

Amateur Telescope Making

...or how to make your own telescope at home

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What is Amateur Telescope Making?

Amateur Telescope Making, or ATM, is a hobby taken by people that have an interest in astronomic observation and enjoy building telescopes.¹

ATM can range from just assembling the individually bought components to actually fabricate some or all of the components of a telescope.

The most common type of telescope made by hobbyists is the so called Newtonian reflector (invented by Sir Isaac Newton).²

¹https://en.wikipedia.org/wiki/Amateur_telescope_making

²https://en.wikipedia.org/wiki/Newtonian_telescope

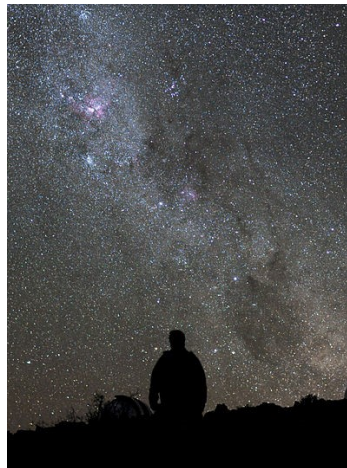
My personal motivation for ATM

One time by chance a few years ago, I had the opportunity to look up at the night sky in Alentejo's countryside, in southern Portugal.

The combination of very low light pollution and clear sky provided for a very distinctive view of the Milky Way.

I had some interest in astronomy in general, but that event was what sparked the beginning of my interest in astronomical observation.

Eventually I found about ATM and ended up deciding to build a telescope myself because I found the challenge interesting.



Not me!

What I'm working on?

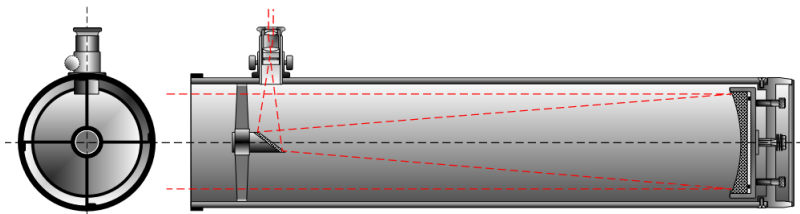
I'm building a Newtonian reflector telescope and I'm making the main mirror lens myself.

It has a 200mm diameter main mirror and initially I planned for a focal length of 1200mm.

Why these characteristics?

- For a certain telescope diameter (aperture), it is the least complicated to make (only one convex main mirror lens and a small diagonal flat mirror).
- A 200mm main mirror with 1200mm focal length is one of the most common configurations. It is a compromise between portability and light collection capability.
- Provided you make some simple tools, the mirror's optical quality will only be limited by the amount of time you want to spend and patience (or lack thereof).

The Newtonian Reflector telescope



Newtonian telescope

The main components of a Newtonian reflector telescope are the main concave mirror³, the diagonal flat mirror, and the eyepiece⁴. Incoming light (red dashed line) comes from the top of the telescope, illuminates the main mirror, and is reflected back to the eyepiece by the diagonal mirror.

³https://en.wikipedia.org/wiki/Primary_mirror

⁴<https://en.wikipedia.org/wiki/Eyepiece>

Making the main mirror

For the main mirror you need a circular disc of some type of glass with a concave face on it.

Simple, right?

For an acceptable mirror, you will need a parabolic shaped surface that needs to have at most $0.15\mu m$ of deviation from the theoretical ideal surface.

How do you make such an impossible smooth surface? By hand, of course.

About the author

My name is Nuno and ...

The end

Thank you!