# NANOPARTICLES ON SURFACES: RESONANCES AND OPTICAL FORCES

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There is an increasing interest in the study of electromagnetic eigenmodes of micro and nanoparticles. Experiments on the linewidth of surface plasmons aim to possible applications of the optical properties of particle arrays. Also, experiments on Mie resonance excitation and whispering-gallery modes establish the interest of dense dielectric particles as field concentrators and high-Q resonator devices. On the other hand, in near field optical studies, the resonant behavior of particles will greatly enhance their detecting properties. In addition, bonding and antibonding interactions between neighbouring particles through like action, can lead to ensambling them in desired nanostructures through optical binding.

Like in AFM, surface topography imaging can be realized through photonic force microsocopy (PFM) by transducing the optical force on a raster scanning nanoparticle into images. This is conceived to measure ultarsmall forces, in the range from a few to several hundreths of pN with laser powers of a few mW.

In this communication, we shall examine these aspects. We shall present procedures to control the excitation of eigenmodes both in metallic and dielectric nanoparticles on substrates. Further we shall show the effect of these resonances on the PFM signal enhancement.