# FDTD simulations of plasmonic metasurfaces

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## Abstract

In the last years, a large interest is shown to plasmonic nanostructures. Plasmonic meta-atoms and plasmonic metasurfaces are investigated in order to obtain optical components as light emitting diodes, lasers or optical nano-antennas [1]. It is demonstrated that plasmonic nano-antennas can introduce an abrupt phase shift, this phenomenon leading to the possibility to employ these structures for realizing metasurfaces with application in flat and singular optics [2,3].

Here we analyze the phase behavior of two types of plasmonic metasurfaces. The plasmonic structures investigated here are resonant structures operating in the subwavelength region. The resonators are i) two parallel dipoles and ii) V-shape resonators, respectively. We performed 3D FDTD simulations with realistic materials and we determined the phase shift of the transmitted and reflected waves as a function of wavelength (see Fig. 1) and as a function of material and geometrical parameters of the structures.

We investigate, by performing FDTD simulations, the possibility to use these structures for flat optical components.

## References

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## Figures

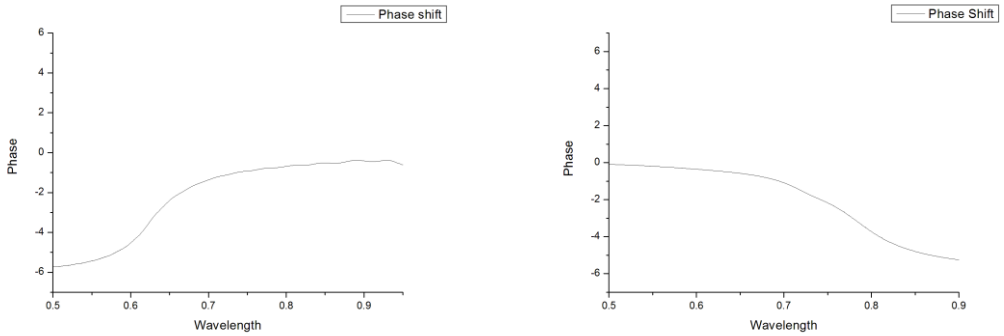


Fig.1 Phase behavior of a transmitted wave as a function of wavelength, after 3D simulations of : a) two parallel dipoles plasmonic resonator structure, b) V-shape plasmonic resonator structure

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