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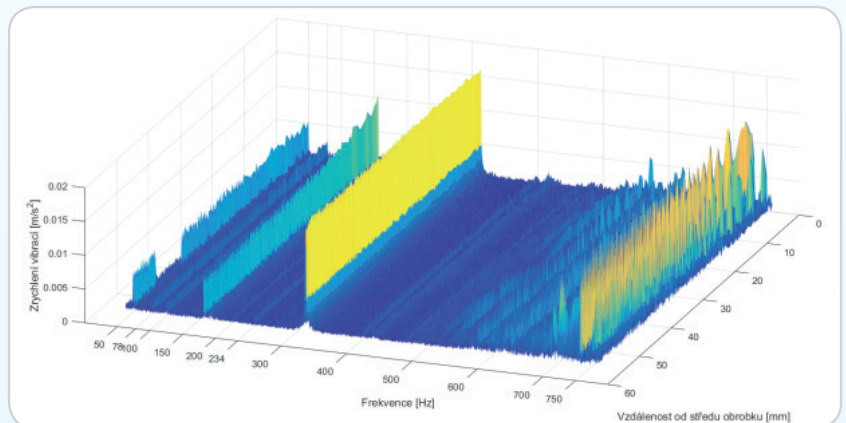
Project Title:

# Midfree – Technology Development for Mid-spatial Frequencies Origin Minimization and Elimination During Production of Aspheric and Free-form Optical Surfaces



The aim of the project is technology development for specific undesirable MSF structure suppression, based on a new type of tools whose design exploits the application of knowledge of material engineering in the field of elastic properties of construction materials. It also includes adjustments of kinematics and the CNC devices controlling systems used in the machining process, which will effectively eliminate unwanted structures. The project realization involves solving a series of tasks, which are elaborated on in detail in individual stages; namely:

- production chain model design, process frequency analysis, data analysis for CNC machine controlling, current tool properties analysis
- design and application of an engineering model for the prediction of problematic structure suppression
- development, production, and testing of tools with controlled material engineering properties
- transfer of the results into the technology of aspherical and free-form optical surface processing



The project is run in cooperation with Polpur s.r.o., which is a traditional Czech producer of polishing and abrasive tools for the processing of glass and crystalline materials with an extensive know-how in this field.

The main results of the Midfree project will be a Verified Technology consisting of grinding and polishing steps, leading to the suppression of MSF generated during the processing of aspherical optical surfaces. As part of this Verified Technology,

a Prototype of the elastic tool is expected to be developed. The findings gained during the project realization have been published in the literature on an ongoing basis:

- Prochaska Frantisek, Matousek Ondrej, Polak Jaroslav, Tomka David: *Aspherical polishing kinematics influences for surface structures formation*, Fine Mechanics and Optics. Vol. 62 - 4 (2017), p. 132-134 ISSN 0447-6441.
- Prochaska Frantisek, Matousek Ondrej, Tomka David, Spina Michal, Benes Jiri: *Characterization of materials viscoelastic properties for the polishing tools construction*, Fine Mechanics and Optics. Vol. 63 - 1 (2018), p. 14-16 ISSN 0447-6441.

