



SEMINARIO

GUPO DE PROCESADO POR LASER (GPL)

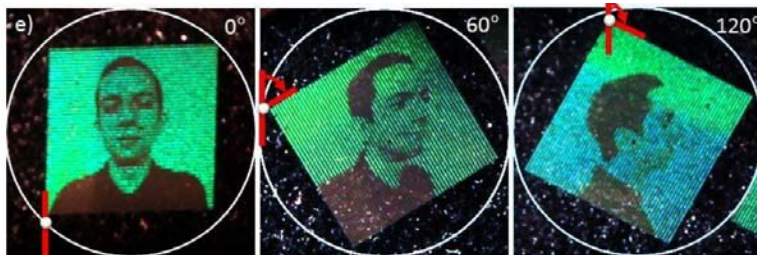
INSTITUTO DE OPTICA (CSIC)

Laser processing of plasmonic metasurfaces for security

Nathalie Destouches

*Univ Lyon, UJM-Saint-Etienne, CNRS, Institut d'Optique Graduate School,
Laboratoire Hubert Curien UMR 5516, F-42023, Saint-Etienne, France*

Hiding several images in a single printing, which appear selectively under different angles of observation, is of great interest for applications to security, data storage or design. Several techniques have been developed for this purpose, based on holography, moiré methods, multiple laser image (MLI) systems or on the use of dichroic plasmonic colors. A technology combining plasmonic metasurfaces and laser scanning processes is presented here. It provides a simple implementation for printing multiplexed images with high flexibility and a micrometric spatial resolution. It is based on the shaping by femtosecond or nanosecond laser pulses of metallic Ag nanoparticles within thin TiO₂ films and the triggering of self-organization mechanisms that lead to very regular periodic patterns controlled at the sub-wavelength scale. Here, we present the main physico-chemical mechanisms that contribute to the shaping of plasmonic films at the nanometer and micrometer scales and we show how such a laser technology allows engineering dichroic colors and reinventing multiple laser image printing with self-organized gratings and image multiplexing with up to three different images printed in the same set of pixels.



N. Sharma, N. Destouches et al.
Laser-Driven Plasmonic Gratings for Multiple Image Hiding. Mater. Horizons 6, 978 (2019).

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Instituto de Optica, Sala de Conferencias

Calle Serrano 121, Madrid

Información: Jan Siegel, Instituto de Optica, CSIC
Tel: 915616800 ext. 942332; email: j.siegel@csic.es