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Title:Terahertz tomography using quantum-cascade lasers
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Abstract:The interfaces of a dielectric sample are resolved in reflection geometry using light from a frequency agile array of terahertz quantum-cascade lasers. The terahertz source is a 10-element linear array of third-order distributedfeedback QCLs emitting at discrete frequencies from 2.08 to 2.4 THz. Emission from the array is collimated and sent through a Michelson interferometer, with the sample placed in one of the arms. Interference signals collected at each frequency are used to reconstruct an interferogram and detect the interfaces in the sample. Because of the long coherence length of the source, the interferometer arms need not be adjusted to the zero-path delay. A depth resolution of 360 μm in the dielectric is achieved with further potential improvement through improved frequency coverage of the array. The entire experiment footprint is <1 m × 1 m with the source operated in a compact, closed-cycle cryocooler. © 2012 Optical Society of America.
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