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Title:Application of multi-subband self-consistent energy balance method to terahertz quantum cascade lasers
Authors:Slingerland, P. (1); Baird, C. (1); Giles, R.H. (1)
Author affiliation:(1) Submillimeter-Wave Technol. Lab., Univ. of Massachusetts Lowell, Lowell, MA, United States
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Abstract:We present simulation results for two resonant phonon terahertz quantum cascade lasers using a self-consistent energy balance model, which determines the electron temperature for each conduction subband. These temperatures, along with the electron populations and scattering rates, are determined in a manner similar to previously published models. However, the presented model is able to converge through the use of an algorithm that appears to be robust. The predicted individual subband electron temperatures, population densities and scattering rates are compared to previously published Monte Carlo and experimental studies for both lasers, where subband temperature variations were observed. These quantities were chosen since they provided the only comparison to modeling results from other studies.
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