

Notice of dissertation defense

22.8.2017

Versatile manipulation of electromagnetic waves with artificial surfaces

Title Spatially dispersive metasurfaces

Content Although the nature supplied people with enormous variety of materials, the choice is not rich enough for engineers, who need specific properties, optimal for particular device applications. Many exotic electromagnetic phenomena, such as optical activity and birefringence, occur in natural materials, but only as weak effects observable in bulky material slabs. Recent developments of artificially structured substances, so-called metamaterials, have demonstrated that these effects can be significantly enhanced and, moreover, that new exciting phenomena can be realized in materials with novel properties.

The dissertation raises two important questions: “What is the scope of functionalities which can be attained using electrically thin metamaterial layers (metasurfaces) with the most general linear response?” and “How to create such artificial structures?” The obtained results show that properly engineered metasurfaces greatly extend practically realizable wave manipulations, beyond those achievable with conventional antenna arrays, diffraction gratings, and holograms. Due to the multidisciplinary nature of the dissertation subject, the phenomena and devices resulting from this study may carry significant implications for applied electromagnetics from microwaves to optical frequencies, as well as for acoustics and mechanics.

Field of research Metamaterials, Radio Engineering, Optics

Doctoral candidate Viktor Asadchy, MSc.
Born in Belarus, 1990

Date and time 29.09.2017 at 12:00

Place Aalto University School of Electrical Engineering, hall T2, Konemiehentie 2 (T-building), Espoo

Opponent Professor Romain Fleury, École Polytechnique Fédérale de Lausanne, Switzerland

Supervisor Professor Sergei Tretyakov, Aalto University School of Electrical Engineering, Department of Electronics and Nanoengineering
Professor Igor Semchenko, Francisk Skorina Gomel State University, Belarus

Dissertation website <http://urn.fi/URN:ISBN:978-952-60-7558-7>

Contact information Viktor Asadchy, +358504205846, viktar.asadchy@aalto.fi, Maarintie 8, 02150 Espoo

The dissertation is publicly available on the notice board of the Library of the Aalto University School of Electrical Engineering (Maarintie 8).