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Title

Low temperature near-field scanning optical microscopy on infrared and terahertz photonic-crystal quantum cascade lasers

Source

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Abstract

We report the development of a scattering-type near-field scanning optical microscope (sNSOM) which operates at temperatures down to 100 K with a scanning range of up to 400  $\mu\text{m}$ . We have used this sNSOM to map the electromagnetic near-field on mid-IR and terahertz (THz) surface emitting quantum cascade lasers with photonic-crystal resonators. Mid-IR devices operate at  $\lambda = 7.5 \mu\text{m}$  (40 THz) while THz devices operate at  $\lambda = 110 \mu\text{m}$  (2.7 THz). The near-field images-in agreement with numerical calculations-demonstrate an instrument resolution of 100's nm. (18 References).