## 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  $\rightarrow$  SSH  $\rightarrow$  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  $\rightarrow$  SSH  $\rightarrow$  X11

#### MobaXterm

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

#### MobaXterm

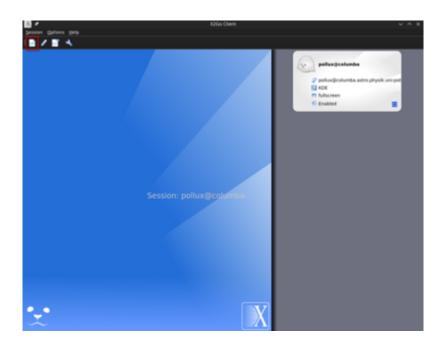
To increase the stability of the connection, it has proven useful to activate the "SSH keepalive" option and then restart MobaXterm.

https://polaris.astro.physik.uni-potsdam.de/wiki/

#### **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.

Session preferences - New session		Session preferences - lambda@columba ? v ^ ×
Session Connection Input/Output Media Shared folders		Session Connection Input/Output Media Shared folders
Session name: New session		Session name: lambda@columba
<< change icon		<< change icon
Path: /		Path: /
<u>S</u> erver		Server
Host:		Host: coļumba.astro.physik.uni-potsdam.de
Login:		Login: lambda
SSH port: 22		SSH port: 22
Use RSA/DSA key for ssh connection:		Use RSA/DSA key for ssh connection:
Try auto login (via SSH Agent or default SSH key)		Try auto login (via SSH Agent or default SSH key)
Kerberos 5 (GSSAPI) authentication		Kerberos 5 (GSSAPI) authentication
Use Proxy server for SSH connection		Use Proxy server for SSH connection
Session type		Session type
Run in X2GoKDrive (experimental)		Run in X2GoKDrive (experimental)
KDE   Command:		KDE   Command:
	<u>O</u> K <u>C</u> ancel Defaults	<u>QK</u> <u>C</u> ancel Defaults

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.

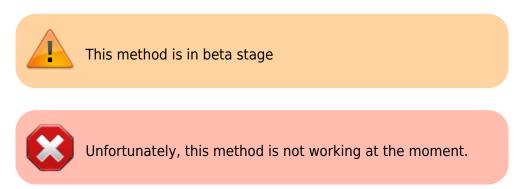
1 *	Session p	oreferenc	es - lambda@colur	nba	?	$\sim$	^ X
<u>Session</u> <u>Connection</u>	Input/Output	<u>M</u> edia	<u>S</u> hared folders				
<u>D</u> isplay							
Fullscreen							
<b>Custom</b> Width:							
Set display DPI							
Xinerama extension	n (support for two o	or more p	hysical displays)				
<u>C</u> lipboard mode							
<ul> <li>Bidirectional copy a</li> <li>Copy and paste fro</li> <li>Copy and paste fro</li> <li>Disable clipboard c</li> </ul>	m client to server m server to client						
<u>K</u> eyboard							
<ul> <li>Auto-detect keyboa</li> <li>Do not configure keyboard</li> <li>Configure keyboard</li> </ul>	eyboard						
				<u>_0</u> K	<u>C</u> ancel	Defa	ults

æ	<b>a12 (pollux)</b> MATE on a12.astro.physik.uni-potsdam.de
Login:	pollux
Password:	
	Ok Cancel

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



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.

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- 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
  - Server address: columba.astro.physik.unipotsdam.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.

C	1 a		Remmin	a Remote Desktop Client	•	×
Na			Plugin			
		) WORKGROUP	RDP			
ŵ	OMS (User)	WORKGROUP	RDP			
То	tal 2 items.					÷

en:praktikum:zugang https://polaris.astro.physik.uni-potsdam.de/wiki/doku.php?id=en:praktikum:zugang&rev=1728540825

	Remote Connection Profile	×	Remote Connection Profile	×
Name	a12 - alpha	Name	a12 - alpha	
Group		Group		×
Protocol	🛇 RDP - Remote Desktop Protocol	~ Protocol	RDP - Remote Desktop Protocol	~
Basic Advanced Beh	avior SSH Tunnel Notes	Basic Advance	ed Behavior SSH Tunnel Notes	
Server	127.0.0.1:3389	<ul> <li>Enable SSH tunne</li> </ul>	el 🗌 Tunnel via loopback address	
Username	alpha	Same server at	port 22	~
Password		O Custom	a12.astro.physik.uni-potsdam.de	
Domain		SSH Authenticatio		
Share folder	(None)	Authentication type	Password	~
Restricted admin mode		Username	alpha	
Password hash		Password		
Left-handed mouse suppo	rt 🗌 Disable smooth scrolling	SSH private key file	(None)	e
Enable multi monitor List monitor IDs	Span screen over multiple monitors	SSH certificate file	(None)	Ē
Resolution		Password to unlock	<pre>c private key</pre>	
Resolution	Use initial window size Use client resol			
Colour depth	Automatic (32 bpp) (Server chooses its best format)	×		
Network connection type				
Keyboard mapping	None	×		
negooare mopping		<u> </u>		
Cancel Save	as Default Save Connect	Save and Connect Cancel	Save as Default Save Co	Save and Connect
Basic setup		SSH tunn	el	
	Remote Connection Profile	× 🖸 Q	Remmina Remote Desktop Client	
	a12 - alpha		RDP 🗸	0
Group		Name Grou	p         Server         Plugin         Last used           127.0.0.1:3389         RDP         2024-04-08 - 13:06:24	
Protocol	RDP - Remote Desktop Protocol	OMS (Admin) WORk     OMS (User) WORk	KGROUP RDP KGROUP RDP	
Basic Advanced Beh	avior SSH Tunnel Notes			
Quality	Poor (fastest)	~]		
Security protocol negotiation	Automatic negotiation	~		
Gateway transport type	HTTP	~		
FreeRDP log level	INFO			
FreeRDP log filters		Total 3 items.		ው
Audio output mode	Off	~		
Redirect local audio output				
Redirect local microphone				
Connection timeout in ms				
Cancel Save	as Default Save Connect	Save and Connect		

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.unipotsdam.de. Replace alpha with the appropriate group name.

All Windows Rounsbell         X         + -        X           P5 C:\U8ers\U1vsses> ssh -L 3399:127.0.0.1:3389 Alpha@al2.astro.physik.uni-potsdam.de        X	Nemote Desktop Connection — 🗆 🗙
	Remote Desktop Connection
PowerShell with SSH tunnel command	General Display Local Resources Experience Advanced
<ul> <li>You can then start the RDP client and enter the following configuration or enable the appropriate option:</li> </ul>	Log-on settings Enter the name of the remote computer. Computer: localhost:3399
<ol> <li>Computer: localhost:3399</li> <li>User name</li> </ol>	Usemame: alpha

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- 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.

	Computer:	localhost:3399	~]
	Usemame:	alpha	]
	You will be as	ked for credentials when yo	u connect.
		E	
	Allow me to	o save credentials	
Conn	ection settings		
1	Save the curre saved connec	ent connection settings to a tion.	in RDP file or open a
	Save	Save As	Open

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

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