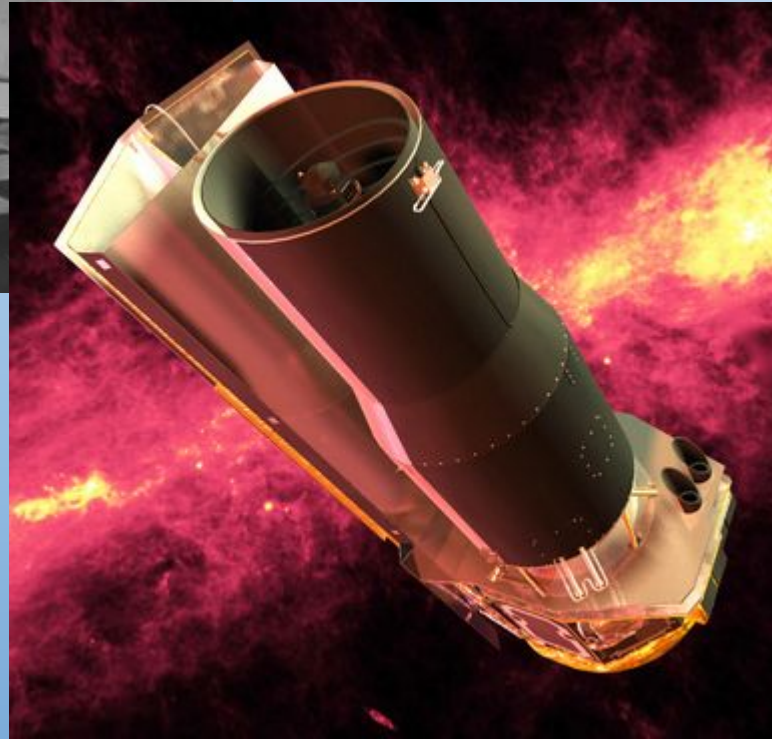


Astronomy



From Galileo to
Spitzer and Beyond!

Syllabus

Week 1: Introduction. Beginning Astronomy. Naked eye viewing, finding your way in the (Northern hemisphere) sky, some interesting objects.

Week 2: Telescopes, history, types and use. Visual fields, understanding magnification, what sort of telescope to use for what sort of observation. Some minimal math.

Week 3: Telescope setup – how to get the most from your instruments.

Week 4: Basic physics. What are Stars, planets, asteroids, moons, comets, etc. What do we see in the night sky? What do we NOT see? What is our Galaxy?

Week 5: Local viewing – Moon and planets

Week 6: Stars, gas, dust and Pretty Pictures

Week 7: Looking at Deep-Sky Objects – Nebulae and Galaxies

Telescope setup

Setup strongly depends on the type of equipment you have.



Telescope setup

For all variants of the Altitude/Azimuth setup, sit the telescope on a flat, comfortable area and begin observing!

Alt/Az mounts are generally simple and inexpensive, but do not offer the advantages of a “tracking” mount.



Telescope setup

Setting up a basic Alt/Az computerized mount may differ between telescope manufacturers, and worse, come in several “flavors” but is generally covered by:



Telescope setup

Setting up a basic Alt/Az computerized mount may differ between telescope manufactures, and worse, come in several “flavors” but is generally covered by:

- Setting the mount level on tripod or other base



Telescope setup

Setting up a basic Alt/Az computerized mount may differ between telescope manufactures, and worse, come in several “flavors” but is generally covered by:

- Setting the mount level on tripod or other base
- Setting the OTA basically level (may not be required by some scope software)



Telescope setup

Setting up a basic Alt/Az computerized mount may differ between telescope manufactures, and worse, come in several “flavors” but is generally covered by:

- Setting the mount level on tripod or other base
- Setting the OTA basically level (may not be required by some scope software)
- Providing local date, time and location information to the computer via control handset



Telescope setup

Setting up a basic Alt/Az computerized mount may differ between telescope manufactures, and worse, come in several “flavors” but is generally covered by:

