DIFFRACTIVE IMAGING WITH BIDIMENSIONAL ELEMENTS: FIRST EXPERIMENTAL RESULTS

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Pseudoscopic (inverted depth) images were only known from stereo photographic or holographic processes but only recently known in diffractive optics imaging. In a previous paper one of the authors analyzed the properties of the pseudoscopic image done under white-light illumination with two diffraction gratings [1], but could not be projected on a screen due to the difference between the longitudinal and lateral imaging processes, which performs astigmatically. This process was extended to bidimensional elements through double diffraction intermediated by a pinhole. This case can also be explained by its symmetry properties. One diffraction element directing light to the pinhole acts as a wavelength encoder of views while a second diffraction element decodes the projected image. The new image may have infinite magnification like the one done with diffraction gratings [2,3], and can be projected with equal lateral and longitudinal unitary magnifications. Images of this kind are interesting because could render larger parallax field than refractive or reflective optics, and constitute a new possibility to be studied for comparing its degree of aberrations with that of the conventional imaging systems.