

Lasing modes of a microdisk with a ring gain area and of an active microring

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Abstract

© 2015, Springer Science+Business Media New York. Microcavity lasers shaped as thin circular disks are famous for the ultra-low thresholds of their whispering-gallery modes. We considered a two-dimensional model of such a laser in free space with a ring-like active region and compared the characteristics of its modes with the modes of an active microring, i.e. a similar disk with a concentric hole. The comparison showed that a microring has considerable rarefaction effect in terms of emission thresholds, accompanied by the blue-shift of emission spectra. If the ring becomes narrower than a half-wavelength in material, then all lasing modes obtain catastrophically high thresholds.

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Keywords

Laser resonators, Lasers, Lasing modes, Microdisk, Microring, Threshold of lasing