

Diffraction theory of binary amplitude and phase gratings with applications for Ronchi test.

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Abstract.

In this paper, diffraction properties of several gratings are considered on the basis of the Fourier physical theory. Binary gratings with unequal strip width are of particular interest, as well as the case of two interlaced gratings of the same period. Under scope are absorptive gratings, phase gratings, and mixed gratings. Some variants of binary gratings, as the so called Bi-Ronchi gratings (2D-gratings), are also discussed. In particular, phase gratings with absorption (mixed gratings) are also taken into account. The interferograms generated for this type of gratings are shown in this work. As examples, the patterns for a spherical mirror are obtained for different grating parameters and different values of primary aberrations. Some of the resulting relevant properties are remarked. Related experimental works from several structures of the gratings are shown. This study can be used not only for optical testing, but also for light gratings for particle diffraction or to describe diffraction effects of micro-gratings.

Keywords

Phase shifting; Ronchi test; Phase grating; Amplitude grating.