Symposium: C Laser-material interactions for tailoring future applications

Title: Customized diffraction response of metal surfaces nanostructured by laser interference

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Abstract (Max length 1500):

Production of surfaces with original and personalized visual color effects is one of the major challenges of our society. It has direct applications in the technologies requiring better methods of personal identification according with the quest of the enhanced police security. Laser interference by phase mask excimer irradiation is a versatile technique for the production of 1D and 2D patterned surfaces. When applied to metal films, the laser irradiation induces the periodic dewetting of the metal from the substrate resulting to the formation of nanoparticles. These nanostructures are optically characterized by their surface plasmon resonance that depends on the size, density and metal composition. Thus, optical contrast between the regions transformed into nanoparticles and non-transformed regions, and thus the diffraction efficiency of the surface, can be tuned. In this work we report the production of bimetallic, with different atomic ratio of Ag/Au, microstructured surfaces with different motives and periodicities in the range 6.3 microns to 1.7 microns. We will present experimental data showing that these regions have different diffraction patterns according with the periodic motive and the optical response of the nanoparticles. Thus, this technique allows a personalized optical signal to be encoded with a time-efficient and single-step laser technique.

X Oral presentation preferred

Poster presentation preferred

Will submit a paper? *

X Yes

No