Study OF THE SPECTRAL COMPOSITION OF Z-Pinch RADIATION OF FIBER-TUNGSTEN ArraY AT THE ANGARA-5-1 FACILITY [[1]](#footnote-1)\*)

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In experiments on the Angara-5-1 facility on current compression of nested fiber-tungsten arrays, the possibility of a significant increase in the peak power of a soft X-ray pulse (SXR) (in the range >100 eV) was shown as compared to a single tungsten (W) array of the same mass at the same level of discharge current [1]. In this case, it was found that there is a significant increase in the spectral power density of the Z-pinch radiation in the range of ~20-40 Å near the SXR maximum. In the figure, the spectrum of a single array is shown by curve 1, the spectrum of the nested array is shown by curve 2. The time profile of the SXR pulse is recorded by a set of vacuum X-ray diodes (XRD) [2] whose sensitivity in this range is low. To determine the increase in the peak power over the entire Z-pinch radiation range, taking into account the range of ~20-40 Å, a lavsan filter 2.3 μm thick was replaced in one of the four diodes with the same one, but 0.6 μm thick.

As can be seen from the figure, the spectral sensitivity of the XRD with such a filter (curve 3) in the specified range is many times greater than the sensitivity of the XRD with a 2.3 μm filter (curve 4). This will lead to a corresponding increase in the amplitude of the XRD signal behind a thin filter. In order for this diode to operate in a linear mode, the pinch radiation flux was attenuated by a “gray” filter, the transmission of which does not depend on the wavelength in this range [3]. A fine-mesh metal grid with a transmission of 0.1 was calculated and fabricated. The measurement of the time profile of the SXR pulse with a detector with a 0.6 µm filter during the implosion of nested fiber-tungsten arrays showed a threefold increase compared to a single assembly, which is significantly greater than the increase in the XRD signal with a 2.3 µm filter [1], and reflects a significant contribution to the SXR pulse of pinch of the fiber-tungsten array at the interval ~20-40 Å.

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References

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