MEASUREMENTS OF THE ENERGY CONTENT IN THE FLUX OF THz RADIATION GENERATED At BEAM-PLASMA INTERACTION AT THE GOL-PET FACILITY [[1]](#footnote-1)\*)

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Generation of megawatt power fluxes of terahertz radiation is an important task for scientific research. Experimental studies of this matter are carried out at GOL-PET facility in BINP SB RAS [1]. Radiation generation is provided by high current relativistic electron beam (REB) relaxation in magnetized plasma. Main generation mechanism is based on the excitation of plasma oscillations by the electron beam and the subsequent transformation of these oscillations in electromagnetic radiation flux with a frequency correspond to the frequency of the upper-hybrid plasma oscillations [2]. During the research carrying out at GOL-PET facility, the conditions to generate radiation flux propagating along its axis with subsequent outgoing from the plasma end into vacuum and, further, radiation rotation by reflector at angle 90 degrees and its output into atmosphere thought the teflon output window have been revealed [3]. It turns out, that at a power level about 10 MW in radiation flux duration of the radiation pulse going out into the atmosphere is limited to 0.5 us by high frequency breakdown on vacuum surface of the output window (see [3]). Lengthen distance from reflector to output window and replace of the teflon window by window of polymethylpentene (TPX) achieved increase of the pulse duration in atmosphere up to 2 us at given power level [4].

In the experiment configuration with a new output window, a series of measurements of the energy content in the radiation flux was carried out using a calorimeter. The energy content in the flux at the exit from the window to the atmosphere was measured in two cases, when the distance between the reflector and the exit window was 30 and 180 cm. Moreover, additional measurements were made with a calorimeter connected directly to the vacuum tube through which the flux propagates to the exit window. In this report a detailed description of the carried out calorimetric measurements of the energy content in a radiation flux with a microsecond pulse duration will be present.

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References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Pt/ru/GX-Samtsov.docx) [↑](#footnote-ref-1)