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EXCIMER AND NITROGEN LASERS FOR TREATMENT OF MATERIALS

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The characteristic of excimer and nitrogen lasers designed specially to microprocessing of materials have been studied [1,2]. Properties common for radiation of both lasers have been noted. Both systems are pumped with transverse electric discharge. The construction of both lasers have been preceded by computations on computers using specially designed mathematical modelling [2,3]. The common characteristic of both theoretical models is composed by the description of the electric circuit allowing a guide ($>10^{11}$ A/s) electric discharge (pump) in laser gas.

The paper will contain some diagrams showing examples of energy-time characteristics of various micromachining applications of these lasers have been presented. Special attention has been given to the choice of applications proper to such important energies of quanta of the UV radiations ($E_{UV} > 3.5 \text{ eV}$) as well as nanosecond pulses with relatively high values of radiation density ($>10^8 \text{ W/cm}^2$). Different examples have been used to underline such advantages of microprocessing with excimer and nitrogen lasers like: minimum thermic impact in boundary zones (cold treatment), submicrometric resolving, a high efficiency in processing metal layers and plastics.

The complete microtreatment machine with a simple and cheap nitrogen laser [4] with microcomputer controller have also presented.

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