

# Selecting microrelief parameters of a diamond DOE based on the numerical analysis of local technological errors

V.S. Pavelyev<sup>1,2</sup>, D.L. Golovashkin<sup>1,2</sup>, V.V. Kononenko<sup>3</sup>, S.M. Pimenov<sup>3</sup>

<sup>1</sup> Image Processing Systems Institute of RAS;

<sup>2</sup> Samara State Aerospace University;

<sup>3</sup> Natural Science Center of the General Physics Institute of RAS

## *Abstract*

The work is devoted to the analysis of systematic technological errors arising during the production of diamond DOEs by way of direct laser ablation. The aim of this article is a numerical analysis (within the framework of the electromagnetic theory of diffraction gratings) of the influence of errors in the formed relief at the junctions of elementary structuring areas. The paper draws conclusions on the nature of the influence of technological errors on the operation of DOEs and formulates recommendations for minimizing energy losses associated with the presence of errors.

*Keywords:* diamond DOE, local technological error, laser ablation, diffraction grating, electromagnetic theory.

*Citation:* Pavelyev VS, Golovashkin DL, Kononenko VV, Pimenov SM. Selecting microrelief parameters of a diamond DOE based on the numerical analysis of local technological errors. *Computer Optics* 2002; 24: 81-83.

[Access full text \(in Russian\)](#)

## *References*

- [1] Kononenko VV, Konov VI, Pavelyev VS, Pimenov SM, Prokhorov AM, Soifer VA. Diamond diffractive optics for high-power CO<sub>2</sub> lasers. *Quantum Electronics* 1999; 26(1): 9-10.
- [2] Kononenko VV, Konov VI, Pimenov SM, Prokhorov AM, Pavelyev VS, Soifer VA. CVD diamond transmissive diffractive optics for CO<sub>2</sub> lasers. *New Diamond and Frontier Carbon Technology* 2000; 10: 97-107.
- [3] Pavelyev VS, Soifer VA, Kononenko VV, Konov VI, Pimenov SM, Prokhorov AM, Luedge B, Duparré M. Diamond focusators for far IR lasers. *Computer Optics* 2000; 20: 71-75.
- [4] Electromagnetic theory on gratings: Topics in current physics. Vol 22. New York: Springer-Verlag; 1980.
- [5] Pavelyev VS. Stochastic approach to the optimization of the quantized diffractive optical elements [In Russian]. *Izvestia of Samara Scientific Center of the Russian Academy of Sciences* 2002; 4(1): 61-67.