complex of colometric, interference and x-ray methods for icf shells control

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A set of techniques has been developed, the studies have been carried out, and the equipments for monitoring the shell parameters in visible, ultraviolet and x-ray radiation has been put forward. These shells can be used as the cores to create the multilayer, multi-shell targets for the presently existing and the future thermonuclear installations [1,2].

For preliminary control of thin ( 0.3-1)μm shells we have developed a new colorimetric method of estimating the shell thickness according to thi color of the shell examined for transparency .The method is calibrated by interferometric and x-ray measurements.

The method of non-destructive x-ray control is supplemented with the calibration destructive methods for measuring the wall thickness and the internal structure using the scanning electron microscopy without additional special lays [3,4].

It is generally accepted that the accuracy of the control and certification of the target and its individual components directly affects the interpretation of the experimental results [5].

We managed to overcome difficulties arising in the work with micro-objects.

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References

1. Gromov A.I., Merkuliev Yu. A. Diagnostic Laser Targets. // Laser Thermonuclear Targets and Superdurable Microballoons. Edited by A.I. Isakov, Nova Science Publishers, Inc., 1996, pр. 57-72.
2. N.G. Borisenko, A.I. Gromov, Yu.A. Merkuliev, Monitoring of super thin shells and low density targets for ICF. // Abstr of XXVI Zvenigorod conference .5-9 of April 1999..p 111.
3. A.I. Gromov, N.G. Borisenko, S.Yu. Guskov, Yu.A. Merkul’ev and A.V. Mitrofanov. Fabrication and monitoring of advanced low-density media for ICF targets// Laser and Particle Beams. 1999, vol 17, No 4, pp 661-670...
4. A.I. Gromov, Yu.A.Merkuliev, A.I.Nikitenko, S,M, Tolokonnikov. Densitigraphic of microradiographic images of targets for laser thermonuclear fusion.// Abstr of XXVII Zvenigorod conference.21-25 of Feb.2000, p 131
5. A.A.Akunets, I.V.Aleksandrova, L.A.Borisenko, N.G. Borisenko, A.I. Gromov, V.A. Davankov, E.I. Demihov, Е.R. Koresheva, E.A.Kostrov, Yu.A. Merkuliev et.al // Laser spherical targets in the projects of XXI century. Abstr of ХLII Zvenigorod conference.. 9-13 of Feb 2015. p147.