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# Modeling of operation regimes in coupled-cavity surface-emitting laser with external photon injection

*Medin M. A. Alrawashdeh, Hennadiy L. Lysenko, Stanislav Ye. Tuzhanskyi, Igor V. Abramchuk, Pawel Komada, Akmaral Tleshova, Gulzat Ziyatbekova*

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## Abstract


We present rate equation model of a modified vertical surface-emitting laser with two optical-coupled active cavities (CC-VSCEL) and external optical channel. The model allows to determine all the relevant parameters – carrier densities, gains, and output powers – starting from two input parameters: the injection currents in each cavity taking into account the additional external photonic injection. The system of rate equations is solved for different operating regimes of the modified laser device. The results provided by the model shown that operating characteristics of CC-VSCEL greatly depend on the number of photons of the external injection.

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