ASTRONOMY EXPERT R.E.E.G.O. COLLIMATOR INSTRUCTION MANUAL

USER GUIDE FOR RITCHEY-CHRETIEN AND CASSEGRAIN TELESCOPES

Dear Customer, thank you for purchasing the Astronomy Expert R.E.E.G.O. (R.E.E.G.O = Recognition of Elements Extraxiality through Glows Observation; R.E.E.G.O = Recognisation of Elements Extraxiality by Glance Observation), universal collimator, compatible with refracting OTAs, Newtons, RC, Cassegrain-derivatives, catadioptrators. Using this instrument is very simple and intuitive, but we suggest you to follow this step-by-step guide, always acting with no haste, taking all of the time required to perform a proper and accurate operation!

This collimator is supplied with a pre-installed CR2032 battery. Please make sure that it is functional and correctly inserted before proceeding.

All of the collimation processes with R.E.E.G.O. they can be executed in the day time. We therefore suggest you to start placing your OTA on a flat table, removing all of the caps and covers.

Step 1: preliminary setup

As a preliminary, it is important to point out that the re-collimation of an RC should take place just in case of a significant reduction of the corrected field extension or when you notice a non-radially symmetrical stars distorsion. Furthermore, the primary mirror often comes out pre-collimated at the factory and, especially in RC OTAs not equipped with separate primary mirror and focuser adjustment systems, the collimation of the primary mirror should be modified only where strictly necessary.

To perform a correct alignment, please insert the R.E.E.G.O. collimator in the eyepiece holder of your refractor, being sure to maintain it in perfectly coaxial position compared to the focuser and the OTA. If you do not have a concentric eyepiece holder you can also simply place the collimator in your standard eyepiece holder, preventing to tighten the locking screws: the R.E.E.G.O. is very light-weight yet very robust, so you will not have to worry about potential disastrous falls.

Keeping the tube in a HORIZONTAL position, proceed step-by-step, as follows:

- Withdraw your telescope's focuser in full, bringing the draw tube to the minimum possible extraction.

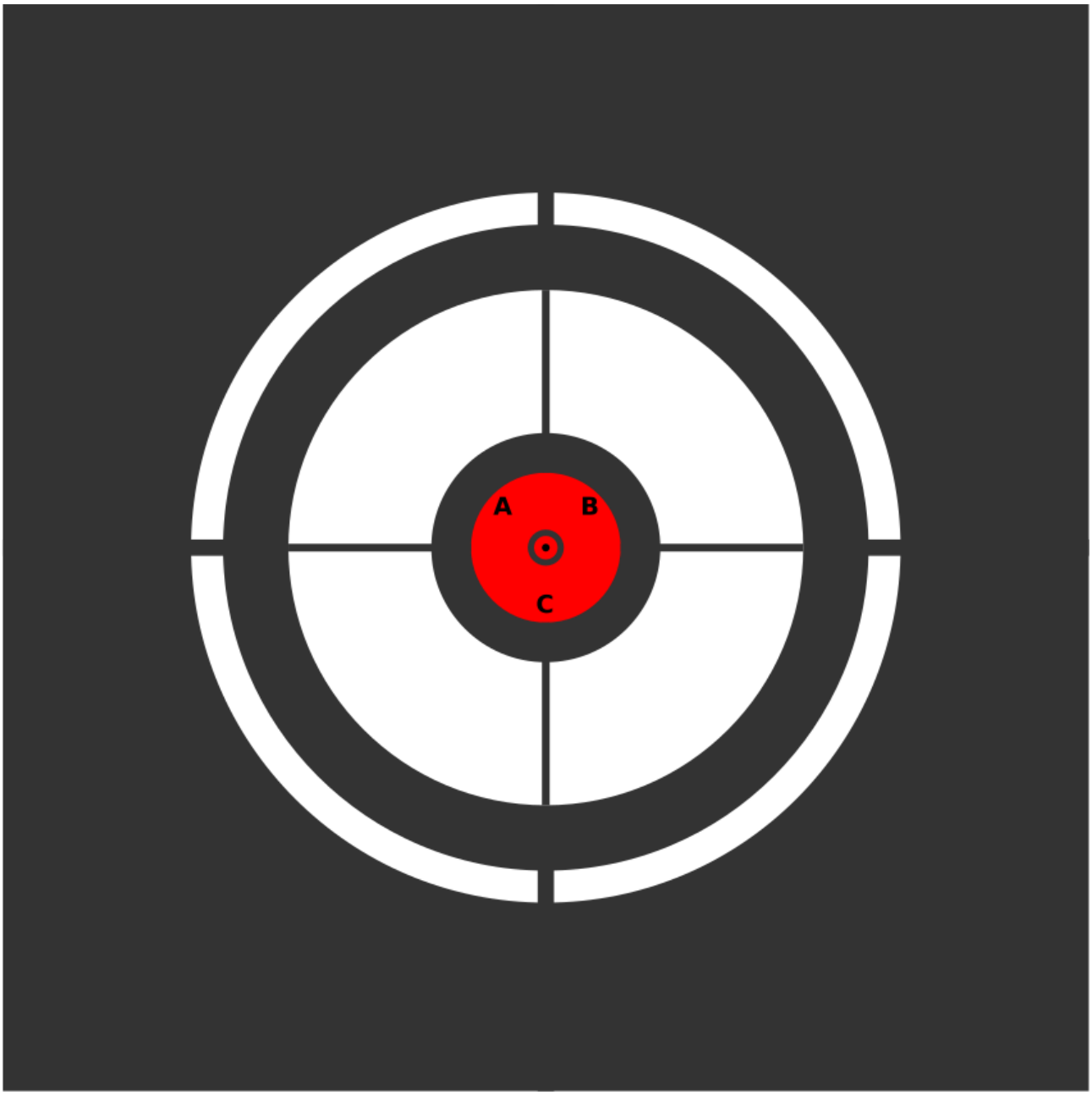
- Insert the R.E.E.G.O. collimator in your eyepiece holder, paying attention to concentricity, as described above.

