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Title:Longitudinal computer-generated holograms for digital frequency control in electronically tunable terahertz lasers

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Abstract:Longitudinal computer-generated holograms (LCGHs) can be used for the inverse design of aperiodic photonic lattices for customizable frequency control of light propagation. A one-dimensional binary LCGH, designed to harness the coarse gain tuning of a terahertz (THz) quantum cascade laser (QCL) operating at around 2.9 THz, is patterned directly by ion milling into the surface plasmon-based waveguides of pre-characterized QCLs. The initial multi-mode emission is suppressed in favour of electronically controlled, discretely tunable single-mode lasing spanning over 160 GHz. Side-mode suppression ratios of over 20 dB are also demonstrated in these tunable THz LCGH-QCLs.

Number of references:32

Inspec controlled terms:computer-generated holography - laser tuning - light propagation - optical lattices - optical waveguides - quantum cascade lasers - surface plasmons

Uncontrolled terms:side-mode suppression ratios - discretely tunable single-mode lasing spanning - pre-characterized QCL - surface plasmon-based waveguides - ion milling - terahertz quantum cascade laser - coarse gain tuning - one-dimensional binary LCGH - light propagation - aperiodic photonic lattices - electronically tunable terahertz lasers - digital frequency control - longitudinal computer-generated holograms

Inspec classification codes:A4240J Computer-generated holography - A4260F Laser beam modulation, pulsing and switching; mode locking and tuning - A4255P Lasing action in semiconductors - A4260B Design of specific laser systems - A4280L Optical waveguides and couplers - B4350 Holography - B4330B Laser beam modulation, pulsing and switching; mode locking and tuning - B4320J Semiconductor lasers - B4130 Optical waveguides

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