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MINIMIZING LASER CHANNEL FOCUS SPOTS IN MULTI-PURPOSE RESEARCH COMPLEX IRRADIATION SYSTEM *)

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High-energy multi-pass laser facilities are designed to conduct experiments on irradiating targets with focused laser radiation. For given parameters of the focusing system, the size of the focal spot is determined by the wavefront (WF) aberrations acquired by the radiation as it propagates along the amplification and transportation path. Adaptive optics are used to correct WF distortions. The final part of the optical path of the facility is a "blind zone" for the standard WF registration system, which limits the possibilities of its correction. The second significant factor determining the WF correction capabilities is the limited spatial range of distortions compensated by the adaptive mirror.

The paper presents the results of measuring the aberrations of the amplification, final and diagnostic circuits of the facility. The value of the difference in aberrations of the final and diagnostic circuits for all channels of the MRC was determined, which in some cases exceeds 6 μm along the WF span. Taking into account the measured difference in aberrations in the operation of the WF correction system led to a significant decrease in the size of the focal spots.

The results of measuring the residual correction error of the WF caused by the limited spatial resolution of the adaptive mirror are presented. A method for correcting the residual correction error using a static WF corrector is proposed.

*) abstracts of this report in Russian