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Variation of optical sideband intensity with current tuning in an extended cavity diode laser[1] TIMOTHY ROACH, JOSH RYOR, College of the Holy Cross — We have observed large, systematic changes in the intensity of optical sidebands of an extended cavity diode laser (ECDL) as the DC injection current is changed. These sidebands have applications for Raman spectroscopy and optical pumping (in our case, repumping of a laser cooling transition). The sidebands are produced by microwave modulation of the injection current ($f \sim 3$GHz) and the optical intensity is about 2% of the total. Changing the DC current of the grating feedback ECDL produces optical frequency tuning in smooth stretches separated by mode hops several mA apart. Within each smooth-tuning cycle the intensity of the sidebands changes by a factor of 5 or more. We compare this behavior to a model of the competition between the laser chip and ECDL cavity modes.

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