

SCT Collimation. *When do you do it? How do you do it? Why do you do it? Does it feel good? Is it legal if you're under 21?*

Truth be known, collimating an SCT is fun 'n easy. Much nicer than adjusting the optics on a big dob. And, by God, is it critical for good CAT performance! The difference between a collimated and an uncollimated SCT, especially on the planets, is like night and day! Really! Unfortunately, many new CAT owners seem intimidated by this simple process.

Collimating Your SCT Rod Mollise

Basically, it's a **two-part process...**

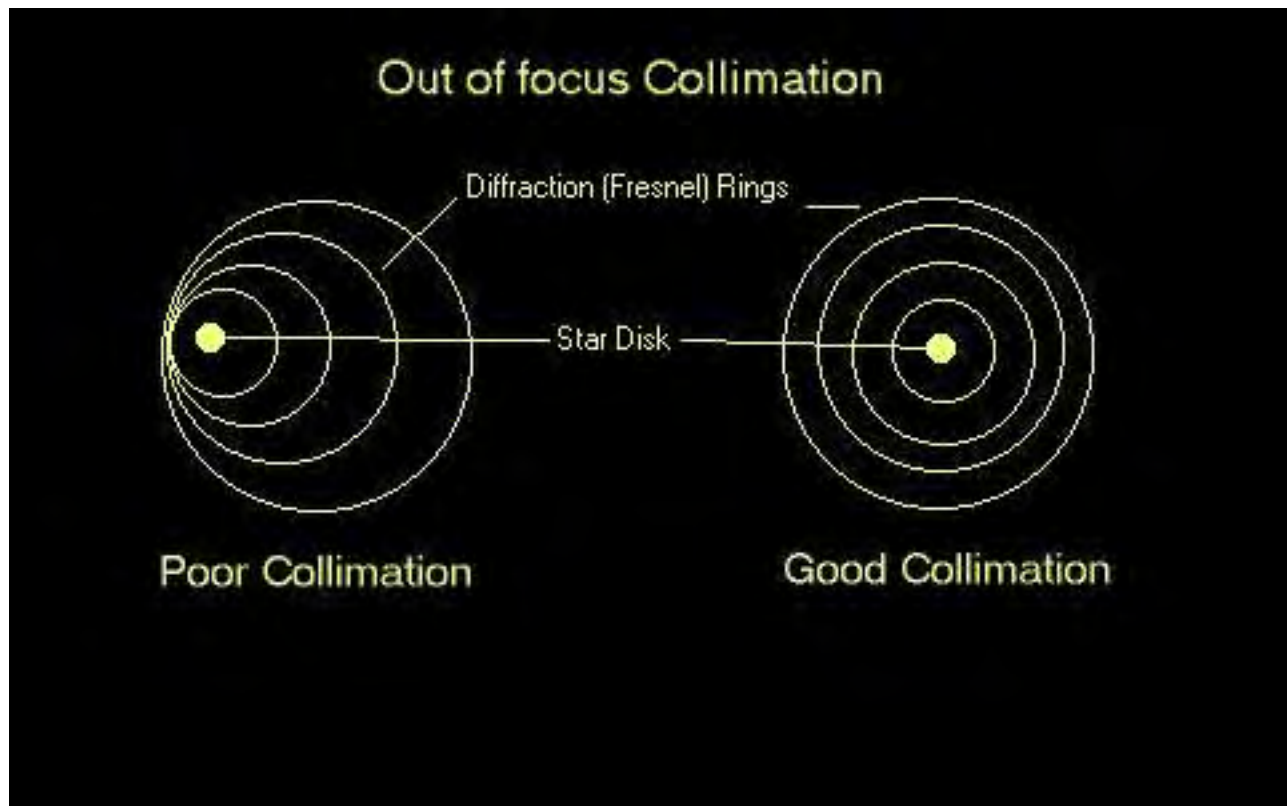
Stage 1 Rough Collimation

Set-up the scope and put a medium bright star in the field of an eyepiece. Polaris would be a nice choice. Defocus a lot until you have what looks like a round “globe” or blob of light with a dark center. Does the dark spot (actually the shadow of your **secondary**) seem more or less centered? If it does, move on to the next step. If not, you'll need to adjust your secondary. Remove the orange 'secondary cover' if your scope has one (I believe Celestron has discontinued these covers; Meade never had 'em), revealing three adjustment screws for the secondary (either Allen head or Phillips style). Pick one and gently tighten it a little. Observe how the dark spot moves, and try the screw's opposite number if it doesn't move in the right direction. Adjust the relevant screw(s) until the dark spot is reasonably centered. *Always adjust your secondary by tightening the screws. Only if a screw is completely tightened and can't be turned anymore should you then loosen the opposite screw to continue movement in the same direction (never, **never force anything**, natch).*

Stage 2 Fine Collimation (“Out of Focus Collimation”)

