



Use of Equivalent Metamaterial Parameters in Finite Element Models of Macro-scale Metamaterial

Title	Use of Equivalent Metamaterial Parameters in Finite Element Models of Macro-scale Metamaterial
Item Type	Abstract
Authors	Grbovic, Dragoslav;Alves, Fabio;Mattish, Richard
Citation	Grbovic, Dragoslav, Fabio Alves, and Richard Mattish. "Use of Equivalent Metamaterial Parameters in Finite Element Models of Macro-scale Metamaterial." Bulletin of the American Physical Society 63 (2018).
URI	https://hdl.handle.net/10945/64523
Publisher	American Physical Society
Date Issued	2018-03-06
Rights	This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.
Download date	2026-04-14 23:41:13
Link to Item	https://hdl.handle.net/10945/64523

Downloaded from NPS Archive: Calhoun

Bulletin of the American Physical Society

APS March Meeting 2018

Volume 63, Number 1

Monday–Friday, March 5–9, 2018; Los Angeles, California

Session F09: Dielectric and Ferroic Oxides - New Materials

11:15 AM–2:15 PM, Tuesday, March 6, 2018

LACC Room: 301A

Sponsoring Unit: DMP

Chair: Wei Ren, Shanghai University

Abstract ID: BAPS.2018.MAR.F09.9

Abstract: F09.00009 : Use of Equivalent Metamaterial Parameters in Finite Element Models of Macro-scale Metamaterial*

1:15 PM–1:27 PM

← Abstract →

Presenter:

Dragoslav Grbovic
(Physics, Naval Postgraduate School)

Authors:

Dragoslav Grbovic
(Physics, Naval Postgraduate School)

Fabio Alves
(Physics, Naval Postgraduate School)

Richard Mattish
(Physics, Bob Jones University)

Experimentally measured reflectance and transmittance are used to obtain effective permittivity, permeability and conductivity for a planar microwave metamaterial. These parameters are then used in a finite element models of macro-scale metamaterial objects, where the metamaterial is represented as a homogeneous layer with frequency-dependent permittivity, permeability and conductivity. We demonstrate good agreement between reflectance and absorbance of metamaterial structure and those obtained from modeling homogenized, macro-scale metamaterials. We further demonstrate use of the method for geometrically scaled, oddly-shaped macroscopic objects. This method significantly reduces computation requirements and enables modeling of metamaterial-made, large area objects without modeling their actual intricate metamaterial structure.

*This work was sponsored by the Office of Naval Research (ONR), under grant (or contract) number N0001416WX01128.

To cite this abstract, use the following reference: <http://meetings.aps.org/link/BAPS.2018.MAR.F09.9>

This site uses cookies. To find out more, read our [Privacy Policy](#).

I Agree