Nonlinear gain suppression in semiconductor lasers due to carrier heating - DTU Orbit (06/12/2018)

Nonlinear gain suppression in semiconductor lasers due to carrier heating

We present a simple model for carrier heating in semiconductor lasers from which the temperature dynamics of the electron and hole distributions can be calculated. Analytical expressions for two new contributions to the nonlinear gain coefficient epsilon are derived, which reflect carrier heating due to stimulated emission and free carrier absorption. In typical cases, carrier heating and spectral holeburning are found to give comparable contributions to nonlinear gain suppression. The results are in good agreement with recent measurements on InGaAsP laser diodes.

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