- Rotate the collimator until the letters present on the inner surface of the R.E.E.G.O., as they can be seen reflected by the telescope's mirrors, do match primary mirror adjustment screws. This will help you to handle the screws correctly. To help you identify the correct position to reach, you can spot the position of one of the the screws with a finger or a stick, in front of your telescope, and then observe it through the hole on R.E.E.G.O.

- Point the telescope towards a flat white surface, like an empty painted wall or a white cardboard sheet.

- Turn on the R.E.E.G.O. in "Newton" mode. You will see four white LEDs light up.

Now, looking through the collimator's front hole, if your OTA is perfectly collimated you should see someting like this:



Depiction of a properly collimated RC telescope.

If what you see corresponds to what is depicted here above, simply stop here: your OTA is already perfectly collimated!!

More probably, you should see something like that:

Depiction of a mis-collimated RC telescope.

If your telescope shows a pattern similar to the one above, then collimation is required.

Let’s start!

Step 2: collimation of the secondary mirror

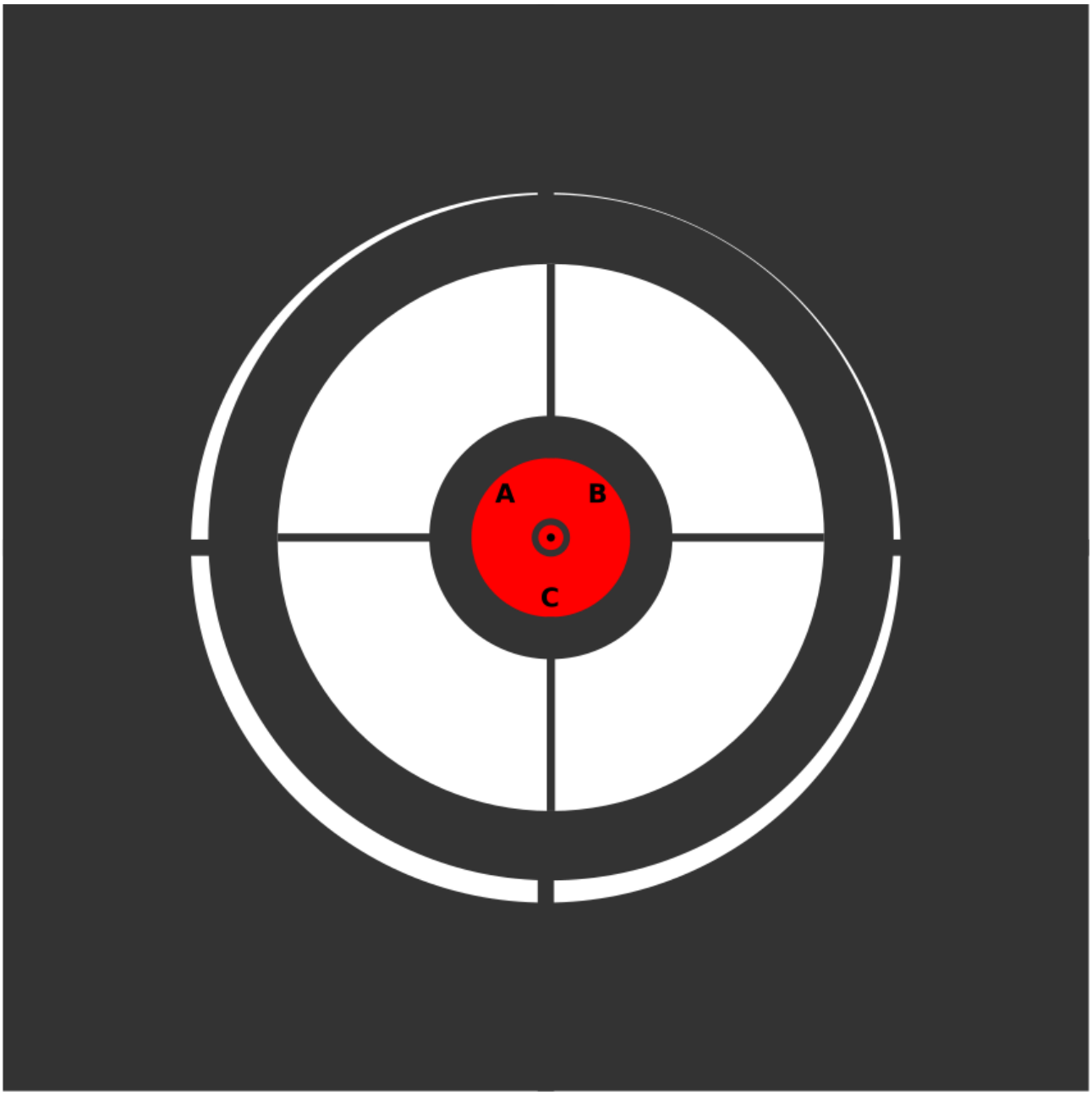
First af all, you do need to reach a proper secondary mirror collimation.

This is quite simple to achieve: you simply need to move the three frontal adjustment screws on the secondary cell, until the round marker on the secondary mirror becomes perfectly contenctric with the R.E.E.G.O collimator.

The illuminated concentric rings design on the R.E.E.G.O. collimator, omitted from the drawing below for simplification needs, will help you to reach the goal in a very accurate and fast way!

Please, always remember to respect the correct mechanical tensioning of the secondary cell by avoiding excessive tractions or backlashes that could affect quality and stability of the collimation. Time and practice are your the best allies.

If everything has been accomplished properly, you should see something similar to this:



Depiction of a collimated secondary mirror and a mis-collimated primary mirror.

If what you see through the collimator corresponds to what has been depicted above, let's proceed to the primary mirror collimation.