- Setting the mount level on tripod or other base
- Setting the OTA basically level (may not be required by some scope software)
- Providing local date, time and location information to the computer via control handset
- Moving the telescope to stars as instructed by the handset – usually at least two – to allow the computer to triangulate the telescope’s position



Telescope setup

Setting up a basic Alt/Az computerized mount may differ between telescope manufactures, and worse, come in several “flavors” but is generally covered by:

- Setting the mount level on tripod or other base
- Setting the OTA basically level (may not be required by some scope software)
- Providing local date, time and location information to the computer via control handset
- Moving the telescope to stars as instructed by the handset – usually at least two – to allow the computer to triangulate the telescope’s position
- Begin observing telescope is (hopefully!) accurately tracking whatever It is pointed toward.



Telescope setup

If you tilt an Alt/Az mount at an angle equal to your latitude, you have a Equatorial mount!



Telescope setup

If you tilt an Alt/Az mount at an angle equal to your latitude, you have a Equatorial mount!

Why is this a good thing?



Telescope setup

An Alt/Az mount – or an equatorial mount that has not been set up – require the user to move the scope in two rotational axes to follow any observed celestial object.

Telescope setup

An Alt/Az mount – or an equatorial mount that has not been set up – require the user to move the scope in two rotational axes to follow any observed celestial object.

An Equatorial mount removes one of those axes. It is therefore a simpler task to follow an astronomical object.

Telescope setup

An Alt/Az mount – or an equatorial mount that has not been set up – require the user to move the scope in two rotational axes to follow any observed celestial object.

An Equatorial mount removes one of those axes. It is therefore a simpler task to follow an astronomical object.

The equatorial mount accomplishes this by aligning one axis with the axis of rotation of the Earth – known as Polar Alignment.

Telescope setup

An Alt/Az mount – or an equatorial mount that has not been set up – require the user to move the scope in two rotational axes to follow any observed celestial object.

An Equatorial mount removes one of those axes. It is therefore a simpler task to follow an astronomical object.

The equatorial mount accomplishes this by aligning one axis with the axis of rotation of the Earth – known as Polar Alignment.

If you have a telescope with an equatorial mount, it isn't NECESSARY to align it in order to observe – but it is very desirable and makes observing more relaxed and enjoyable.

Telescope setup

An Alt/Az mount – or an equatorial mount that has not been set up – require the user to move the scope in two rotational axes to follow any observed celestial object.

An Equatorial mount removes one of those axes. It is therefore a simpler task to follow an astronomical object.

The equatorial mount accomplishes this by aligning one axis with the axis of rotation of the Earth – known as Polar Alignment.

If you have a telescope with an equatorial mount, it isn't NECESSARY to align it in order to observe – but it is very desirable and makes observing more relaxed and enjoyable. Probably.

Telescope setup



Telescope setup



Telescope setup

Before we align though, there is another basic thing to do with the GEM.



Telescope setup

GEM mounts look a little complicated.
Let's look at the parts.



Telescope setup

Before we align, there is a basic thing we need to do with the mount.

See those big weights hanging off the right in this image?



Telescope setup

Before we align, there is a basic thing we need to do with the mount.

See those big weights hanging off the right in this image?

They aren't there for show – they balance the weight of the telescope placed on the mount.



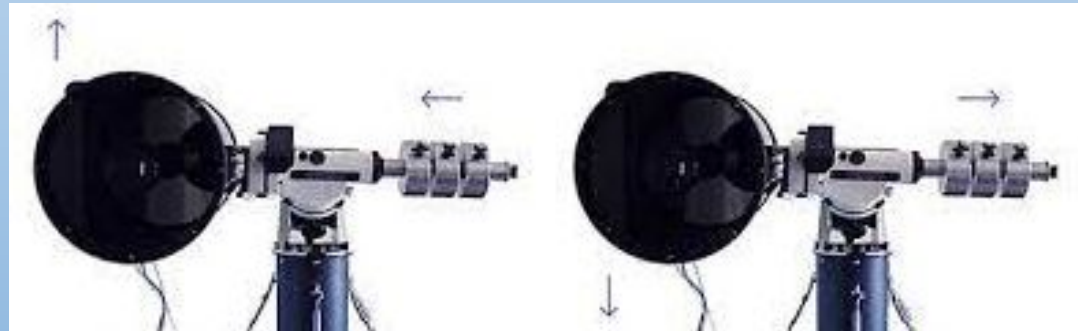
Telescope setup

Before we align, there is a basic thing we need to do with the mount.

