

Tender for a master thesis titled

Actively controlled precision adjustment of stamp and substrate in a UV-NIL process for the replication of diffractive optical elements with strong curvature

- work on the thesis can start immediately -

A technology for the replication of diffractive optical elements (DOEs) with strong curvature has been developed at the chair of micro and precision devices in cooperation with industry partners micro resist technology GmbH and NOB Nano Optics Berlin GmbH. DOEs disperse light according to its wavelength and are therefore mostly used in spectroscopy applications.

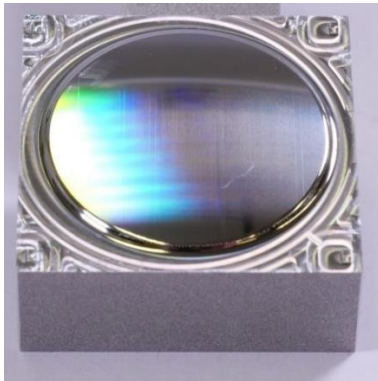


Figure 1: DOE with 30 mm width

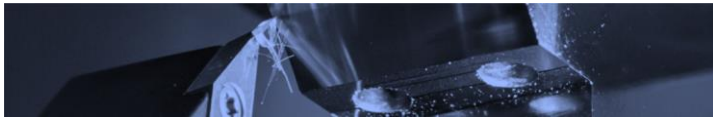
The adjustment of the mould halves in 6 degrees of freedom is to be realised via an industrial control process in this thesis. The existing Beckhoff environment of our industry-ready machine is to be expanded accordingly. The conditioning of signals produced by sensors to generate a control loop will be the core of this thesis. There are different approaches, they need further work in order to be integrated in a procedure for the adjustment.

Requirements:

- Signal conditioning of sensors
- Creation of a control loop for the adjustment of the mould halves
- Integration of the control
- Experiments to verify the precision of the adjustment
- Writing of an academic thesis with
 - problem identification
 - detailed explanation of the theoretical background
 - summary of the state of the art
 - frame of the aim of the thesis derived by the problem identification
 - methodical derivation of possibly solution strategies based on the aim of the thesis
 - documentation of carried out solution strategies
 - formation of results, conclusion and discussion (critical analysis of achieved results)
 - outlook



Figure 2: Interior of the machine with hexapod and linear axes



What we offer:

- intense cooperation (weekly or biweekly meetings)
- specific contents of the thesis can be discussed and decided upon
- working with industry tools → Beckhoff control environment
- well-equipped laboratory, many components are already available

Administration:

If you are interested send a mail to kastl@mfg.tu-berlin.de, ideally with an enrollment notice and a summary of your study results so far. Work can (but does not have to) start immediately.