Access to the laboratory computer

The analysis of the data obtained within the scope of the laboratory courses can either be done from your computer at home or directly at our laboratory computer after previous date arrangement.

External Login

The remote analysis of the data can be done in the computer pool at the physic institute or at your home computer with internet access.

```
User:      alpha
Password:  is given in the seminar
```

alpha is given here as an example and must be replaced by the corresponding group name. The password can also be obtained from the supervisors.

Linux / Unix

Since the computers in the astrophysics are all operated with Linux, it's easy to log in from another computer with the same operating system. So you can do the complete evaluation from distance by logging in with a normal SSH connection on our laboratory computer. This also works for graphical output (i.e. view FITS files or text editors), but the performance crucially depends on the connection speed. In the computer pool at the university this is no problem but with a connection at home the speed may be low.

Login in the console with this command:

```
ssh -X alpha@columba.astro.physik.uni-potsdam.de
```

alpha is given here as an example and must be replaced by the corresponding group name. You will be asked for the password. The parameter **-X** (capital X) ensures that graphical output will be transferred so it can be displayed.

Alternative: Xpra

Alternatively you can log in with Xpra, which also communicates via *SSH*, but allows you to work with graphical output even with a poor internet connection. *Xpra* usually has to be installed from the package sources first. Once this is done, the following command establishes a connection to the laboratory computer

```
xpra start ssh:alpha@columba.astro.physik.uni-potsdam.de --ssh=ssh
```

The command is not very different from the one above, except that here the beginning and the end are slightly different. **alpha** has to be replaced by the group name here as well. If the connection has

been established successfully, a *Xpra* icon or menu usually appears on the desktop (under Ubuntu it can be found in the upper right corner next to the network/volume/battery indicator). This menu can be used to configure *Xpra* as well as, via the menu item `Start`, to start programs directly on the laboratory computer. *Xpra* has the nice advantage that the windows integrate seamlessly into the local system.

Furthermore it offers the possibility to disconnect from the *Xpra* session without ending it by using the menu button `Disconnect`. This allows you to interrupt the session at any point and continue it later. All that is needed is the following console command:

```
xpra attach ssh:alpha@columba.astro.physik.uni-potsdam.de --ssh=ssh
```

The *Xpra* session is terminated with:

```
xpra exit
```

Windows

PuTTY and Xming

Linux uses the X-Window-System to display graphical output while Windows has it's own system. That's the reason why graphical output from a Linux computer can not simply be displayed by Windows. To solve this you need to install an X-Window-Server designed to work with Windows. There are many options and programs that offer this functionality and we suggest these, slim freeware solutions:

Required programs

- PuTTY as the SSH-Client
- Xming to display X-Window-Server windows

First install the server Xming, which optimally should be incorporated in the Windows autostart list. PuTTY is an executable that just requires a quick configuration:

- click on the menu item *Session* and enter `columba.astro.physik.uni-potsdam.de` in the field *Hostname*
- in *Connection* → *SSH* → *X11* check `Enable X11 Forwarding` to allow graphical output
- in case of problems with the graphical output, enter `localhost:0` in the field *X display location* in *Connection* → *SSH* → *X11*

MobaXterm

MobaXterm is a SSH client which already includes the X11 Server.

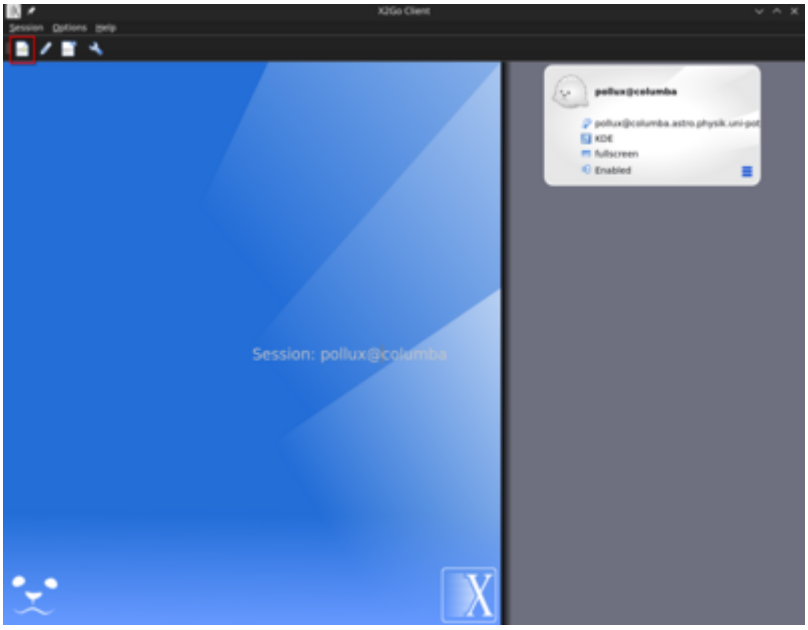
- MobaXterm

To increase the stability of the connection, it has proven useful to activate the „SSH keepalive“ option and then restart MobaXterm.

