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A high-precision method for attesting the shape parameters of large-sized polished flat optical products based on the calculation and analysis of the spectral density of the correlation function

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The paper considers the possibility of describing medium- and fine-structured inhomogeneities of the surface profiles of large-sized optical products using the two-dimensional spectral density of the correlation function (SPCF). A method for measuring the amplitude values of spatial inhomogeneities in a wide spectral range is proposed, based on the Parseval and Wiener-Khinchin theorem, using the algorithm of reducing the two-dimensional SPCF function to a one-dimensional form. This method makes it possible to compare the measured SPCF function with the theoretically calculated one and specified in the technical specification for the manufacture of an optical part, as well as to put forward requirements for control equipment. The article presents a mathematical description of the method of reducing a two-dimensional SPKF function to a one-dimensional form of the function and proposes an algorithm of software developed for the implementation of this method of reducing the SPKF function, and its approbation both on mathematical models of surfaces and on the results of experimental measurements.

Keywords: dynamic interferometry, surface roughness parameters, spectral density of the correlation function (Power Spectral Density), processing algorithm.

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