67. Title: Terahertz lasing in a polariton system: Quantum theory

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Source: PHYSICAL REVIEW B

Volume:83

Issue:19

Pages: 193303

Publication year: 2011

Document type:Journal article (JA)

Abstract: We study the laser regime of terahertz (THz) emission from a semiconductor microcavity in the strong-coupling regime, where optical transitions between upper and lower exciton-polariton modes are allowed due to the mixing of the upper mode with one of the dark exciton states. Using a system of master-Boltzmann equations describing both polariton modes and the THz mode, we calculate the first-and second-order coherence functions and the spectral shape of THz emission. This analysis shows that THz lasing in microcavities is possible provided that the system is embedded in a good THz cavity, that the optical (polariton) lasing condition is fulfilled, and if the depletion of the upper polariton mode due to acoustic-phonon-assisted relaxation processes is reduced. This latter condition is likely to be realized in pillar microcavities, which seem to be the most suitable candidates for realization of a THz laser.