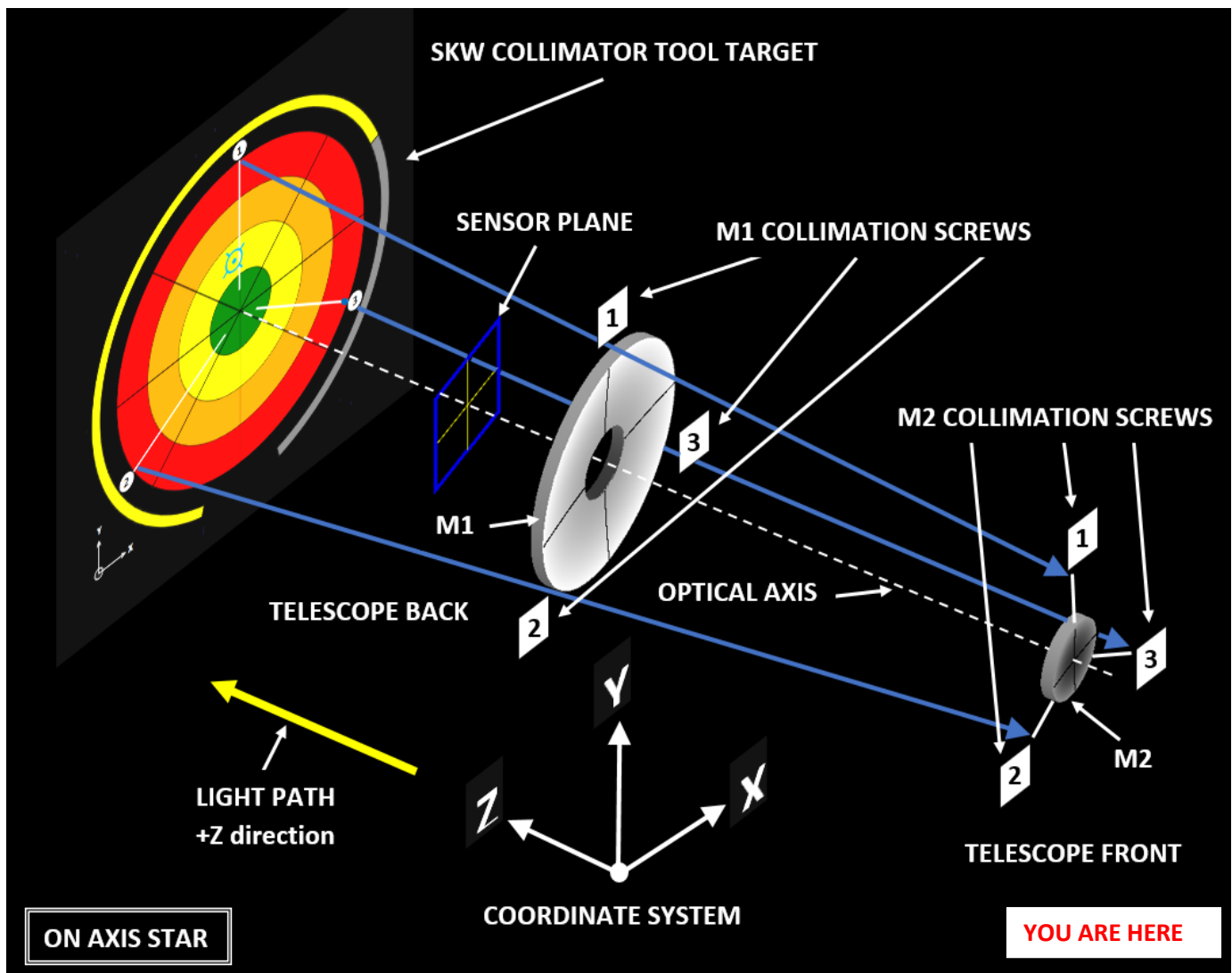


A Quick Start

This document provides a quick procedure to locate the telescope collimations screws of the primary (M1) and the secondary (M2) mirrors in the SKW collimator tool (CT) and to label them on the telescope. Below a reference diagram showing how the CT related to the telescope optics, mirrors, imaging sensor (camera) and collimation screws.

