

Optimisation of spontaneous four-wave mixing in a ring microcavity

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Abstract

© 2017 Kvantovaya Elektronika and Turpion Ltd. A theory of spontaneous four-wave mixing in a ring microcavity is developed. The rate of emission of biphotons for pulsed and monochromatic pumping with allowance for the dispersion of group velocities is analytically calculated. In the first case, pulses in the form of an increasing exponential are considered, which are optimal for excitation of an individual resonator mode. The behaviour of the group velocity dispersion as a function of the width and height of the waveguide is studied for a specific case of a ring microcavity made of silicon nitride. The results of the numerical calculation are in good agreement with the experimental data. The ring microcavity is made of two types of waveguides: completely etched and half etched. It is found that the latter allow for better control over the parameters in the manufacturing process, making them more predictable.

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Keywords

Ring microcavity, Silicon nitride., Spontaneous four-wave mixing

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