

Abstract Submitted
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Interband Cascade Laser ($\lambda = 3.7 \mu\text{m}$) Operating cw to Thermoelectric Cooler Range D. LARRABEE, J.A. NOLDE, W.W. BEWLEY, C.L. CANEDY, C.S. KIM, M. KIM, I. VURGAFTMAN, J.R. MEYER, Naval Research Laboratory — In the mid-infrared, a significant range of wavelengths, from 3.1 to 3.8 μm , is currently inaccessible to cw semiconductor lasers operating at ambient temperature. The most promising device design for reaching this range is the interband cascade laser (ICL), based on a type-II “W” quantum well active region. Here we present results of ICLs fabricated in narrow ridges, which improves both the lateral heat dissipation and the beam quality compared with broad-area lasers. For example, a five-stage ICL with 12- μm ridge width and Au electroplating for improved epitaxial-side-up heat sinking operates cw to a maximum temperature of 257 K, where the emission wavelength is 3.7 μm . The device emits 100 mW per facet for cw operation at 80 K, 54 mW at 200 K, and 10 mW at 250 K. The beam quality is within twice the diffraction limit for injection currents up to 14 times the lasing threshold.

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