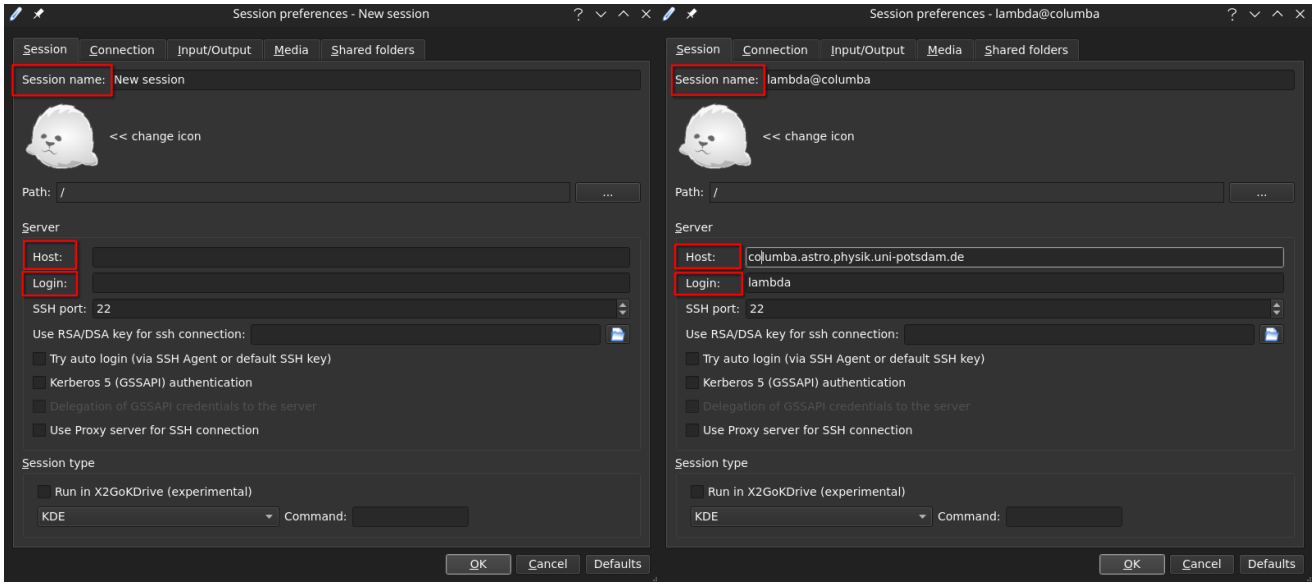
Operating system independent

X2G0

In addition to the above mentioned possibilities, a *X2Go* server is also installed on the laboratory computer **columba**, which allows to work remotely and efficiently with graphical programs. The *X2Go* client is available for all major operating systems (Windows, Linux and MacOS).

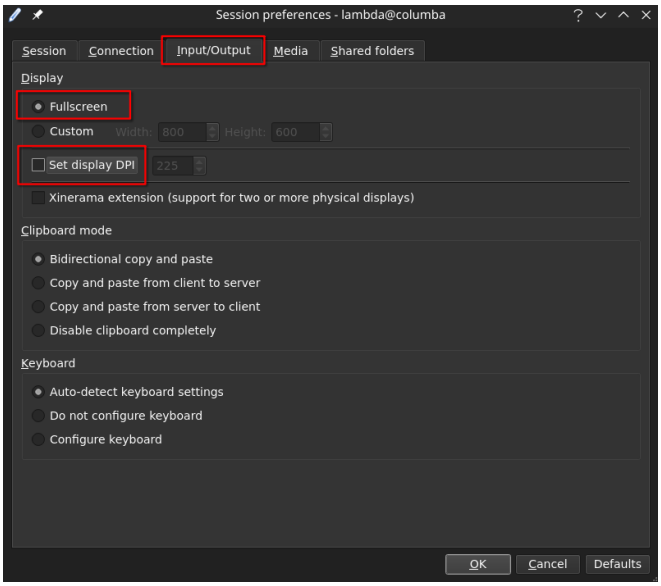


After installing the client you can create a new session by clicking **Session** and then **New session …**. In the window that opens you have to define the session parameters.

