

74-UV, 74-VIS Collimating Lenses Instructions

Description

To obtain accurate data, the light entering the sample and the light collected after exiting the sample must be well collimated. The 74-UV and 74-VIS collimating lenses screw onto the end of SMA-terminated optical fibers and other sampling optics to convert divergent beams of radiation (light) into a parallel beam.

Collimating lenses are useful for any optical setup that requires the acceptance or transmission of parallel beams of light at the illumination source, at the entrance optics, or at both ends (illumination and read) of the setup. That's important because the optical fibers Ocean Optics specifies for use with its spectrometers and light sources have a field of view (FOV) of $\sim 25^\circ$ -- an acceptance angle that may not be appropriate for some experiments. Collimating lenses are adjustable, providing FOV angles from collimation (near 0°) to $\sim 45^\circ$. Without the collimating lenses, the light would disperse more than is required for efficient transmission and collection of the signal.

Using a collimating lens is easy. Screw a collimating lens onto the end of any SMA-terminated port to collect, shape, or focus light.

Adjusting the Focus for Collimating Lenses

All collimating lenses are already adjusted at the time of manufacture such that light emerging from a 200 μm fiber/collimating lens assembly is collimated. To readjust the focus of light so that accurate data is collected by the spectrometer, use the following procedure.

► **Procedure**

Adjusting the Focus of the Collimating Lens on Your Light Source

1. Connect the fiber that you are going to use as the illumination fiber in your setup to the light source. Ensure the connection is tight. The female SMA connector of the fiber must be screwed all the way into the male connector of the lamp.

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2. Turn on the lamp and inspect the light beam emitted from the other end of the fiber by pointing the fiber at a light-colored object such as a white piece of paper. The distance is not too critical but should be at least 3 inches from the surface. Loosen the set screw on the fiber barrel of the light source with an Allen wrench.
3. After the set screw has been loosened, slide the inner barrel of the collimating lens on the light source until you see an even intensity across the beam spot. The spot of light should be uniform; there should be no fluctuations in intensity and color. There should not be any dimmer rings of light surrounding the center spot.
4. Once the inner barrel is positioned so that a well-focused, uniform spot of light is obtained, tighten the set screw with the Allen wrench. Do not put down the fiber and then tighten the set screw. Try to continue to hold the fiber 3 inches from the surface while you tighten so that if the inner barrel of the collimating lens slips and distorts the spot of light, you will be able to readjust the focus. Now the collimating lens on the light source is focused for the fiber.

Adjusting the Focus of the Next Collimating Lens in Your Setup

5. For this part of the procedure, the illumination fiber is still connected to the lamp and its collimating lens and the lamp is still on. Now take the second collimating lens in your setup (removed from the illumination side of a cuvette holder, for example) and screw it onto the other end of the illumination fiber. Make sure the fiber and the second collimating lens are completely connected. Point this end of the fiber at least 2 meters away from a wall. If the beam spot on the wall is too faint, you may need to dim the room lights.
6. Loosen the set screw that holds the barrel of this second collimating lens in place and slide the barrel until the spot of light focused on the wall has crisp edges. You are looking for the sharpest and cleanest image possible. Tighten the set screw. Do not put the fiber down and then tighten the set screw. Try to continue to hold the fiber with the spot of light focused on the wall while you tighten the set screw so that if the inner barrel of the collimating lens slips and distorts the image while tightening, you will be able to readjust the focus. Now that the second collimating lens has been refocused, remove it from the end of the fiber and install it back into your setup (back into a cuvette holder, for example).

Continue to Adjust the Focus of the Other Collimating Lenses in Your Setup

7. You have completed adjusting the focus of the collimating lenses in the illumination part of your setup. Continue to adjust the focus of the other collimating lenses in your setup. If the read fiber is the same diameter size as the illumination fiber, repeat step 6 with each collimating lens in your setup. If the read fiber is a different diameter size than that of the illumination fiber, you need to remove the illumination fiber from the light source, connect the read fiber to the light source, and repeat Step 6 for every collimating lens on the read part of your setup.