OP sidebands from direct RF injection

2014: Dan Friesen's co-op report.
24±2 mW used (about 13 dBm)
The 2014 diode has near 100% linear polarization and less elongated spatial mode. It made about 20 mW of light.

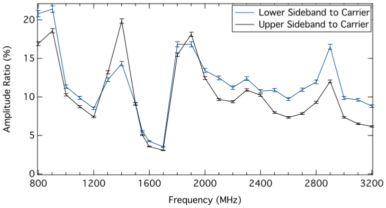
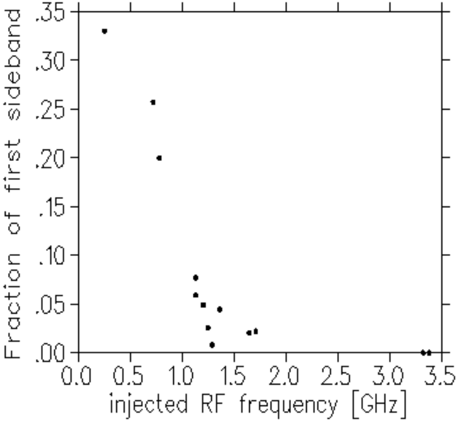


Figure 4.2: Percent Amplitude in the Upper (black) and Lower (blue) frequency sidebands relative to the master carrier peak. The two particular areas of interest are around 3036 MHz, to optically pump ^{85}Rb, and around 1550 MHz, to optically pump ^{82}Rb.

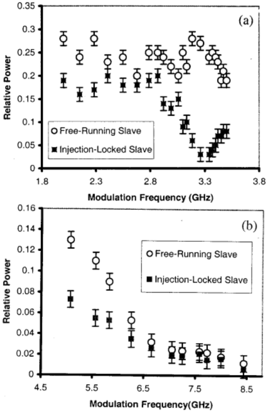
Usable sidebands across our range of interest.
This diode is dead, but likely available for purchase

2023: same external laser cavity
≈ 23 dBm = 200 mW RF.
256 to 250 mA DC goes into laser diode.
Present laser diode: 3:1 polarization along different axes, elongated spatial mode. Very different laser diode! About 50 mW of light.



Kowalski Gensemer Gould RSI 72 2532 (2001) the external and/or internal cavity finesse can suppress sidebands. Even a slave laser (no external cavity!) does not always work:

2534 Rev. Sci. Instrum., Vol. 72, No. 6, June 2001



Hypothesis: (although RF reflection changes injection by $\sim$ 2) Our internal cavity finesse is not supporting sidebands, and will not do so.

A manual for a laser like ours has the frequency filter overlaps:

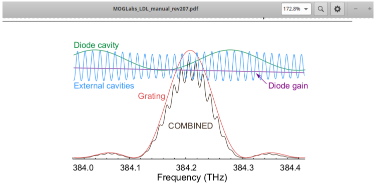
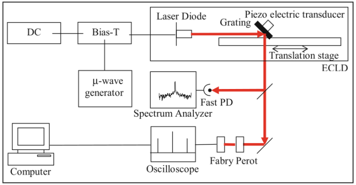


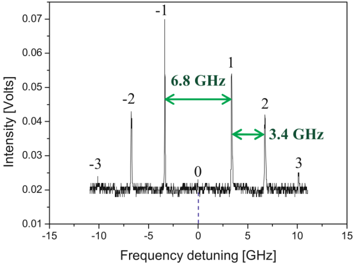
Figure 1.4: Schematic representation for the various frequency-dependent factors of an ECDL, adapted from Ref. [1], for wavelength $\lambda = 780$ nm and external cavity length $L_{ext} = 15$ mm.

To fix reliably, Waxman ... Folman Appl Phys B (2009) 95: 301 $\rightarrow$

(This geometry is ambitious)



Resonantly enhance sidebands: tune external cavity free spectral range = sideband frequency



Suppress carrier!