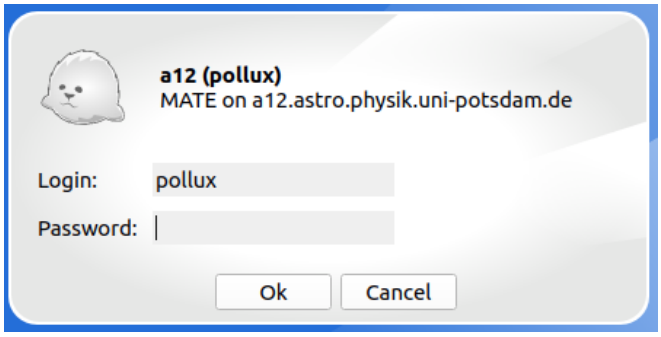


These include **session name**, **host**, **login**, and the **session type**. The **Session name** can be freely chosen and is only used to distinguish between different sessions. As **host**

`columba.astro.physik.uni-potsdam.de` must be specified. As **Login** the respective user name like e.g. alpha has to be entered. For **Session type** you have to select `Custom desktop` from the dropdown menu and enter `MATE` as **Command**.



After clicking on `OK` you can start the connection to **columba** by double clicking on the corresponding session entry in the main window of *X2Go*. Only the password for the respective account will be requested before the connection is established. The window that opens shows the MATE desktop, on which you can work as if you were sitting directly at the computer.



Attention Wayland users: Under Wayland, it is possible that the current client does not work properly and simply crashes when logging in, in this case it may help to start the client from the command line with

```
env QT_QPA_PLATFORM=xcb x2goclient
```

Logging in via Remote Desktop Protocol

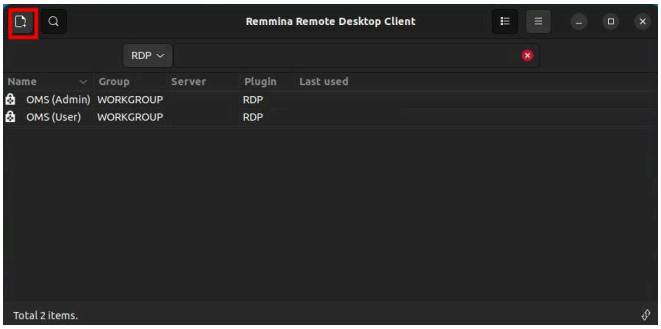
This method is in beta stage

Unfortunately, this method is not working at the moment.

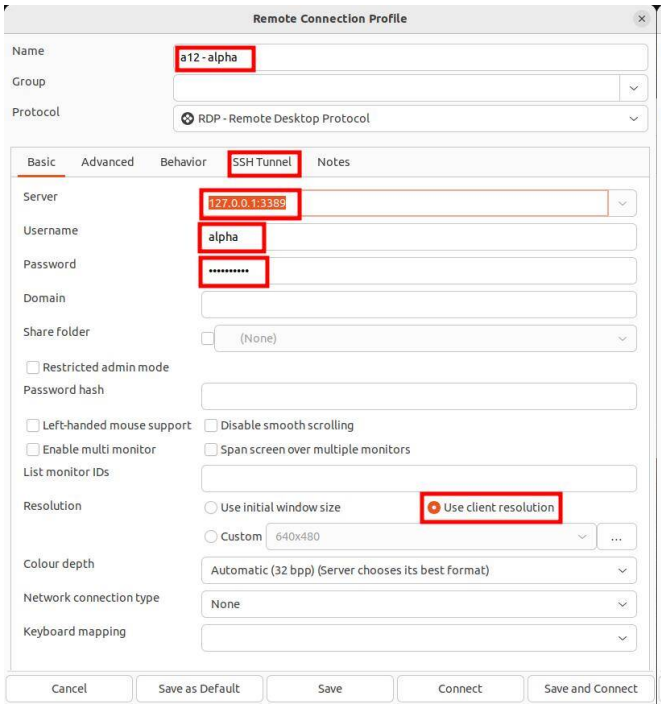
In addition to the methods described above, you can also log in to columba using the RDP protocol. The protocol developed by Microsoft is very performant and offers the possibility of displaying the entire desktop without any major loss of speed. There is a free implementation for Linux, so we can also use this with columba. However, since RDP is not considered the most secure method, you must first establish an SSH tunnel to columba before you can connect to the RDP server.

