

Investigation of the possibility of modeling the thermal effect of plasma on the Tokamak divertor using a frequency-pulse electron beam

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The problem of erosion of the tungsten lining of the Tokamak reactor vacuum chamber in contact with thermonuclear plasma is currently of serious interest. This problem is particularly acute in the area of the Tokamak divertor, where the greatest threat to the cladding elements is represented by intense pulsed thermal loads resulting from rapid transients in the hot plasma of the Tokamak. Thus, the study of tungsten erosion during cyclic pulse heating at a frequency of 10–20 Hz, with a cumulative number of heating pulses $\geq 10^7$, energy densities of $\sim 1 \text{ MJ/m}^2$, and a submillisecond duration of the heating pulse, is an actual scientific task. This paper describes an experimental stand based on a frequency-pulse source of an electron beam with an energy of 15–20 keV and a thermionic cathode for the study and simulation of a thermal pulsed load on tungsten from the plasma side.

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