

We employ a variety of lasers in our microscopy systems, including both continuous wave (CW) and pulsed sources. The information below focuses primarily on different available CW lasers, with some brief notes on pulsed or modulated laser sources.

Continuous Wave (CW) Lasers:

We have generally been very happy with the performance of various [pigtailed butterfly laser diodes](#) from Thor Labs. A wide variety of central wavelengths and operating powers are available. We use [FiberPorts](#) to collimate and couple light out of the fiber pigtails. We use the [CLD1015 Laser Diode and Temperature Controller](#) to mount and drive these laser diodes, which is very compact and has an easy-to-use touch screen. We have found that combining these components results in high-quality beam profiles.

We do not use any non-pigtailed laser diodes in our current microscopy systems, but we have done so in the past. Thor Labs [TO can laser diodes](#) combined with a [laser mount with an integrated thermoelectric cooler and temperature controller](#) can provide an economical option. However, these laser diodes will output highly elliptical beam shapes, and circularizing the beam can be challenging. Therefore, we strongly prefer to work with pigtailed diodes whenever possible.

For both initial system alignment and certain applications requiring low power CW sources, we have had success with these [Compact Laser Modules with Phono Jack](#) from Thor Labs, a very economical option.

Beyond Thor Labs, there are various other suppliers of CW laser diodes. We have a laser diode and accompanying drivers from [Lumics](#) (based in Germany) that have also worked well. The [Coherent OBIS line](#) is another popular option for optical microscopy applications, although we have not tested any lasers from this line ourselves.

Pulsed Lasers:

We use a Coherent Chameleon Ultra II Ti:Sapphire laser as our primary pulsed laser source, with tunable wavelengths in the near-infrared range. Coherent offers various high-quality Ti:Sapphire options, including the [Chameleon Ti:Sapphire family](#) and the even higher-end [Chameleon Discovery NX](#). We combine our Chameleon Ultra II with an acousto-optic pulse picker to reduce the 80 MHz repetition rate when necessary and a second harmonic generation system to produce visible wavelength pulses.

The [Picosecond Pulsed Sources from PicoQuant](#) are another appealing option that we have also explored. We have not personally tested any of these laser sources, but we have had positive experiences with other PicoQuant products.

Finally, many of the Thor Labs laser drivers mentioned in the prior section have a modulation input that allows the use of a function generator to modulate the laser output. We have found this option to work well for low-frequency applications.