

The eye – our window to the world. It is said that 80% of information about the surrounding world is detected by means of our visual system. And how much do we know about the eye itself? We have a quite good knowledge on its optical system and its imperfections, called refractive errors; we are able to improve the individual's visual acuity by application of an appropriate refraction correction. We know still more and more about the mechanical properties of the eye; we keep on trying to develop new diagnostic methods, aimed to diagnose the ocular pathologies in their earliest possible stages in order to increase the efficiency of their treatments. Is it enough? Absolutely not, because the human eye is an infinite source of information about itself.

Recently, still more and more emphasis is put on the investigations of the dynamics of the processes ongoing within the eyeball. The dynamics of accommodation. The dynamics of pupillary light reflection. The dynamics of the rotational movement of the eyeball. Our project entitled „ *Complex analysis of inertial oscillatory movements of the crystalline lens* ” refers to the last issue: the functional dynamics of the changes which are take place in the anterior segment of the eye being a consequence of rotational movement of the whole eye.

Not many people know that the rotational movement of the eye, which is related to the rapid change of the visual gaze, is accompanied by a very fine, hardly noticeably movement of the crystalline lens: the wobbling. It is a inertial kind of movement, and has a meaning of damped oscillations. This movement is so rapid and its duration is so short, that is not even realized by our brain. Nevertheless, it has to be pointed out that the parameters of these movement can be the subject of the internal conditions prevailing the eye globe. The most natural and apparent of the conditions seems to be the intraocular pressure. The fact, that the relation between the wobbling parameters and the intraocular pressure has never been investigated, was the best motivation for us to start this project on closer analysis of the crystalline lens wobbling.

The researchers from the Faculty of Fundamental Problems of Technology at Wroclaw University of Science and Technology attempt to address these problems and answer the questions: whether the increased intraocular pressure influence the parameters of dynamical processes in anterior segment of the eye, and what is the contribution of these changes. In our research we use the cutting-edge non-invasive diagnostic devices used in ophthalmic practice, which includes optical tomographers, Scheimpflug camera, tonometers, pachymeters, and a custom-developed optical setup based on Purkynje imaging method. All these diagnostic procedures are the sources of biomedical data, which should give us an answer to the question, whether it is possible to measure the purely noninvasive way to measure the intraocular pressure, based only on the observations of the crystalline lens wobbling.