Benchmarking five numerical simulation techniques for computing resonance wavelengths and quality factors in photonic crystal membrane line defect cavities

We present numerical studies of two photonic crystal membrane microcavities, a short line-defect cavity with relatively low quality (Q) factor and a longer cavity with high Q. We use five state-of-the-art numerical simulation techniques to compute the cavity Q factor and the resonance wavelength ($\lambda$) for the fundamental cavity mode in both structures. For each method, the relevant computational parameters are systematically varied to estimate the computational uncertainty. We show that some methods are more suitable than others for treating these challenging geometries.

General information
Publication status: Published
Organisations: Department of Photonics Engineering, Quantum and Laser Photonics, Nanophotonic Devices, Department of Electrical Engineering, Electromagnetic Systems, Department of Mechanical Engineering, Solid Mechanics, Metamaterials, Zuse Institute Berlin, St. Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO)
Corresponding author: Gregersen, N.
Pages: 11366-11392
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 26
Issue number: 9
ISSN (Print): 1094-4087
Ratings:
BFI (2018): BFI-level 2
Scopus rating (2018): CiteScore 3.98 SJR 1.473 SNIP 1.601
Web of Science (2018): Impact factor 3.561
Web of Science (2018): Indexed yes
Original language: English
Electronic versions:
de_Lasson_et_al._2018_Benchmarking_five_numerical_simulation_techniques_for_computing_resonance_wavelengths_and_quality_factors_in_p.pdf
DOIs:
10.1364/OE.26.011366
Source: FindIt
Source-ID: 2391371597
Research output: Contribution to journal › Journal article – Annual report year: 2018 › Research › peer-review