Step 3: collimation of the primary mirror

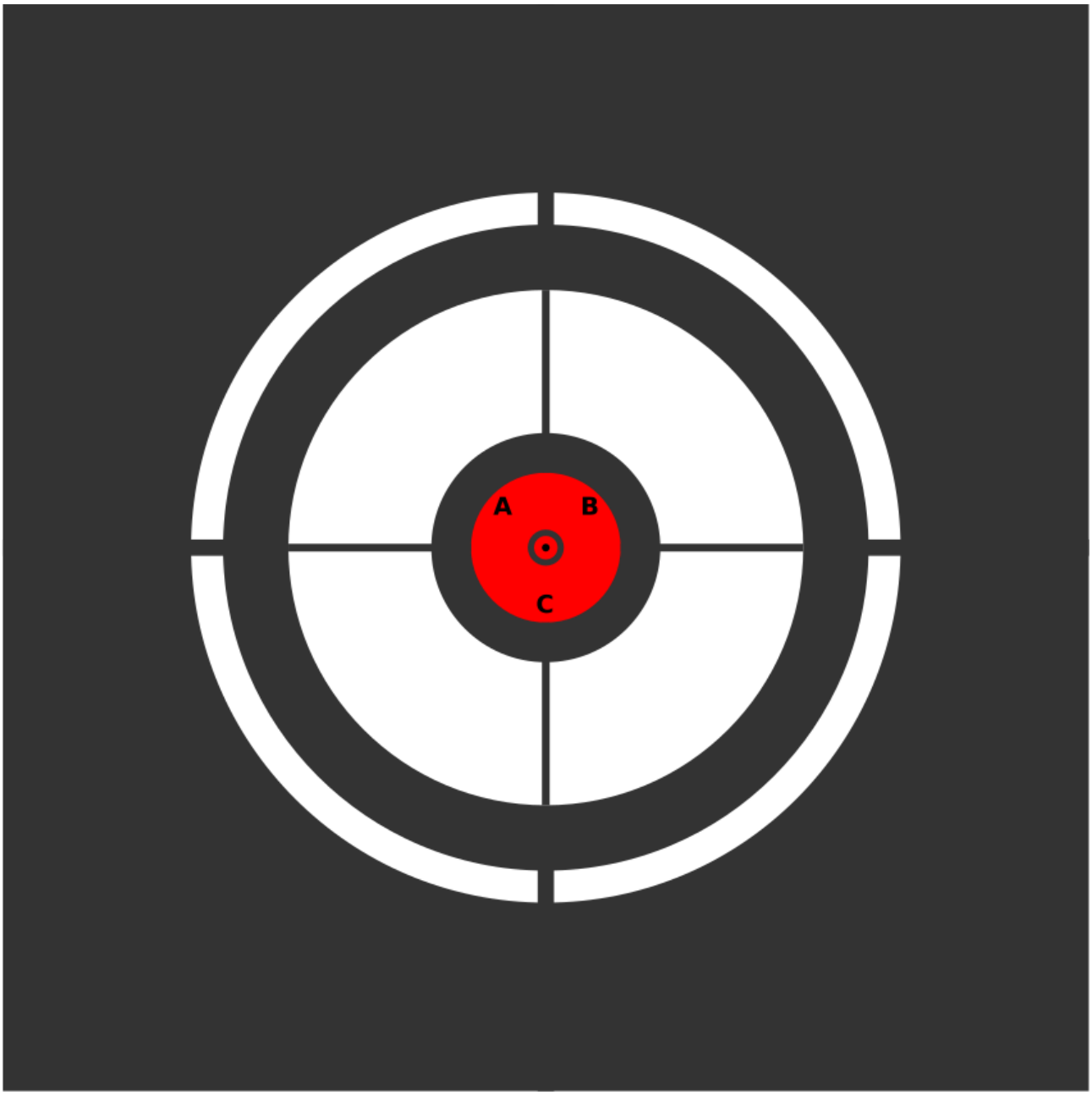
To collimate the primary mirror, please look carefully to the thin light ring along the edge of your OTA. You can see a representation of that in the figures above. That ring is produced by the the secondary mirror's cell that stands out against the front aperture. If seen through the R.E.E.G.O. collimator, the shadow produced by the secondary mirror's cell reaches a considerable apparent size, almost identical to the one of the full frontal aperture; so it can be used as a good reference for primary-secondary mirror relative alignment.

Acting on the adjustment screws of the primary mirror's cell (or on the flange of the focuser, depending on the version of the OTA), look at the light ring, and move the secondary mirror's cell until thy are concentric. Stop once the light ring is perfectly circular and completely regular.

Once the collimation has been completed, proceed to tighten the locking screws progressively, at the same time checking not to introduce unwanted variations in the collimation previously reached. Please always remember not to leave the locking screws fully loose, otherwise you will get a loss of collimation in a very small time. At the same time, however, also please do not exceed cell tension limit, as this could compromise the optical quality of your telescope. The optimum is to proceed with a progressive tightening, until a stable and lasting result is achieved.

The adjustment screws of the primary are normally six, and comes in pairs (a push/pull screw and a locking grubscrew). In some OTAs, however, they are placed along the edge of the focuser and they can be three or six. In the first case, the collimation system is almost identical to the one normally present on secondary mirrors; in the latter case, please act as with a normal primary mirror adjustment.

