Three-Dimensional Modeling of Micropillar Microcavities Using a Coupled FEM–Multigrid Approach

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Abstract. We performed three-dimensional modeling of wavelength-scale micropillar microcavities using a coupled finite element method (FEM) and multigrid method (MGM) approach. This study investigates the modifications in spontaneous emission from narrowband emitters positioned at the resonance center. To this end, we employed more sophisticated architectures specifically annular cavities and photonic crystal defect cavities providing both lateral and vertical confinement, thereby minimizing residual sidewall scattering.

Key-Words:- Finite element method (FEM), Finite Difference method (FDM), Multi-grid method (MGM), Photonic crystal.

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