# *Optical Properties of Nanoparticles*

## The World Of Nano-optics And Plasmonics

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Abstract:

Motivated by the rapid growth of nano-technology and nano-sciences the study of optical properties of nano-material becomes more and more important. Optical experiments brought a lot of discoveries to our well-known macroscopic world. So what kind of knowledge just waits to be explored at nano-scale? To find new effects there is a need for adequate tools and strategies for fabrication, manipulation and characterization at nanometer scale.

As you will see in this presentation nano-optics is a huge field showing a wide variety of phenomena. Some of these phenomena have been appearing in nature for millions of years, however, even the Romans did pottery with special optical properties based on nano-particles about 2400 years ago. To get a feeling how these materials work the theory of surface plasmons will be introduced.

Plasmon excitations, i.e. collective oscillations of the conduction electrons, strongly influence the optical properties of metal nanostructures and are of great interest for future photonic devices. The research field dealing with plasmons, called plasmonics, has already created a lot of applications and has probably the potential to tailor materials with never seen quality characteristics. Then let me be your guide trough the fascinating world of nano-optics.