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Erratum

Erratum to "Nonlinear refraction measurements of materials using the moiré deflectometry" [K. Jamshidi-Ghaleh, N. Mansour, Opt. Commun. 234 (2004) 419]

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ABSTRACT

This is an erratum to the paper [K. Jamshidi-Ghaleh, N. Mansour, Opt. Commun. 234 (2004) 419], in which a new method for measuring the nonlinear refractive index of materials using the moiré deflectometry is reported. The paper was published with an error in Eq. (4) and it has propagated through the paper.

We regret that an error in the Eq. (4) of [1] has propagated through the paper. In the previous paper [1], a new method proposed for measuring nonlinear refractive index of materials using the moiré deflectometry, which has been referred [2–5] or has been used for many times [6–11].

However, there is an error in the derivation of Eq. (4), in which due to this error all of the reported quantities by the proposed method are affected by a factor 2.

In this note all of parameters are similar to the parameters that appeared in [1].

In the parabolic approximation one can rewrite Eq. (2) of [1] in following form

$$I(r,z)\simeq I_0\frac{w_0^2}{w^2(z)}\left[1-\frac{2r^2}{w^2(z)}\right]. \tag{1}$$

Using this one in Eq. (1) of [1] we have

$$n\simeq n_0+\frac{n_2I_0w_0^2}{w^2(z)}-\frac{2n_2I_0w_0^2}{w^4(z)}r^2. \tag{2}$$

Then, using the transmission phase function of a positive thin lens, $-\frac{2\pi}{\lambda}\frac{r^2}{2f}$ [12], $I_0=2p_{in}/\pi w_0^2$, and Eq. (2), the corrected form of Eq. (4) of [1] is given by

$$f_{eff}(z)=\frac{\pi w^4(z)}{8dn_2p_{in}}=f_{eff}(0)\left(1+\frac{z^2}{z_0^2}\right)^2. \tag{3}$$

As a result, according to the assumptions of [1], corrected form of Eqs. (12) and (13) of the paper are given by:

$$n_{2,min}=\frac{\theta}{2z_t}\frac{f_2^2\pi w_0^4}{2dp_{in}z_0^2}\alpha_{min}, \tag{4}$$

$$\Delta n_{min}=\frac{\theta}{z_t}\frac{f_2^2w_0^2}{dz_0^2}\alpha_{min}. \tag{5}$$

Finally, according to the corrections, the measured parameters should be corrected. As a common comment on all of work were published in [2–11] similar corrections should be considered.

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