THEORETICAL MODELLING OF LIGHT-MATTER INTERACTIONS AT THE NANOSCALE

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In the past few decades, metal nanoparticles have attracted a lot of interest due to their ability to confine light in nanometric volumes [1] resulting in interesting applications of plasmonic nanoparticles such as optical sensors [2]. Nanometer-sized metallic particles or structures can strongly absorb and scatter light due to their ability to support surface plasmon resonances - coherent oscillations of surface conduction electrons in response to the electric field of light [3].

In my talk, I will briefly present the theory from a classical electrodynamics perspective [4] and discuss my ongoing research on (a) plasmonic enhancement and circular dichroism response of 2D metamaterials (nanoslits arrays) with circularly-polarized light, and (b) optical response of 1D and 2D arrays of gold, silver and aluminium particles with linearly polarized light. Numerical modelling will be based on finite-difference time-domain [5] and coupled-dipole methods [6].

References:

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