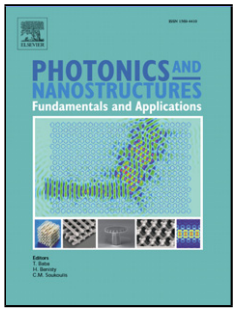

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High-Quality Laser Cavity based on All-Dielectric Metasurfaces

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Abstract

In the last few years, all-dielectric metasurfaces cause great interest because of their ability to create broadband perfect reflectors. It opens unique opportunities for designing of optical lenses, reflectors, and cavities for semiconductor lasers. Here, we propose a very compact design for a laser cavity based on all-dielectric metasurface perfect reflectors. We demonstrate that all-dielectric metasurface perfect reflector increases quality factor and reduces threshold power.

1. Introduction

Metasurfaces are two dimensional sheet type metamaterials having thickness several times smaller compared to wavelength of operation. Their subwavelength structure spreads in two dimensions in either periodic or aperiodic arrangement. Metasurfaces can be used to provide such peculiar optical properties to a device which cannot be achieved by thin films of naturally occurring materials [1, 2, 3]. Recently, all-dielectric metamaterials and metasurfaces have been proposed as a more effective counterpart for plasmonic ones

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