

# Supertransmission and light concentration at nanoscale

*Francisco Javier Valdivia-Valero  
ICMM-CSIC  
C/Sor Juana Inés de la Cruz, 3 (Campus de Cantoblanco)  
Madrid (Spain)*

This work deals with a combination of two subjects in nanophotonics: one is the phenomenon of anomalous transmission, or supertransmission, through a subwavelength slit; the other pertains to light concentration inside dielectric particles by excitation of morphology-dependent resonances (MDR) as either whispering gallery modes (WGM) or localised plasmons (LP).

In this study we address particles of nanometric size and show computer simulation results in the near field range. In order to observe supertransmission by a nanoslit in a metallic slab, we consider p-polarised light. Both the wavelength and the aperture width are adjusted so that the supertransmitted wave also excites the MDRs of nanoparticles in front of the aperture.

Results show enhancements of transmission much larger than from the slit alone, and concentration of both WGM and LP in the particles for these configurations. This suggests that the excitation of these resonances produce giant “extraction” of light through apertures, and it is associated to large intensity concentrations of both WGMs and LPs. Therefore such nanoparticles act as a switch for light. Several configurations of particle sets are considered.

