

What is collimation and how do I do it?

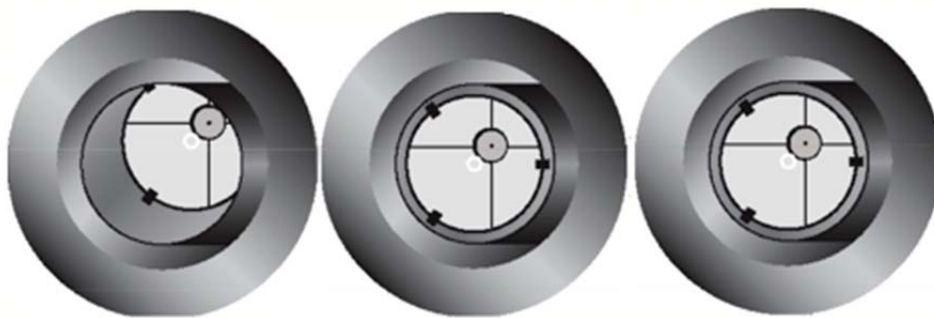
What is collimation and how do I do it?

Collimation is when you accurately line up all the optics in your scope. This alignment can be upset if the scope gets knocked, or after it's been moved around a lot. You'll get the best views out of your telescope if it's well collimated, so it's good to occasionally do it.

If you bought a Newtonian reflector, then to collimate it you need to carry out the steps below.

But first things first, check whether you need to do it in the first place by looking at a star out of focus. If you can see a circle with some practically perfect concentric and symmetrical rings around it, your telescope's collimation is good and you don't need to do anything.

If they're not concentric or symmetrical, then you can collimate your scope indoors during the day using a homemade collimation tool following the steps below. Just point the telescope at the ceiling to get a bright, uniform view.



Collimate with a homemade tool

1. Get an old plastic film canister and pierce the base in the centre with a 1-2mm drill bit. Put a paper-reinforcing ring on the exact centre of the telescope's main mirror.
2. Take out the eyepiece and replace it with the collimation tool. Adjust the set of screws on the secondary mirror that aren't on the back of it so that the paper ring is in the centre of the view, seen through the tool.
3. Make sure that the secondary mirror appears circular, not slightly elliptical, when seen through the collimating tool by adjusting the same screws on the secondary mirror.
4. Centre the main mirror by adjusting the screws on the back of the mirror holder. Look directly through the collimation tool. The view should look like the third image above, with the hole in the collimation tool in the middle of the paper-reinforcing ring. Your scope is now collimated.

How do I focus the telescope?

With a reflector, you can use the tiny spikes that you'll see coming out of the stars to help with focusing: when the view is defocused the spikes will be doubled up. Adjust the focus knob until you only see one set of spikes to bring the scope to focus. These spikes come from the 'spider' brackets that hold a little secondary mirror in the tube.

Refractors don't have a secondary mirror so when you look at stars they don't have spikes coming out of them – they appear as round points. You can tape a cross of string in front of your refractor's main lens to create these spikes.

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Another focusing aid, for refractors and reflectors, is a Scheiner mask. This is a mask that you can make from card that fits over the front of the scope. The mask has three circular holes cut into it, so that when you look through the eyepiece you see three of every star if the scope isn't focused. Focusing the scope will bring the views together and when it's focused you'll see each star as one. Don't forget to take the mask off afterwards!