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Stellarium

Stellarium is a free software to simulate a planetarium on your own computer. This article intends to give a short overview on the basic function and possibilities using Stellarium.

Install Stellarium

You can download the software on the official [website](#). There are multiple versions for Windows (32/64Bit), Mac OS and Linux.

For Linux one gets the source code which has to be compiled. For Debian and their derivatives such as Ubuntu, Stellarium can easily be installed from the standard package repository:

```
sudo apt-get install stellarium
```

Working with Stellarium

Stellarium is capable of simulating the apparent sky at given time on any position on the earth. We will now go through the basic menus that control what you can see.

The menus

Stellarium has three different menu bars. Two in the lower left which appear only if the mouse is close. The third one is in the upper right corner and is always visible.

Main menu

All basic functions can be found here as well as useful and necessary configurations. This is the vertical menu on the left.

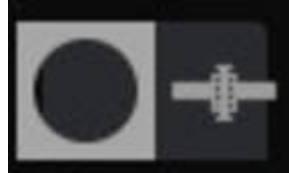
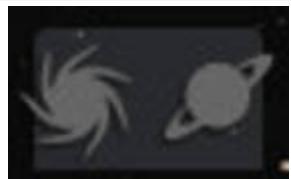
Button	Hotkey	Description
	[F6]	Choose your place on earth. Stellarium has a large list of known locations gathered by the community. There you find the <i>Astrophysical Institute Potsdam</i> which is the AIP in Potsdam Babelsberg. This is sufficiently close enough to Golm to plan lab course observations. Alternatively one can enter coordinates directly. One needs longitude, latitude, and elevation above ground level . A more rough method is to simply click into the shown map to retrieve coordinates.

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Button	Hotkey	Description
	[F5]	Configure the clock.
	[F4]	Here you can choose which objects are displayed.
	[F3]	Opens the search window. Stellarium has an extensive database of over 100K stars, various nebulae, clusters, satellites and the like. This can be extended by plug-ins. If there is an internet connection, Stellarium matches the search term with the database of Simbad and obtains the coordinates. This allows Stellarium to find an object with different designations.
	[F2]	Opens the options menu
	[F1]	Opens the help window
	[STRG]+[Q]	Exits Stellarium

The observer menu

Buttons group	Designation	Hotkey	Function
	Turns the display of constellations on and off. The options can be combined as desired.	[C]	Connecting lines between stars of the constellations are displayed.
		[V]	The name is displayed.
		[R]	Artistic impressions matching the constellations are displayed.
	Displays coordinate systems.	[E]	An azimuthal coordinate system (orange) in which the coordinates of an object depend on the choice of location.
		[Z]	The equatorial coordinate system (blue) with the axes right ascension and declination.
	Controls the view in Stellarium	[STRG]+[M]	Viewing angle can be switched between azimuthal and horizontal mount.
		[LEER]	Centers the view on an object as long as it is selected.
		None	Switches to night vision mode. Red light does not dazzle and destroys the eyes habituation to the dark less.
		[F11]	Switches between window and full screen mode.
	Responsible for eyepiece view and finding satellites.	[STRG]+[O]	Switches to the eyepiece view and gives an impression of the field of view with different equipment, more about this under telescope menu.
		[STRG]+[Z]	Displays artificial satellites, selected ones also with predicted trajectory.
	Displays markers for additional objects.	[D]	Deep sky objects, including galaxies, nebulae, and star clusters.
		[P]	Solar system objects, planets and their moons

Buttons group	Designation	Hotkey	Function
	Switching on and off the influence of the earth	[G]	Toggles the display of the ground level. Useful to see how high an object is above the horizon. The ground display can be adjusted in the options menu to simulate high buildings or mountains in the vicinity.
		[Q]	Display of cardinal directions for easier orientation
		[A]	Switching the atmosphere. The artificial earth atmosphere simulates scattered light, refractive position changes, and extinction.
	Control of the time flow. At startup Stellarium inherits the system time and lets the time run along. With the control the speed and direction of the time can be specified or completely stopped.	[J]	Fast rewind, each additional click increases speed
		[K]	Pause the simulation, at increased speed it will be reset to normal.
		[8]	Resets the clock to system time. The increased speed is preserved.
		[L]	Fast forward, each additional click increases the speed

Das Teleskopmenue

Schaltflaechengruppe	Bezeichnung	Funktion
	Das Teleskopmenue bietet die Moeglichkeit Gesichtsfelder der eigenen Ausrustung zu simulieren. Die Verwendung dieser Option wird separat beschrieben	Schaltet die Okularansicht ein. Es erscheint eine weitere Schaltflaeche, die ein Fadenkreuz einblendet
		Zeigt die Groesse des Bildsensors an.
		Oeffnet die Konfiguration des Teleskop Plugins

What does Stellarium offer me?

Stellarium offers a considerable amount of additional information in addition to the simulation.

