2021

Mode Hops with VBG-Stabilized Single Mode Lasers

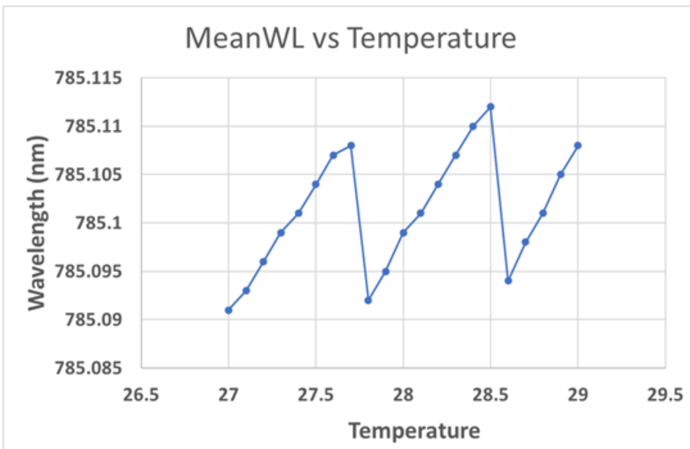
GREG CHARACHE

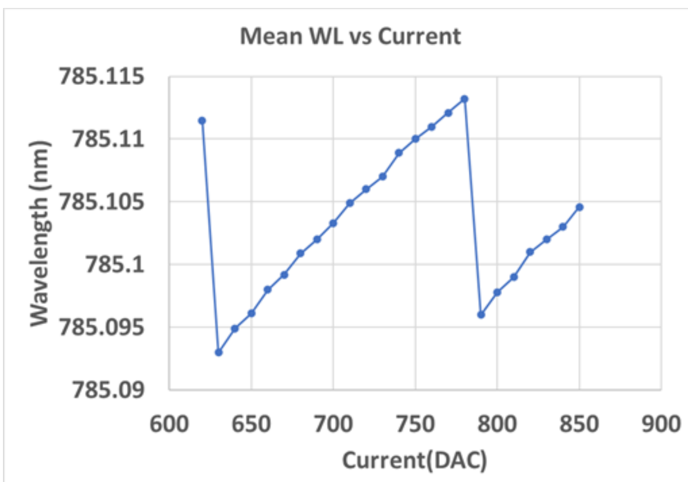
Mode Hops with VBG-Stabilized Single Mode Lasers

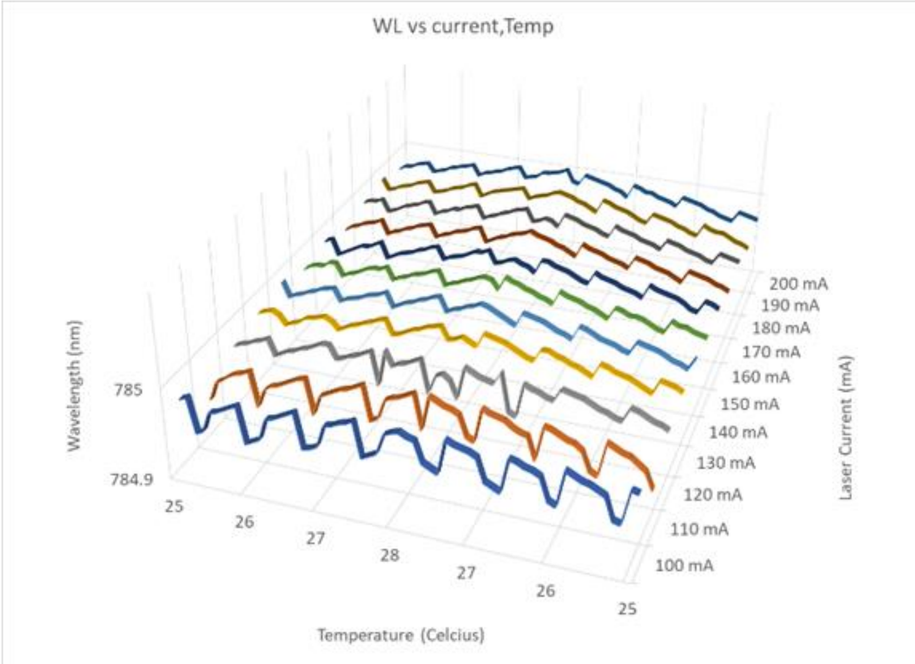
With a VBG-locked single-mode laser, it is very important to profile the device in both temperature and drive current space to avoid mode-hops which can lead to power and wavelength instabilities.

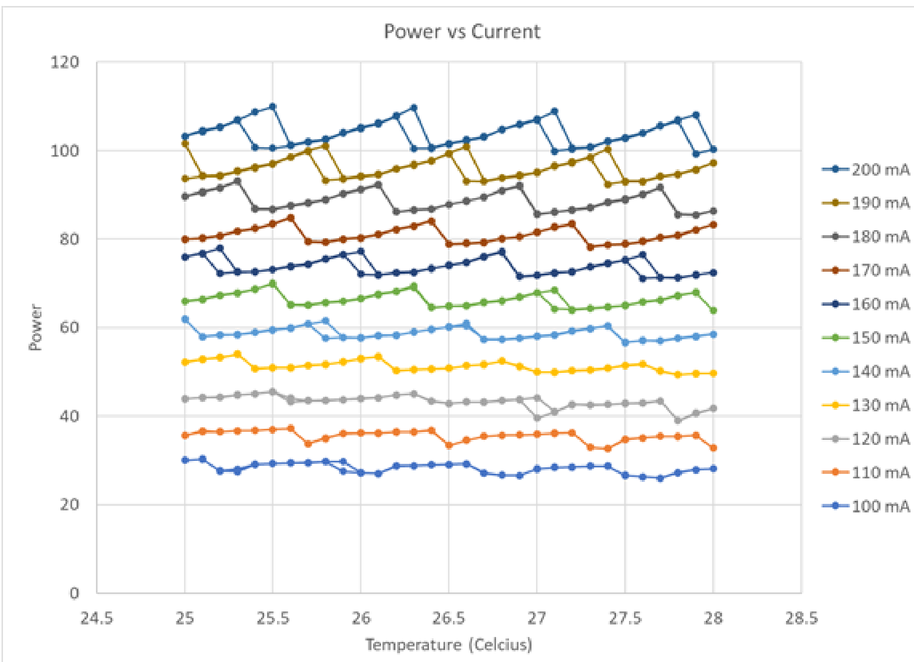
These mode hops occur approximately every 1 degree C and every 25 mA. These mode hops result in a very small wavelength change ~0.02 nm, but can lead to power changes of up to 10% depending on drive current and temperature as the lasing mode shifts from one longitudinal mode to the adjacent longitudinal mode.

Below is an example for a 785 nm laser diode, but very similar behavior is also observed for other wavelengths.









The easiest way to avoid this behavior is to profile the device first with a temperature sweep and set the temperature midway between 2 mode hops and then profile the device with a current sweep and set the current midway between two mode hops.