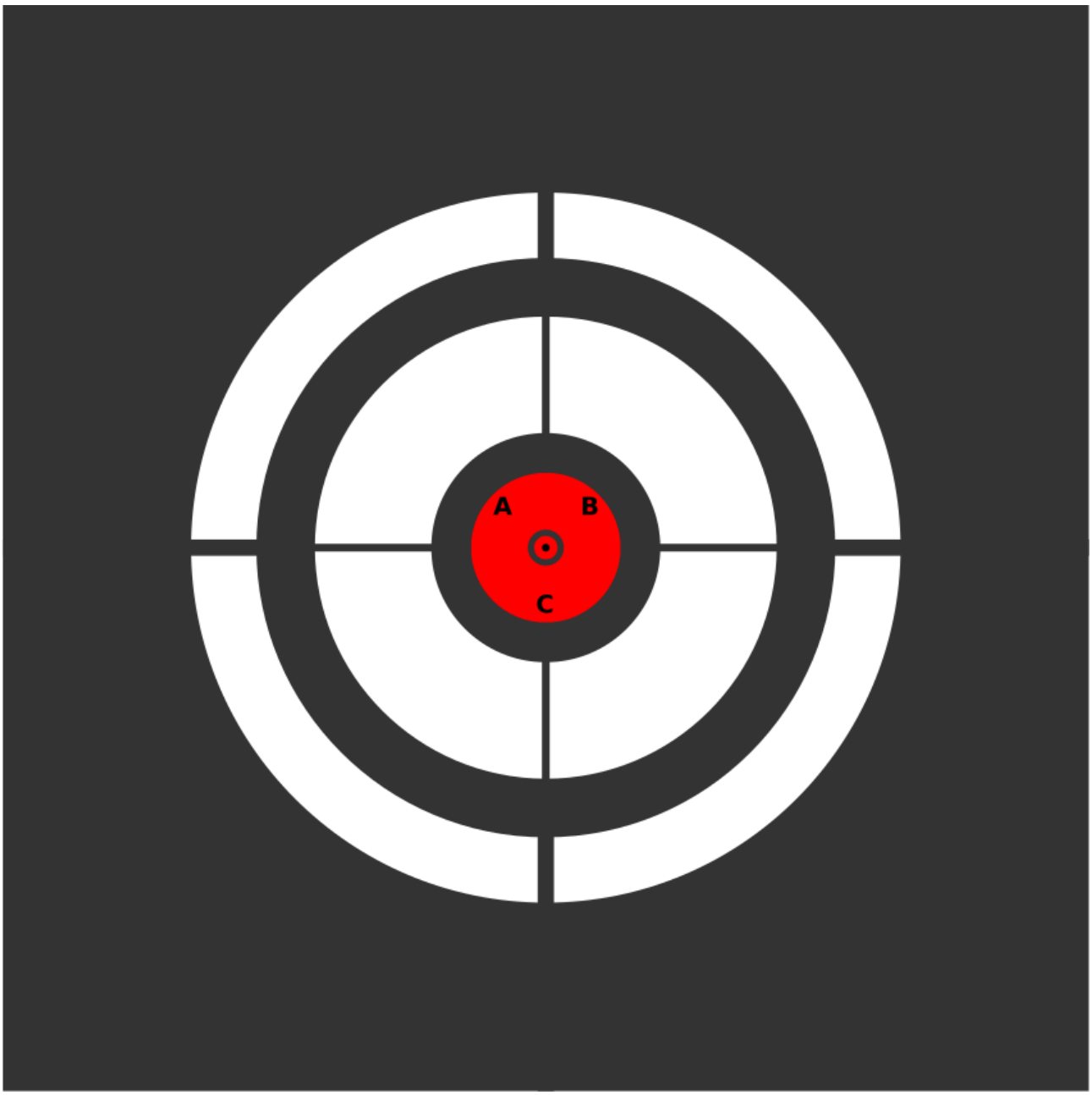
If you did a good job, what you will see will look like this:



