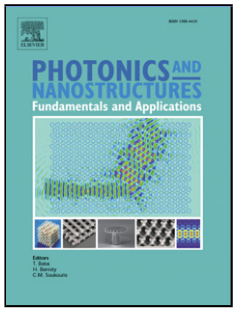

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A Simple Homogeneous Model for Regular and Irregular Metallic Wire Media Samples

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Abstract

To simplify the solution of electromagnetic problems with wire media samples, it is reasonable to treat them as the samples of a homogeneous material without spatial dispersion. The account of spatial dispersion implies additional boundary conditions and makes the solution of boundary problems difficult especially if the sample is not an infinitely extended layer. Moreover, for a novel type of wire media – arrays of randomly tilted wires – a spatially dispersive model has not been developed. Here we introduce a simplistic heuristic model of wire media samples shaped as bricks. Our model covers WM of both regularly and irregularly stretched wires.

Keywords: Metamaterials, Wire media, Homogeneous model, Radiation enhancement, Extreme anisotropy, Hyperlensing effect

1. Introduction

Wire media (WM) is an important class of metamaterials (MMs). They represent as electrically (optically) dense arrays of thin (compared to the array period) metal wires. Classification, properties and applications of WM were reviewed in [1].

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