See those big weights hanging off the right in this image?

They aren't there for show – they balance the weight of the telescope placed on the mount.

Begin by placing the telescope on the mount and setting it so that the weights are on the opposite side. Balance the scope in this position.



Telescope setup

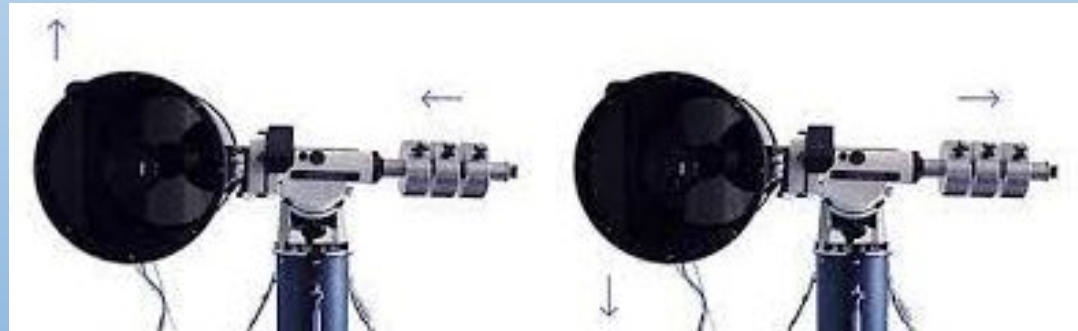
Before we align, there is a basic thing we need to do with the mount.

See those big weights hanging off the right in this image?

They aren't there for show – they balance the weight of the telescope placed on the mount.

Begin by placing the telescope on the mount and setting it so that the weights are on the opposite side. Balance the scope in this position.

Insure that the locks are off and the scope swings freely – and is balanced.



Telescope setup

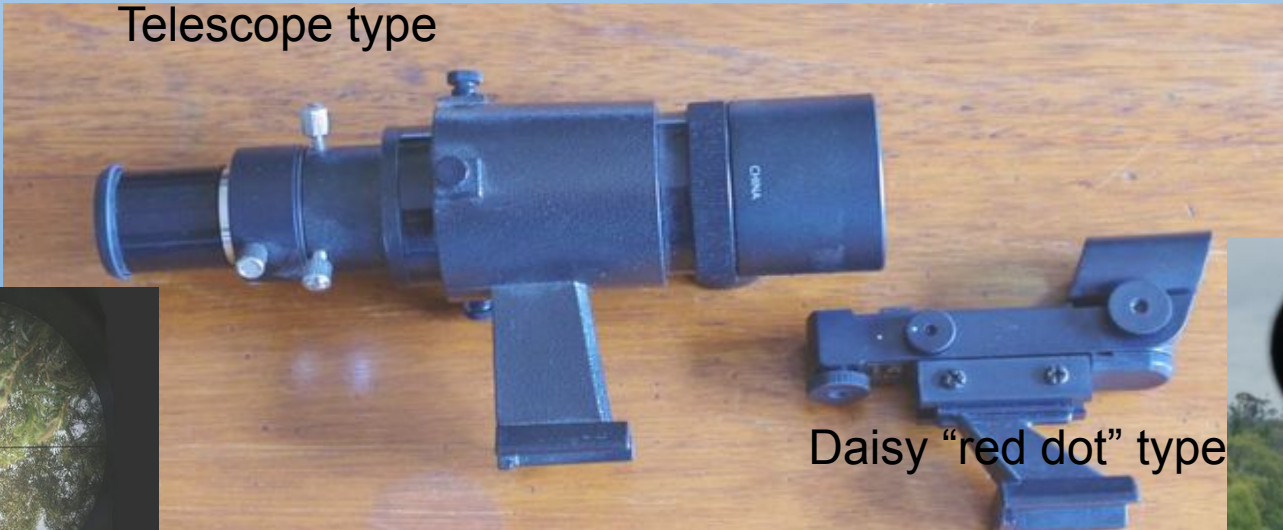
Now that the scope is balanced, the finder scope should be checked for accuracy. This will assist you in pointing the telescope at things that can be seen with the naked eye.