Level of detail and additional information

Stellarium outputs a list of parameters for each object. Most of these are coordinates in various coordinate systems. In addition, depending on the object, there is also basic information. For stars

these are for example spectral type and photometric data. These are to be handled with care. Often these data differ from the current state of knowledge. Therefore, for each object at least the [Simbad database](#) should always be consulted.

Tages- und Nachtzyklus, Streulicht

Stellarium simulates not only the positions of objects but also the brightness variation in the sky. This is based on a rough approximation taking into account the positions of all bright objects. In the first place, the Sun is responsible for most scattered light. But even darker objects, like the Moon, Jupiter or Saturn, can make the sky so bright that darker objects are no longer visible. The representation of Stellarium is therefore only a rough value to consider, for observations at the OST it is the light scattering due to air pollution of the surrounding cities that is more important.

Einbeziehung der eigenen Beobachtungsausruestung

It is possible to simulate the specifications of your own observation equipment. A special plugin is required, which is already available in the standard installation. If it is activated, a new menu appears in the top right corner. There you can enter parameters. It is required to enter telescope equipment, lens widths of the telescope and the used eyepieces and the size of a detector. From this Stellarium calculates the field of view of the selected combination of the entered equipment. This can be helpful, for example, if a nebula is to be photographed. It allows you to check in advance whether the object is too large or too small for a specific configuration.

Erweiterungs möglichkeiten

There are many extensions for Stellarium, too many to mention here. For work at the OST it is usually sufficient to use the standard installation. Installing additional catalogs makes sense only if the connection to the Simbad database already contains all known objects, which were listed somewhere, even if they are not currently displayed, because they can be found again under their coordinates, even if they are not currently displayed.

Wie verwende ich Stellarium?

Eine Beobachtung planen

As part of the preparation for an observation, it is necessary to put together a list of objects. In the first place, the choice of objects naturally depends on the nature of the desired observation itself. If one is interested in what kind of objects to observe, one can check with Stellarium whether certain objects are visible at the time of the observation. The creation of an object list is done by following the following steps:

1. What do I want to observe? Stars, galaxies, nebulae?
2. Is it day, b.z.w. night at the time of the observation? Dazu kann der

Zeitpunkt in Stellarium auf die gewünschte Nacht eingestellt werden. Der genaue Zeitpunkt, der gewählt werden sollte, ist abhängig von der Jahreszeit und von der Beobachtungsplanung. Im Sommer geht die Sonne erst später unter, der Start einer Beobachtung verschiebt sich damit nach hinten. Im Winter kann bereits deutlich früher angefangen werden. Es sind dann sogar zwei verschiedene Beobachtungen möglich, die Zweite sollte dann mit einer späteren Zeit geplant werden. Auch die Bewegung eines Objektes muss mit einbezogen werden, wenn für die Beobachtung viele Aufnahmen oder eine lange Belichtungszeit notwendig sind. Das OST folgt zwar der Bewegung, ist aber machtlos, wenn ein Objekt während der Beobachtung untergeht oder hinter Gebäuuden verschwindet.

3. Wie hell ist das Objekt? Stellarium ist in der Lage die Helligkeit eines Objektes mit Einfluss der Erdatmosphäre abzuschätzen.
4. Wie gross ist das Objekt? Bei Nebeln oder Galaxien kann es passieren, dass das Sichtfeld des Teleskops zu klein ist. Dazu bietet Stellarium eine Vergleichsmöglichkeit mit der vorhandenen Teleskopausstattung. Mehr zu dem Thema [hier](#).
5. Was befindet sich in der näheren Umgebung? Sind hellere Objekte vorhanden, die meine Beobachtung beeinflussen können? Größter Stoerfaktor ist hier der Mond, aber auch Jupiter und Saturn können durch ihre große Helligkeit den Himmel um sich herum so stark aufhellen, dass dunklere Objekte überstrahlt werden. Selbst die hellsten Sterne sind nahe am Vollmond praktisch nicht mehr zu erkennen. Stellarium zeigt die Phase und den Grad der Beleuchtung an. Auch die grafische Darstellung von Morden und Planeten ist dynamisch, das heißt, die beleuchtete Fläche in Stellarium entspricht der am Himmel.
6. Gibt es weitere Detailanforderungen? Planeten und Monde des Sonnensystems haben eine besondere Genauigkeit in Stellarium. So verschwinden beispielsweise Monde hinter Jupiter oder werfen einen Schatten auf ihn, wenn sie an ihm vorüber ziehen. Auch die Rotation von der Planeten selbst ist mit einbezogen und so kann festgestellt werden, ob zum Beispiel der große rote Fleck sichtbar ist.

Alternativen

Stellarium bietet mit seinen vielen Möglichkeiten bereits viele Informationen. Vergleichbar leistungsstarke Software ist meist nicht frei nutzbar. Eine Auswahl befindet sich [hier](#).

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