Relaxed Optics: Present and Future

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Relaxed Optics (RO) is the chapter of modern physics of irreversible interactions light and matter [1,2]. It is based on the phenomenological kinetic classification of proper phenomena.

Basic effects of RO are caused of the processes of saturation of excitation of proper centers of the absorption of an irradiation. The model of cascade step-by-step excitation of these centers is represented and discussed. These effects may be have long-range and short-range action nature. First effects are caused phase transformations of "classical" types (thermal and plasmic); second - of "quantum" types (photokinetic).

A usage of this model is illustrated on the examples of the irreversible interaction of laser radiation with indium antimonide (two-dimensional lattice of sphalerite [2]) and silicon (phase diagram [3]). Two regimes of light scattering: on stable and unstable centers, are analyzed too.

This theory allow to explain the chain of possible phase transformations in laser-irradiated materials, including laser generation [1,2], transitions between various crystal phases [3], a chaotization of laser radiation [4], a creation of nanostructures [2], a destruction [1] and other.

Possible ways of the development of RO and a creation of new methods of this science are discussed too.

[1] Trokhimchuck P.P. Foundation of Relaxed Optics. - Lutsk: Vezha, 2006. - 294 p.

[2] Trokhimchuck P.P. Mathematical Foundations of the Knowledge. Polymetrical Doctrine. - Lutsk: Vezha, 2009. - 520 p. (In Ukrainian)

[3] Philips J.C. Metastable honeycomb model of laser annealing.//Journal of Applied Physics, No.12, Vol. 52, 1981. - P.7397-7402.

[4] Haken H. Laser light dynamics.Vol.2. - Amsterdam: North Holland Publishing Company, 1985. - 354 p.