The key point here is that the CT shares the same coordinate system (X & Y axes) than the image taken by the camera at the sensor plane (when displayed in SKW).

We assume that the user is in front of the telescope facing M2, looking down, along the positive Z axis, toward the imaging camera (sensor plane).



SKW coordinate system and the collimator tool (CT) in relation to the telescope

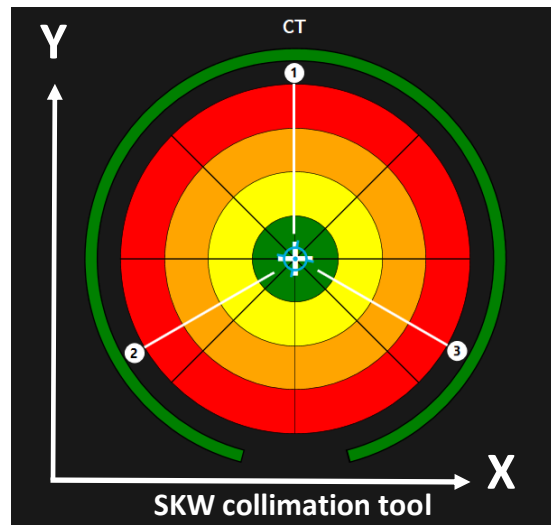
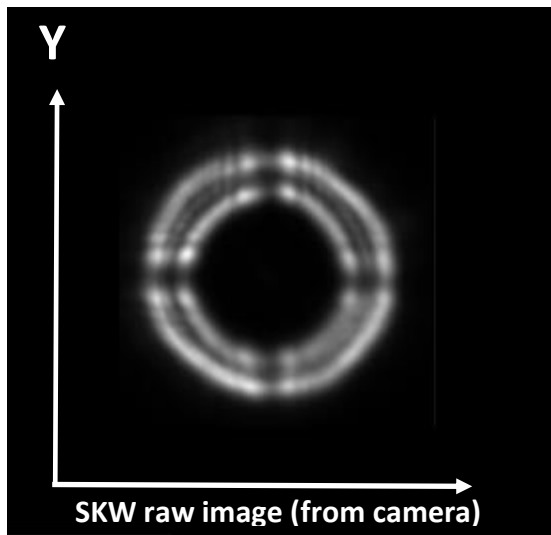
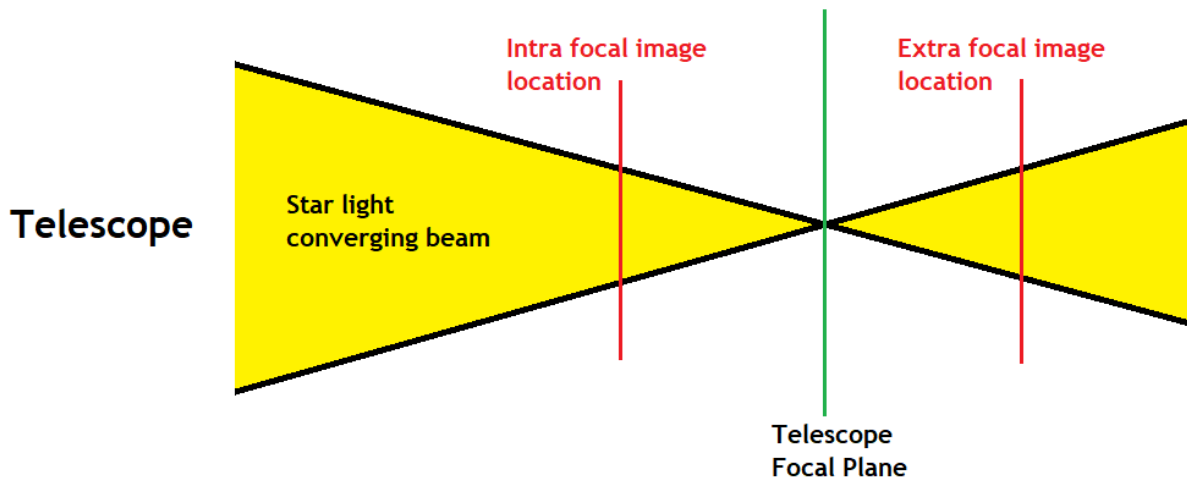


Image from the camera (displayed SKW) and SKW CT share the same X & Y axes

We recommend loading the images in SKW for this procedure since the X and Y axes could be flipped or inverted relative to SKW in the acquisition software used to take them. However, for convenience SKW offers the option to flip either, or both, X and Y axes too.