Under Linux, Remmina can be used for this, which can be installed in the vast majority of distributions via the package sources if it is not already supplied with the distribution.

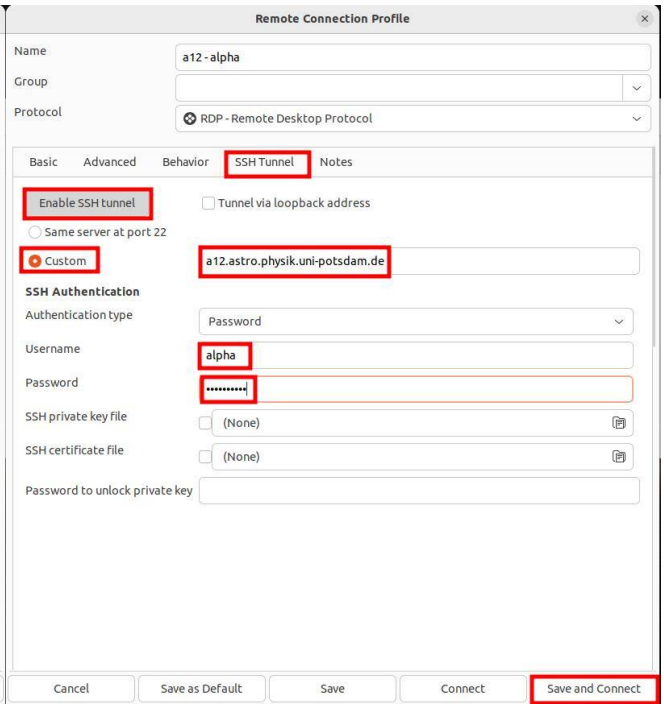
Configuration instructions Linux:



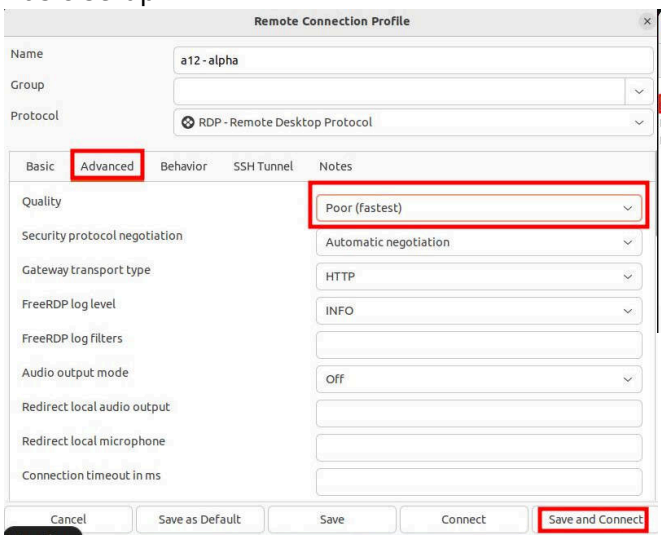
- After Remmina has been started, click on the plus symbol in the top left corner.
- This opens the configuration dialog
- Enter the following or activate the corresponding option:
  1. Name for the configuration
  2. Server address: 127.0.0.1:3389
  3. User name
  4. Password
  5. `Use client resolution`
- Then click on `SSH Tunnel` and add the following configuration or enable the corresponding option:
  1. `Enable SSH tunnel`.
  2. `Custom`
  3. Server address: columba.astro.physik.uni-potsdam.de
  4. Username
  5. Password
- Then finish the configuration by clicking on `Save and Connect`.
- Remmina will then connect to columba
- If you are satisfied with the connection speed, you can increase the quality of the connection in the `Advanced` tab.
- After saving the configuration, you will find it under the name you entered in the list that Remmina displays when the program starts. Doubleclick on the entry to easily connect to the columba.



