

Abstract Submitted
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Optical Sidebands in Extended Cavity Diode Lasers¹ TIMOTHY ROACH, JOSH RYOR², PAUL OXLEY, The College of the Holy Cross — We have measured the amplitude of optical sidebands produced by RF current modulation of extended cavity diode lasers and studied its dependence on laser drive current, modulation frequency, and external cavity length. The modulated laser light is used in our work for optical repumping for laser cooling (Rb) and atomic beams (Li), but this can be (and is) a broadly applicable method for producing easily controlled optical sidebands. We require the linewidth and stability provided by an extended cavity; this is known to affect sideband amplitude but is not well studied. We found that sideband amplitude in a 780nm diode laser increased significantly in the modulation frequency range 2.8 to 3.3GHz, with a more pronounced effect at higher laser drive current. The same effect was seen with the external cavity removed, so this is likely due to a relaxation effect in the semiconductor. The external cavity reduced the sideband amplitude, in comparison to the bare laser, but no strong dependence on cavity length was seen for cavity lengths from 2 to 4cm. Further investigations to look for effects near the cavity free spectral range using higher modulation frequencies (6.8GHz) and other cavity lengths are ongoing.

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