

Abstract Submitted  
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**Distributed Bragg reflectors on quantum cascade lasers fabricated by focused ion beam milling** AFUSAT DIRISU, CLAIRE GMACHL, Princeton University, DEBORAH SIVCO, Lucent Technologies — The use of Focused Ion Beam (FIB) milling to fabricate custom gratings on Quantum Cascade (QC) lasers for single mode operation is reported. Using the FIB, gratings that fit specific laser wavelength requirements can be fabricated after all other laser processing is completed. This has the advantage that the processed lasers can be fully characterized before milling to determine the laser gain spectrum and its alignment with the desired emission wavelength, hence allowing the proper choice of the grating parameters, such as period and strength to be tailored to the final device. We have been able to mill gratings onto QC laser ridges using the FIB method to significantly narrow the emission spectrum without compromising other properties, such as output power or threshold, of the working device. We fabricated distributed Bragg reflector gratings approximately  $1.2\ \mu\text{m}$  deep,  $250\ \mu\text{m}$  long, with square profile, and with a period of  $1.2\ \mu\text{m}$ ; these were processed on top of 2.7-3 mm long QC laser ridges emitting at  $7.7\ \mu\text{m}$ . We observed single mode operation with a side mode suppression ratio of about 12dB.

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