Electromagnetic Scattering of Resonant Nanoparticles and Nanoantennas

Title of the dissertation
Resonant Scattering Particles: Morphological characteristics of plasmonic and dielectric resonances on spherical, superquadric, and polyhedral inclusions

Contents of the dissertation
The dissertation discusses the electromagnetic scattering of single subwavelength nanoparticles and nanoantennas and their morphological effects to the overall scattering response. In particular, the energy localization via plasmonic or dielectric resonances has been studied for a number of shapes, such as spheres, spherical shells, tetrahedra, hexahedra, octahedra, dodecahedra, and icosahedra. The results were extracted via analytical methodologies (sphere) or with the aid of computational techniques (non-spherical particles), elucidating the shape effects to the overall scattering response. Understanding the single-particle response is of paramount importance for applications with enhanced or novel energy control/harvesting functionalities within the areas of RF engineering, material science, applied physics, optics, and photonics.

Field of the dissertation
Electromagnetics and Circuit Theory;

Doctoral candidate
Dimitrios C. Tzarouchis, (M.Sc)

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Aalto University, School of Electrical Engineering, lecture hall Odeion, TUAS Building, Maarintie 8, Espoo

Opponent
Professor Ortwin Hess, Imperial College London, London, United Kingdom

Custos
Professor Ari Sihvola, Aalto University School of Electrical Engineering, Department of Electronics and Nanoengineering.

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Doctoral candidate’s contact information
dtzarouc@gmail.com, dimitrios.tzarouchis@aalto.fi, +358503652771