

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 23 March 2017

17:00 -18:00

3rd Floor Seminar Room

" Toroidal multipoles in metamaterials "

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Abstract

Besides the well known electric and magnetic multipoles there is a third class of multipoles which is omitted in most textbooks on Electrodynamics, that of toroidal multipoles. With the inclusion of the latter the most general distribution of currents and charges within the source volume can be described in a complete way. The toroidal dipole can be visualized as poloidal currents flowing on the surface of a torus creating thus a strong loop of magnetic field along the axis of the torus.

Although toroidal excitations have been employed in studies of nuclear, atomic, molecular and solid state physical systems, it is only recently, with the advent of metamaterials, that toroidal excitations can exhibit a dominant role in electromagnetic radiation. In the talk, two systems of metamaterials will be presented and analyzed showing the decisive role of the toroidal dipole radiation.

Recent review: N. Papasimakis et al., Nature Materials, 15, 263 (2016)