

Resonant optical antennas

Jean-Jacques Greffet

Institut d'Optique, Université Paris Sud, CNRS

Institut Universitaire de France

Abstract: The goal of this paper is to discuss two types of applications of the concept of antenna in the context of light sources. In the first part, I will discuss the design and fabrication of nanoantennas used to tailor single photon emission by quantum dots in the visible. In the second part, I will discuss infra red incandescent sources with unprecedented properties obtained by designing resonant structures. In both cases, surface waves (surface plasmons or surface phonon polaritons) play a key role. From the electromagnetic point of view, these waves are strictly speaking Sommerfeld surface modes. Yet, in the optical or IR regime, they coincide with microscopic resonances of the material introducing significant differences with the microwave regime.