

## Metamaterials: New possibilities in electromagnetic wave control

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Metamaterials are artificially structured materials with novel and unique electromagnetic properties arising mainly from the shape and distribution of their subwavelength-scale building blocks. Arranging properly those building blocks one can achieve properties such as with negative permeability (even in the optical region), negative refractive index, extreme permittivity and permeability values, unusual anisotropy etc. All these properties provide a unique vehicle for the control of electromagnetic waves, and can be exploited in a variety of applications, including imaging, sensing, telecommunications and information processing, etc.

In this talk I will review some of the recent metamaterials-related activities of our group, emphasizing on two main metamaterial categories: (a) Chiral metamaterials, able to give giant optical activity and negative refractive index in the THz range; (b) metamaterials made of phonon-polariton materials; such metamaterials present a variety of interesting properties and capabilities, including hyperbolic dispersion relation (with great potential in imaging applications), subwavelength wave-guiding and collimation, permittivity near-zero response, etc., which provide a great tool for the control of THz waves.

### Short CV



Maria Kafesaki is Associate Professor in the Dept. of Materials Science and Technology of the University of Crete and associated Researcher at the Institute of Electronic Structure and Laser (IESL) of Foundation for Research and Technology Hellas (FORTH). She obtained her Ph.D. in 1997, at the Physics Department of the University of Crete, Greece. She has worked as post-doctoral researcher in the Consejo Superior de Investigaciones Cientificas in Madrid, Spain, and in IESL of FORTH. (1997-2001). Her current research is on the area of electromagnetic wave propagation in periodic and random media, with emphasis on photonic crystals and metamaterials, especially negative refractive index materials. She has around 90 publications in refereed journals and conference proceedings (with ~3000 citations), she has participated in various European projects as well as in the organization of many international conferences and schools. Full CV and detailed information for M. Kafesaki can be found at the web-address <http://esperia.iesl.forth.gr/~kafesaki>, h-factor according to SCOPUS = 29.