

SINGLE-PASS METHOD FOR RECONSTRUCTION OF EXTREME UV SPECTRA

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This work is devoted to the development of a method for the reconstruction of plasma extreme UV (EUV) spectra recorded by a three frame grazing incidence spectrograph (GIS-3D). The spectrograph provides registration of radiation reflected from the diffraction grating (DG) on a three-frame detector based on a microchannel plate with a scintillator screen and registration on a CCD camera, with an exposure time of one frame of $\hat{a}^{\frac{1}{4}}1.5$ ns [1]. DG has a gold-coated spherical concave form with a radius of curvature of 2 m and dimensions of $30 * 40 * 10$ mm². In this case, radiation is incident on the DG at a grazing angle of 2°, the DG period is 1.66 $\hat{I}^{\frac{1}{4}}$ m. The new single-pass method for the reconstruction of plasma EUV spectra was developed [2], which solves the inverse problem of decomposing experimental signals into separate contributions from each of the diffraction orders, followed by the reconstruction of the true plasma spectrum. Using the developed method, the possibility of finding a close approximation to the shape of a DG groove profile based on a priori information about the recorded spectra was demonstrated [2]. In order to test and demonstrate the efficiency of this method, several experimental EUV spectra obtained at the Z-pinch facility Angara-5-1 with a current of $\hat{a}^{\frac{1}{4}}3\hat{a}^{\text{€}}4$ MA through loads made of either tungsten wires or polypropylene fibers were reconstructed [2]. In addition, to test the single-pass method, the transmittance of EUV in cold aluminum was measured in the wavelength range of $3\hat{a}^{\text{€}}35$ nm, and it has a good match with the Henke database [2].

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 2. Skobliakov A. V., Kolesnikov D. S., Kantsyrev A. V., Golubev A. A., Rudskoi I. V., Gritsuk A. N., Grabovskii E. V., Mitrofanov K. N., Oleinik G. M. // Plasma Physics Reports 2023. V. 49. No. 6. P. 700.