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Plasmon, Surface Plasmon, Localized Surface Plasmon resonances.

Collective excitation of electrons in metals cannot be directly excited by photons. However, when a metal is confined in one or more dimensions resonance conditions can be found. This phenomena will be described starting from a simple description of electrons in metals, like the Drude model, and showing how the most efficient type of calculations allow obtaining the optical properties of nanoparticles also with complicated structures and in aggregated forms.

LSPR exploitation: SERS (surface enhanced Raman scattering) and its application in the nanobiotechnology field.

Starting from the results of the first lesson on localized surface plasmon resonances, it will be shown how the enhancement of the local electromagnetic field, possible with metallic nanostructures, can be exploited for the Raman effect. Huge enhancement of the Raman scattering cross section can be calculated and observed. It will be shown how efficient nanostructures can be synthesized and how they can be used in the nanobiotechnology field.