

*Title:* **Plasmonic and chirality in the MID-IR**

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Plasmonic chiral metamaterials (PCM) can be used for ultra sensitive detection of chiral biomolecules. When light hits the chiral metal nanostructure it generates a superchiral electromagnetic field due to the collective vibrations of the free electrons. These fields interact in different ways between a pair of enantiomers depending on the handedness of the structure that supports it, and therefore, PCM provide a method to distinguish between optical isomers.

In this project the plasmonic effect of one micron gold shurikens in the MID-IR has been studied. Localized surface plasmons are plasmonic resonances that occur at the interface of the metal and a dielectric, and besides being confined on the nanostructures, they are highly influenced by size, shape, surroundings... An increment in the particle size or a change in the refractive index of the substrate that holds them induces a red shift in the position of the resonance. Moreover, the angle-dependent reflectivity spectra revealed that the resonance obtained, apart from the LSPRs, it also had a Bragg plasmon contribution.

Secondly the effect of the adsorption of a biomolecule onto the gold nanostructures has been studied. First, measuring the reference spectra for left and right-handed PCM before any molecule has been adsorbed and repeating them after adsorption generates a red shift of the resonance mode and is different for both LH and RH structures. These differences are parameterized as dissymmetries.