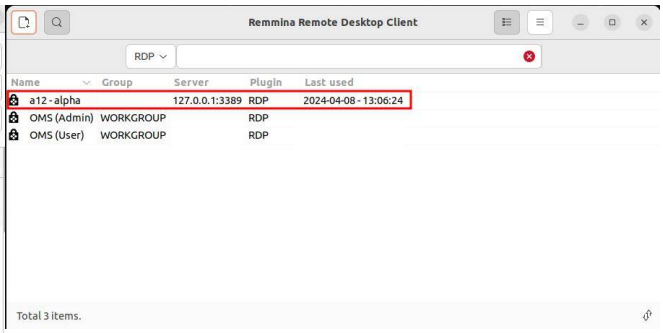
Basic setup



SSH tunnel

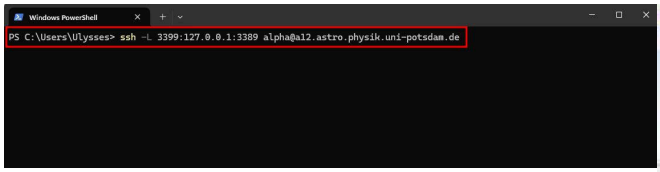


Additional options



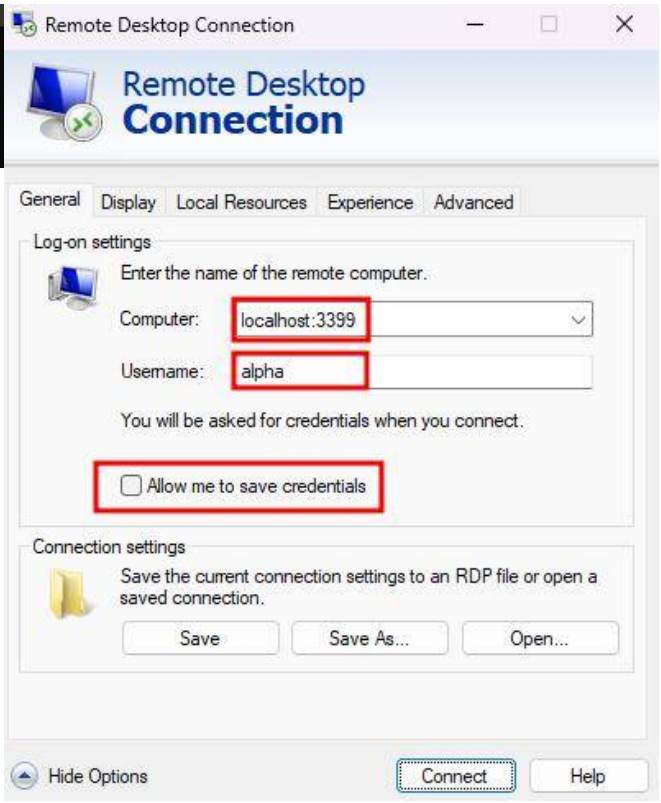
Configuration Instructions for Windows 11:

- On Windows, you must first set up the SSH tunnel before you can use the Windows RDP client because it does not provide this functionality itself.
- To do this, you must first open a PowerShell window.
- In this window, type the command `ssh -L 3399:127.0.0.1:3389 alpha@columba.astro.physik.uni-potsdam.de`. Replace `alpha` with the appropriate group name.



PowerShell with SSH tunnel command

- You can then start the RDP client and enter the following configuration or enable the appropriate option:
  1. Computer: `localhost:3399`
  2. User name
  3. `Allow me to save credentials` (optional)
- It may be necessary to click on `Show Options` first.
- Click on `Connect` to establish the connection. The password prompt will follow.



RDP Windows Client

External Login from the computer pool in the Physics Institute

Also the Linux computers in the computer pool of the Physics Institute (room 2.28.1.101) can be used to login on the lab computer. See the description here: Linux. The computers share the fast internet access of the University and so the transfer rate, i.e. for graphical output it is sufficient to work. To get an account for the computer pool, ask Mr H. Todt (room 2.28.2.004).

Working directly on the data reduction computer

The computer for the laboratory courses shall be used for data reduction. It is in room 2.009 in the Institute in Golm and can be booked, i.e. request a timeslot by email.

These timeslots are already booked:

Linux Sheet Paper

This pdf file list the absolutely basic commands for a Linux console. The Bash Cheat Sheet contains some further commands.

Access to files by SFTP

Pure file transfer is possible, independent of the computer system, by logging in with SFTP (Secure File Transfer Protocol). All you need is a program that can run SFTP transfers, be it console based or graphical (i.e. WinSCP).

The login information are in principle the same as for the SSH client:

```
Server:   columba.astro.physik.uni-potsdam.de
Protocol: SFTP
User:     alpha
Password: as before
```

alpha is given here as an example and must be replaced by the corresponding group name.

Attention: In contrast to the login methods described in the previous sections, SFTP is just for file transfer. It will not let you work on data reduction or alike.

Laboratory Courses- overview