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- FUNDAMENTALS OF PLASMONIC ANTENNAS

In this lecture we will review the main properties of localized plasmon resonances in nanoscale metal antennas. We will approach the problem from the point of view of both nanoscale optical scattering and standard antenna theory, in order to merge the backgrounds of knowledge inherited both from Mie theory and from the impedance description usually employed for circuit engineering. Then, we will review the standard methods for the nanofabrication of optical antennas and the optical characterization techniques that are available to study the spectral resonances and map the spatial field distributions of the nanoantennas.

- APPLICATIONS OF PLASMONIC ANTENNAS

In this lecture we will move from the basics to the applications of metal nanoantennas. We will cover the use of localized plasmon resonances for molecular sensing applications, both in the visible and in the infrared part of the electromagnetic spectrum. Moreover, we will discuss the interaction between antennas and photon emitters (molecules, nanocrystals, or point defect) and the associated excitation and emission enhancements that can be achieved. Finally, we will cover the use of metal nanoparticles for plasmon-enhanced nonlinear optics and plasmon-enhanced photocatalysis.