

# Mathematical and numerical analysis of the spectral characteristics of dielectric microcavities with active regions

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## Abstract

© 2016 IEEE. We investigate electromagnetic fields and emission thresholds of two-dimensional dielectric microcavities solving the Lasing Eigenvalue Problem (LEP). We propose a new convenient formulation of LEP as a nonlinear spectral problem for a Fredholm holo-morphic operator-valued function and solve LEP for microcavities of arbitrary shape with active regions. We reduce the original problem to the system of Miiller boundary integral equations, which we solve numerically by the Nystrom method. We study properties of the characteristic set theoretically and prove convergence of the Nystrom method.

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