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Title:Impact of "ghost" mode interaction in terahertz quantum cascade lasers
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Abstract:Mode degeneration caused by the interaction between guided lasing modes and parasitic "ghost" modes in a terahertz (THz) quantum cascade laser (QCL) waveguide has been investigated and is reported here. It is shown that such interactions can degrade the performance of a QCL by causing abrupt rises (by as much as tenfold the normal value) in the gain threshold of the fundamental lasing mode. The impact of such interaction on the performance of a GaSb/AlGaSb THz QCL operating at 3.0 THz is elucidated here through the results of a rigorous numerical simulation. An optimized design is also proposed to suppress such undesirable intermodal interactions and, thus, to enhance the performance of the QCL.
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