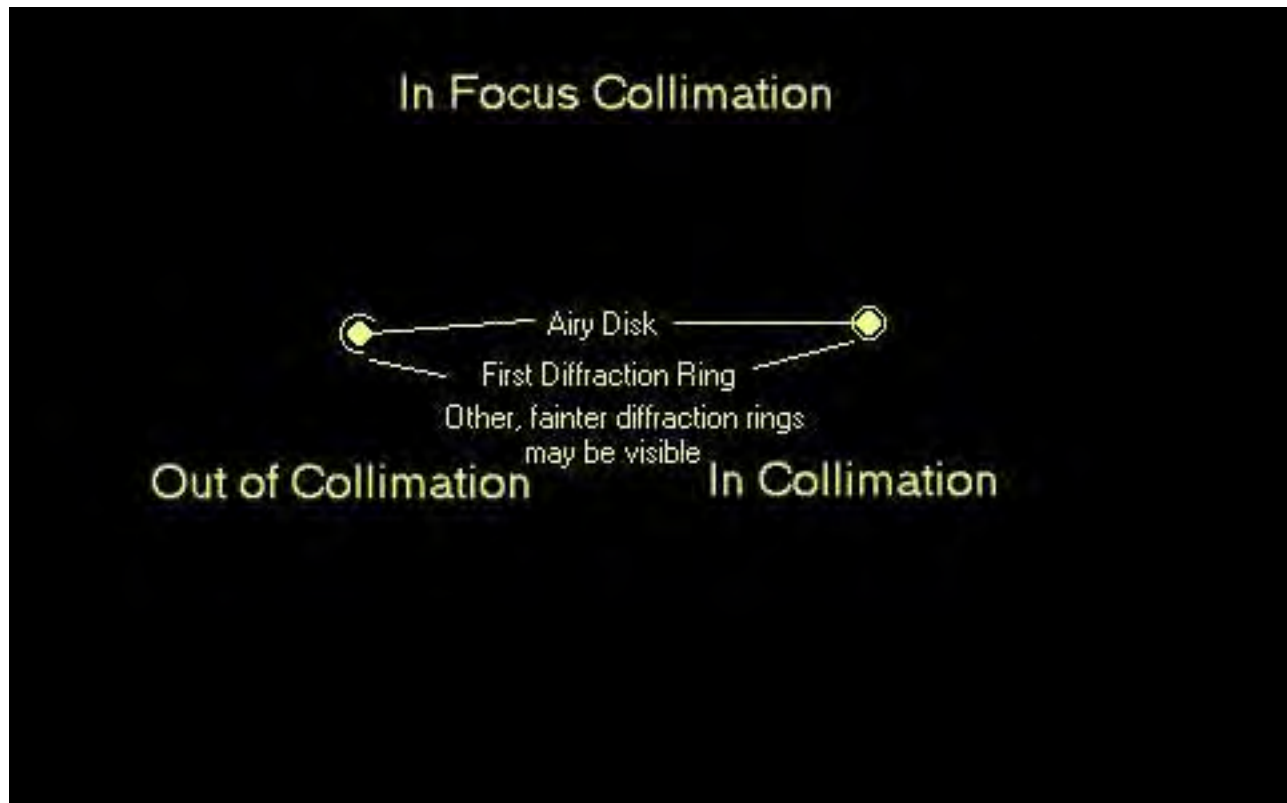
OK, you've done a rough collimation using the secondary's shadow. But this *ain't* good enough, especially if you like to look at planets. Let's do a *fine* collimation. Replace the eyepiece you've been using with one that yields around 200x – 250x. Move the star

almost into focus **until you see a series of diffraction rings** (technically, *Fresnel* Rings) surrounding a small, bright star disk. Is everything centered? Does the combination of star disk and rings look like a perfect little **bullseye**? If yes, you're done. But if the rings seem "skewed" to one side or another, you've got more collimatn' to do, pardner. Adjust your secondary (by very small amounts) until the rings are *concentric*. When you adjust the secondary, this will decenter the star in your field. *Always recenter the star carefully before making a further adjustments*. Keep on going until you've got a nice little bullseye with everything centered.



Stage 3 Fine Collimation ("In-focus Collimation")

Want to get things adjusted even better? If you've got a really good, steady night, you can go to Stage 3, collimating by observing the airy disk and diffraction rings of a star **IN FOCUS**. To do this, you'll probably have to run the power up to at *least* 300x. If you're able to clearly see the star's diffraction pattern (what you'll see is the star's small, bright airy disk, one very prominent 1st diffraction ring, and, possibly, one or more fainter outer rings). If your collimation is dead on, you should see the airy disk completely surrounded by the first diffraction ring as in the illustration below. If you're still off, the first ring will be *broken*. Adjust as above, using even smaller movements of the secondary adjustment screws, until the first diffraction ring is unbroken in appearance, completely surrounding the airy disk.



Collimation Tips

Should you collimate with your star diagonal in the scope? This is controversial, since poorly made diagonals can affect collimation. But my gut feeling is that you should collimate with the diagonal in place if you plan on using the diagonal during your observing runs.

Before attempting fine collimation, especially in-focus collimation, always allow the scope to reach ambient temperature. If there's much of a temperature differential between outside and the scope's storage area, you'll need to wait *at least* an hour for thermal equilibrium to arrive.

If seeing is so bad that you can't ever do fine collimation on a real star, try an *artificial* star. A Christmas ornament or ball bearing illuminated by the Sun (never point your scope anywhere near the real sun, of course) or another suitably bright light source will provide a good target. Distance from scope to target is not critical, just place your "star" far enough away so that you can achieve focus with your scope. Try to place a grassy area between scope and target to minimize "seeing" problems. If you use an ornament and an artificial light source, the light will need to be a suitable distance from the ornament to produce a pin-point reflection.

Your scope's allen or phillips head screws make collimation unduly difficult—especially phillips head screws. Consider obtaining a set of Bob's Nobs. They make collimation an absolute JOY <http://www.bobsnobs.com>.

Once collimation is complete, most SCTs hold it very well. But DO check it every once in a while—especially if your scope goes on many road trips!

Rod to SCT user:

"Hmmm...looks like you may be a little off in collimation."

User:

*"Well, I collimated it a couple **of years** back. Haven't worried about it since. SCTs are supposed to stay in collimation, ain't they?!"*

If you have ANY questions about this document or collimation in general, please email me at RMOLLISE@aol.com.