Telescope setup

Now that the scope is balanced, the finder scope should be checked for accuracy. This will assist you in pointing the telescope at things that can be seen with the naked eye.

Like everything else, there are several types of finder scopes. Some are telescopes, some are not. Generally, they are all good and some are better than others.

Telescope type



Daisy "red dot" type



Telescope setup

Now that the scope is balanced, the finder scope should be checked for accuracy. This will assist you in pointing the telescope at things that can be seen with the naked eye.

The Telrad is a “red-dot” variant. The glass surface may be used either behind (normal) or from the top (reflection) – if the object is bright enough!



Telescope setup

Basic setup:

Set the Right Ascension axis (a) equal to the latitude and lock.



Telescope setup

Basic setup:

Set the Right Ascension axis (a) equal to the latitude and lock.

Point the RA axis North (Geographic, not Magnetic!!)



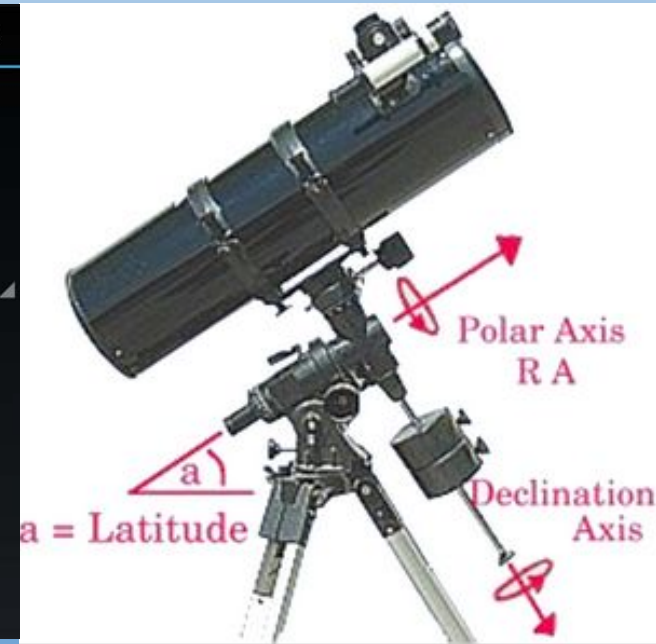
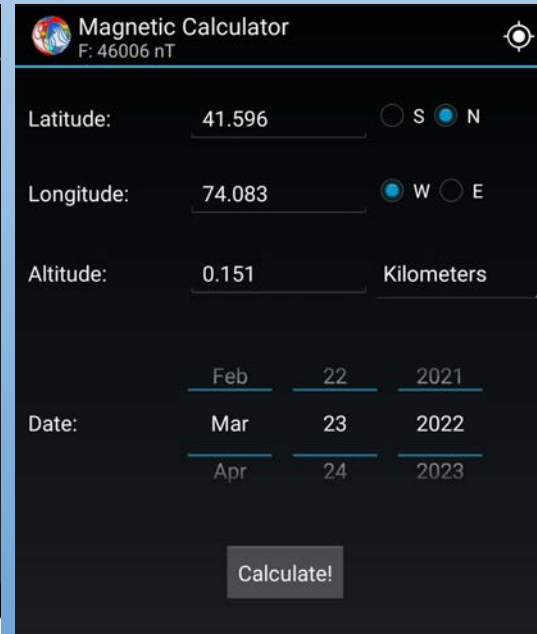
Telescope setup

Basic setup:

Set the Right Ascension axis (a) equal to the latitude and lock.

