



## ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

# PHYSICS COLLOQUIUM

**Thursday, 21 November 2013**

**17:00 -18:00**

**3<sup>rd</sup> Floor Seminar Room**

**“Metamaterials: new possibilities in electromagnetic wave control”**

**Prof. Maria Kafesaki**

Department of Materials Science & Technology, UoC and FORTH-IESL

### **Abstract**

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.