegro/lib/jao-mirror/AIV/science/analysis_scripts/')`

Now can you import AnalysisUtils in your CASA session as follows:

- `import analysisUtils as au`

## CARTA

Firstly, CARTA is easy to install and we **recommend downloading and running it locally**. CARTA works well even on most laptops. You can download it here:

<https://cartavis.org/>

If you need to run CARTA on our machines use the following instructions.

### Step 1: Open a terminal on the Allegro server

```
allegro_computer> carta --no_browser &
```

You will get a message with the process ID; note it down. It will look something like:

```
[1] 139301
```

You will get some more messages from CARTA. Note down the web address which looks something like this:

```
[2022-11-11 14:38:16.137] [CARTA] [info] CARTA is accessible at  
http://132.229.226.243:3002/?token=bff94309-1335-44c3-8dbc-71317003c25f
```

This web address has the form

```
<ip_address>:<port_number>/?token=<token_number>
```

Note the port number down (in the example above it is 3002)

## Step 2: SSH into the same Allegro computer from your personal computer

In a terminal on your personal computer (not the Allegro computer) ssh into the same Allegro computer again with this command

```
your_machine> ssh -L <port_number>:localhost:<port_number>  
<your_username>@almportal.strw.leidenuniv.nl
```

In our example, if we opened CARTA in a VNC session on the Allegro computer 'helada' as a Leiden Observatory (STRW) user, this would be `ssh -L 3002:localhost:3002 -o ProxyCommand="ssh -W %h:%p <your_username>@ssh.strw.leidenuniv.nl" <your_username>@helada.strw.leidenuniv.nl`.

Leave this connection running. If it drops, you will need to restart it to regain access to the CARTA session.

## Step 3: Open CARTA in the browser of your personal computer

Go to the CARTA web address in a web browser on your personal computer, but replace the IP address with "localhost" or "127.0.0.1". The format should be:

```
localhost:<port_number>/?token=<token_number>
```

In our example this would be:

```
localhost:3002/?token=bff94309-1335-44c3-8dbc-71317003c25f
```

OR

```
http://127.0.0.1:3002/?token=bff94309-1335-44c3-8dbc-71317003c25f
```

You should now be able to use CARTA. You can leave the CARTA instance on the Allegro computer running and come back to it by repeating steps 2 and 3.

## Step 4: Kill CARTA when finished

When you are finished using CARTA, kill the process with the following command:

```
allegro_computer> kill -9 <processID>
```

In our example this would be: `kill -9 139301`. However, you can leave the CARTA instance on the Allegro computer running and come back to it by repeating steps 2 and 3. If you want to do this, do not kill the CARTA process on the server!