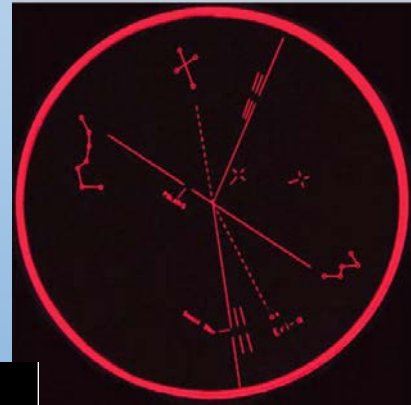
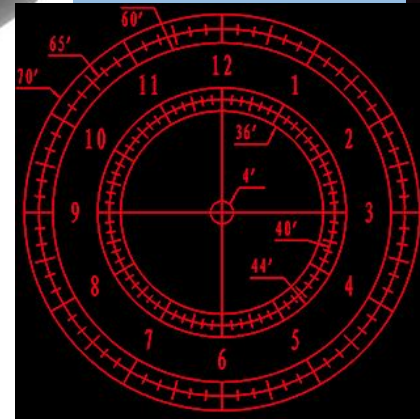
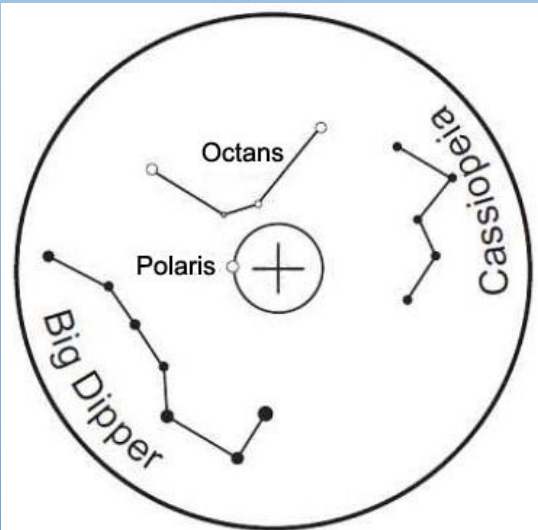
Point the RA North (Geographic, not Magnetic!!)

Both Latitude and North can be found by many methods, but [CrowdMag](#) is recommended!



Telescope setup

If your telescope mount has a “Polar Finder” scope, and Polaris is visible, Use it to refine the RA setting and North alignment to achieve a proper polar alignment.



Telescope setup

If your GEM-style mount does NOT have a Polar Finder scope, there are a few ways to get the alignment more accurate – if you are that concerned. The easiest is probably Drift Alignment.

Telescope setup

If your GEM-style mount does NOT have a Polar Finder scope, there are a few ways to get the alignment more accurate – if you are that concerned. The easiest is probably Drift Alignment.

Drift alignment is basically setting a star at the edge of your view (or centered in a lit eyepiece with crosshairs) through the telescope and seeing which way it drifts, then correcting for that drift by adjusting the mount.

Telescope setup

If your GEM-style mount does NOT have a Polar Finder scope, there are a few ways to get the alignment more accurate – if you are that concerned. The easiest is probably Drift Alignment.

Drift alignment is basically setting a star at the edge of your view (or centered in a lit eyepiece with crosshairs) through the telescope and seeing which way it drifts, then correcting for that drift by adjusting the mount.

There are [a lot of steps](#) and it's probably best to look the method up and study it before trying it “in the field” – or having someone experienced with the method instruct you in person.

Telescope setup

Fork-type mounts can also be polar-aligned if needed. Basic clock (not computerized) drives are placed on the Equatorial Wedge, set to the proper latitude as before and aligned with Polaris.



Telescope setup

Fork-type mounts can also be polar-aligned if needed. Basic clock (not computerized) drives are placed on the Equatorial Wedge, set to the proper latitude as before and aligned with Polaris.

A “close enough” alignment for observing can be achieved with just the finder scope, but a true polar alignment can be achieved either with a base-mounted polar finder, or by the Drift Method as before.



Telescope setup



Astrobiology is held back by the fact that we're all too nervous to try to balance on the ladder while holding an expensive microscope.

Now get out there and observe the Universe!

<https://xkcd.com/1522/>