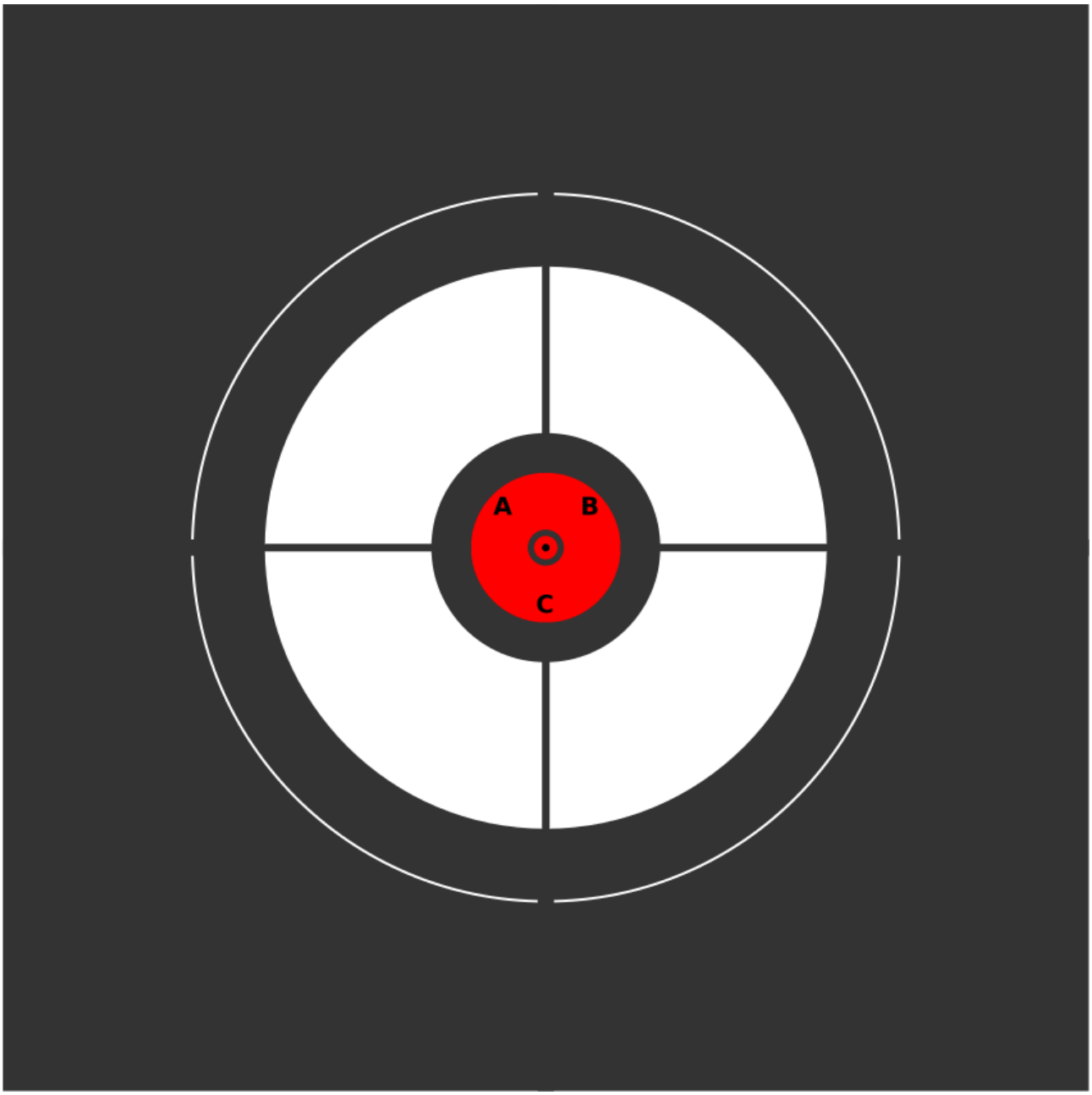
Depiction of a properly collimated RC telescope.

A small yet important task to accomplish, to achieve a perfect fine collimation of the primary mirror, is to check that the light ring is as thin as possible.

Reducing the size of the light ring is extremely simple: just extract the focusing draw tube slightly, just like if you were focusing, until you get the desired configuration:



Depiction of an RC telescope with too inner focuser's position.



Depiction of an RC telescope with a perfect focuser's position.

Step 4: more on RCs collimation

If necessary, you can repeat the collimation of the secondary and primary mirror iteratively, to compensate any further unwanted variation in the optical alignment.

It is particularly recommendable to repeat Step 2 and Step 3 in case you own an OTA equipped with triple adjustments (secondary mirror, primary mirror, focuser) or if you have a dedicated tilter.