Modeling cavities exhibiting strong lateral confinement using open geometry Fourier modal method - DTU Orbit (09/11/2017)

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We have developed a computationally efficient Fourier-Bessel expansion based open geometry formalism for modeling the optical properties of rotationally symmetric photonic nanostructures. The lateral computation domain is assumed infinite so that no artificial boundary conditions are needed. Instead, the leakage of the modes due to an imperfect field confinement is taken into account by using a basis functions that expand the whole infinite space. The computational efficiency is obtained by using a non-uniform discretization in the frequency space in which the lateral expansion modes are more densely sampled around a geometry specific dominant transverse wavenumber region. We will use the developed approach to investigate the Q factor and mode confinement in cavities where top DBR mirror has small rectangular defect confining the modes laterally on the defect region.

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