

# Light harvesting structures optimized at infrared frequencies

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One-dimensional light harvesting structures with a realistic geometry nano-patterned on an opaque metallic film are optimized to render high transmission efficiencies at infrared frequencies. Simple design rules are developed for the particular case of a slit-groove array with a given number of grooves that are symmetrically distributed with respect to a central slit, see Fig. 1. These rules take advantage of the hybridization of Fabry-Perot modes in the slit and surface modes of the corrugated metal surface. Same design rules apply for optical and infrared frequencies. The parameter space of the groove array is also examined with a conjugate gradient optimization algorithm that used as a seed the geometries optimized following physical intuition. Both uniform and nonuniform groove arrays are considered. The largest transmission enhancement, with respect to a uniform array, is obtained for a chirped groove profile. Such relative enhancement is a function of the wavelength.

## References

- [1] F. Villate-Guío, F. López-Tejera, F. J. García-Vidal, L. Martín-Moreno, and F. de León-Pérez, Opt. Express 20, (2012) 25441-25453

## Figures

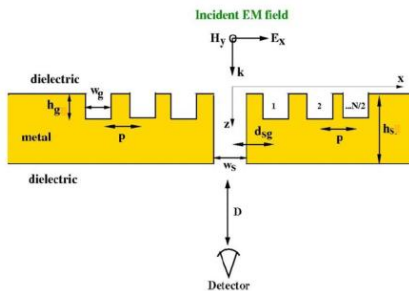


Figure 1: Schematic representation of the system under study.