Diploma thesis abstract

# Study of properties of teraherz radiation generated by two-color femtosecond laser pulses under optical air breakdown

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In the study of intense laser-matter interaction considerable attention is paid to terahertz (THz) radiation generation in the laser induced plasma. This is due to both the understanding of the various physical processes, as well as with a large number of applications.

The influence of preliminary created plasma under focusing of two-color femtosecond laser radiation in air on the efficiency of THz radiation generation is studied. A significant decrease of THz signal by focusing the two-color radiation in preliminary created plasma in comparison with the case of focusing of the pump radiation in neutral gas is observed.

The dependence of the average power of THz radiation on different states of polarization of two-color radiation fields is also investigated. It is found that the maximum of THz signal averaged over the phase shift between the pump waves is observed when the pump pulses are both elliptically polarized. These results are in good agreement with the calculations based on the transient photocurrent model.

An experimental setup for measuring of the spatial distribution of the THz radiation intensity based on Golay cell is created. The distribution of the radiation intensity in the waist is obtained.

A created imaging setup based on interferometry method makes it possible to measure spatiotemporal distribution of electric field in THz pulse generated by two-color laser air optical breakdown plasma.