Special Issue

Contemporary Nonlinear Plasmonics

Message from the Guest Editors

Nonlinear plasmonics is a rapidly growing field that combines the principles of nonlinear optics and plasmonics to create new and advanced photonic applications. The field focuses on the study of nonlinear interactions between light and matter at the nanoscale in metal-dielectric or, more recently, in graphene–dielectric interfaces which support surface plasmon polaritons. The main advantage of plasmonics circuits is the ability to guide light on a smaller scale than the diffraction limit, which is a well-known restriction of traditional optical devices. This increased optical confinement that plasmonics offer significantly enhances the light–matter interaction, especially nonlinear effects. Two-dimensional materials are also very well suited in plasmonic circuits, where the surface plasmon polariton modes can offer increased interaction lengths. Thus, the combination of nonlinear optics and plasmonics opens new opportunities for the creation of novel optical devices with unique functionalities, such as high-efficiency frequency converters in the visible, infrared, or even THz regimes; all-optical switches; nanoscale lasers; and bio-sensors.

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