

# NANOSCIENCE COLLOQUIUM

## Laser-induced periodic surface structures (LIPSS): 2D-Self-Organization of Surface Properties

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**Abstract:** Laser-induced periodic surface structures (LIPSS) are formed by a self-organization process triggered by the laser excitation of surfaces. This process causes a reorganization of surface atoms ending up in periodic surface structures like parallel lines or regularly arranged dot arrays. In addition to the relocalization of matter, also alteration of the surface-near composition of the material is observed. Examples of different surface patterns are presented. Potential uses of this technique range from the creation of colors on stainless steel, the generation of nanoparticle arrays of differently shaped nanoparticles, to the surface modification to significantly reduce friction in steel bearings, and finally the freeform generation of templates for carbon nanotubes (CNT) growth. The treatment of multilayer structures offers a further dimension of laser-mediated surface processing. Because there is no need for a reference beam like in holography and LIPSS formation is a maskless process this technique can be easily integrated into a wide variety of production processes.

