

Fast nanometer pattern generation by a new hybrid cutting process for generating discontinuous diffractive optics

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Diffractive optics, mostly fabricated in process chains consisting of many steps for making bulk products, have gained importance within the last decade. Nevertheless, there is no cost effective technique for generating customized diffractive optics like holograms for security applications, aspheric optical lenses with superimposed diffractive structure for reduced aberration or references in optical shop testing. The objective of this project is the development of a new hybrid precision diamond turning process for customized manufacture of diffractive structures on transparent or reflective substrates in a single step process. The basic idea is to combine a diamond turning process with a nanometer stroke fast tool servo (nFTS) with an extreme high bandwidth compared to conventional techniques for making structures with nanometer depth profile and to adapt the hologram calculation to this process. The main challenges are to set up the nFTS and its implementation into an ultraprecision turning lathe as well as to find algorithms for the calculation of the holographic pattern taking the diamond turned surface structure into account.

Projektbeteiligte

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