VIII International Conference on Ultrafast Optical Science
«UltrafastLight-2024»
Moscow, 2024

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Book of Abstracts

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Lebedev Physical Institute, Moscow

"UltrafastLight-2024" is the broad-scope, annual international symposium dedicated to the most important aspects of ultrafast phenomena in different fields of natural sciences and engineering.

The Conference topics:

1. Extreme light
2. Ultrafast phenomena in ionized gases, semiconductors and metals
3. Ultrafast laser micro- and nanotechnologies
4. Diamond photonics
5. Frequency combs in spectroscopy and optical clocks
6. Ultrafast optical technologies and nonlinear optical phenomena
7. Ultrafast laser technologies in biomedicine

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Section 1: Extreme light

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Scope

High intensity laser plasma interaction

Laser particle acceleration

Secondary processes with laser accelerated particle beams

Nuclear photonics & Compton sources

Ultrarelativistic field physics

Ultra-high intensity & high reprate laser facilities

Generation of terahertz radiation during relativistic interaction of laser radiation with a thin-layer liquid target

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Currently, studies of the generation of terahertz radiation during the interaction of relativistic intensity laser pulses with matter are actively underway [1]. Such interest is due to the lack of energy saturation effect in comparison with other sources of terahertz radiation [2]. In theory, this means that with an increase in the energy of the main pulse, at which the charge of the electron beam increases, we will be able to generate THz pulses of radiation with extremely high energies [3]. Within the framework of the scientific program of the National Center for Physics and Mathematics, work is underway to create a research complex "Multitera" on the basis of a pulse-periodic laser installation with a femtosecond pulse duration and an energy of ∼1 J. At this 20-terawatt laser installation, research will be carried out in the field of creating a THz radiation source based on relativistic laser-plasma interaction.

This paper presents the results of the study of the generation of THz radiation at 1 TW Ti:Sa laser system of the MSU with an experimental scheme similar to "Multitera" for the interaction of a relativistic intensity laser pulse with a thin-layer liquid target. The identity of the obtained characteristics of THz radiation inherent in the mechanism of coherent transient radiation was established, studied earlier in [4], where a lavsan film with a thickness of 16 μm was used as a target. Nevertheless, the thin-layer liquid target, in comparison with the film, has higher spatial stability, long continuous operation time, does not require protection of optical elements from contamination, and it becomes possible to change the thickness and shape of the target.

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