

Spectral response of current-modulated interband cascade lasers

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The spectral characteristic of interband cascade lasers (ICL) in continuous wave (cw) operation is well investigated. However, certain spectroscopic techniques require a modulation of the radiation. The most common way is here a variation of the operating current. In this case the spectral behavior deviates significantly from the cw operation. However, the exact knowledge of the laser's spectral response is decisive for precise spectroscopic results. We developed a Michelson interferometer-based method which allows high-resolution measurements of the change of wavelength ($d\lambda/dI$) as well as the absolute wavelength ($\lambda(I)$) as functions of the laser injection current and present exemplary results of a mid-infrared ICL.

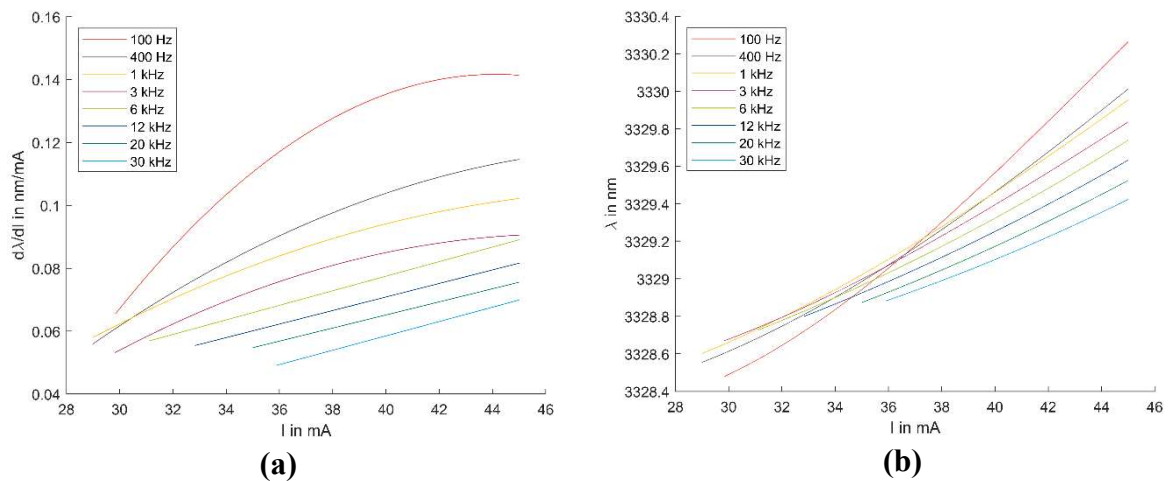


Figure 1: ICL at saw-tooth modulation; **(a)** wavelength change as function of operating current for different modulation frequencies; **(b)** absolute wavelength as function of operating current for different modulation frequencies.

- [1] Demtröder, W. (2011). Laserspektroskopie 1: Grundlagen. Germany: Springer Berlin Heidelberg.
- [2] Bahr, M.-S., and Wolff, M. (2021). Interferometric Technique for the Spectral Characterization of High Frequency Current-Modulated Mid-Infrared Semiconductor Lasers. *Photonics* 8, no. 10: 443. <https://doi.org/10.3390/photonics8100443>