Nanophotonics: principles and applications

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Abstract

Interaction of light with nanostructured materials gives rise to nanostructured optical waves, i.e., to electromagnetic fields varying strongly at the nanoscale, opening exciting possibilities for surpassing the classical diffraction limit and molding the flow of light at length scales far below the optical wavelength. Using carefully designed nanostructures light can be manipulated in fascinating new ways that are impossible to achieve with natural materials and in conventional geometries. This control over light at the nanoscale led to unveiling new physical phenomena and empowered many applications, including integrated optical circuitry, optical processing, super-resolution microscopy, quantum information technologies, bio- and medical sensing. In this talk, main principles and applications of nanophotonics are briefly overviewed with the emphasis on metallic nanostructures and surface plasmon-based (plasmonic) configurations for nanophotonics.

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