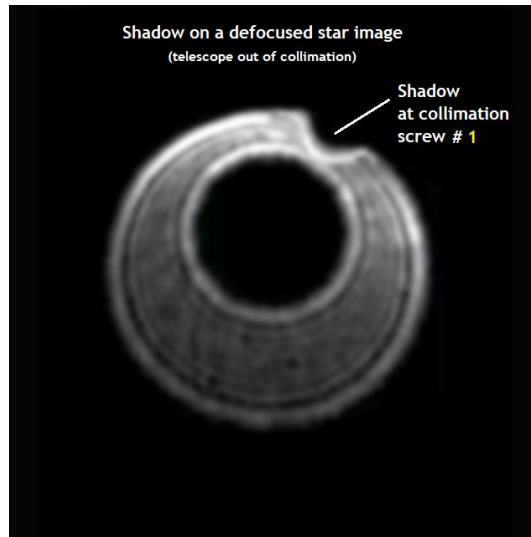
There two possible ways for taking a defocused image of a star, intra or extra focal. You can use either of them, however the locations of the collimation screws in the SKW CT are a function of this choice (intra versus extra focal).



Intra versus extra focal image location relative to the telescope focal plane

The location on the SKW CT and labeling on the telescope of the collimation screws procedure is the same for M1 & M2. The user is assumed in front of the telescope in this document.

Let's locate and label our first collimation screw #1 (here on M2, as an example).



Shadow of a finger next to the collimation screw (of M2) labeled #1

Pick a collimation screw (see example above) and name it as #1. Label it on the telescope with some means (sticker, marker, ...) for future reference during collimation. Then using your finger, or any opaque object, create a shadow on the defocused star image at the screw #1 location. Do not touch any optical surface in the process. Load this image on SKW.



Collimation screw location in SKW CT for INTRA versus EXTRA focal images

Using the screw locator in CT, select the mirror 2 (M2), here, and rotate the screw locator graphic until the number 1 is located at, either the same position than the shadow on the raw defocused image displayed in SKW in the context of **INTRA** focal images, or at the opposite (180 degrees) position in the context of **EXTRA** focal images, see above.

Doing so ensures that the telescope collimation procedures using SKW will be correct in term of which screw(s) must be adjusted and in which direction to turn such screw(s), CW or CCW, for pulling or pushing the related mirror, improving collimation.

Now that the SKW CT screw locator angle has been set with the screw #1 it should not be touch anymore for that mirror.

Using this shadow method, and the INTRA versus EXTRA location rule, it is easy to find and label the remaining collimation screw #2, #3 (or even #4 in the context of 4 collimation screws) on the telescope.

You have just to bring the shadows at the locations (or opposite if extra focal) in the raw image displayed in SKW related to the screw number (#2, #3, or #4, when applicable) in the SKW CT. Remember that the CT and the raw image (in SKW) of the defocused star share the same coordinate system (same X and Y axes).

Below an example (intra focal), the three M2 collimation screws are labeled according to the SKW CT screw locator numbering (#1, #2, and #3).



Final labeling of the M2 three collimation screws in reference to SKW CT

When applicable, do the same for the other mirror (M1 in this example).

You are now ready for doing collimation using SKW and its collimator tool (CT).

Here are links to SKW collimation procedures for the most common telescopes:

https://www.innovationsforesight.com/Wavefront/SKW_Scope_with_Spherical_Mirror_Alignment_011522.pdf

https://www.innovationsforesight.com/Wavefront/SKW_RCT_Alignment_011522.pdf