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Title:Common mode frequency instability in internally phase-locked terahertz quantum cascade lasers

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Abstract:Feedback from a diode mixer integrated into a 2.8 THz quantum cascade laser (QCL) was used to phase lock the difference frequencies (DFs) among the Fabry-Perot (F-P) longitudinal modes of a QCL. Approximately 40% of the DF power was phase locked, consistent with feedback loop bandwidth of 10 kHz and phase noise bandwidth ~ 0.5 MHz. While the locked DF signal has ≤ 1 Hz linewidth and negligible drift over ~ 30 min, mixing measurements between two QCLs and between a QCL and molecular gas laser show that the common mode frequency stability is no better than a free-running QCL.

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