

Numerical simulation of the holes formation in thin metal films under femtosecond laser irradiation

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Investigated is the process of surface nanostructures formation due to femtosecond laser irradiation of the thin golden film, deposited on the thick glass substrate. Depending on adsorbed fluence, the unexpectedly rapid growth of the nanostructures diameter can be observed. Two-dimensional hydrodynamic model and code are presented for investigation of the underlying mechanism. Considered are the stages of propagation and spherisation of the arising shock wave, which lead to layer-by-layer delamination of the film from the substrate and form the holes. Estimates of the hole diameter are made. The data obtained correspond well with the experimental results.