



School of Nano Science



IPM Condensed Matter &
Statistical Physics Group

Weekly Seminar

Dynamics and biomechanical properties of the eye structures and their application in ophthalmology

Invited Speaker:

Prof. Henryk Kasprzak

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Wrocław, Poland

Abstract:

Eye globe and eye structures undergoes continuous fast movements and deformations due to blinking, eye muscles activity and blood pulsation inside blood vessels of the eye. These movements and deformations play important role both in the eye refraction and in variability of optical properties of the eye. Deformations of different eye structures are highly correlated with quasiperiodical blood pulsation in the eye tissues. Response of the eye structures or the whole eye globe on different mechanical stimuli depends directly on biomechanical properties of the eye tissues. This effects are especially interesting and important in some diagnostic procedures in ophthalmology.

Blood pulsation directly influences pulsating variations of Intraocular Pressure (IOP) and respective eye expansions. Spectral analysis shows high coherence values between blood pulsation, measured by oximeter, ECG signal and displacements of the corneal surface. Response of the eye structures on IOP variations depends on biomechanical properties of the cornea and the sclera.

Usually one gives only single number representing value of IOP. However, due to IOP pulsation one can define amplitude of such pulsation and their spectral characteristics. Measurement of IOP and its pulsation is still a challenge in ophthalmic measurements. Since value of IOP is a very important data in ophthalmic diagnosis there are many different devices used in IOP examinations (tonometers). Modern tonometers are mostly based on air puff principles and measurements of the corneal response due to the fast air pulse. Tonometers can be also used for evaluation of viscoelastic properties of the anterior eye. Results of measurements by use of most modern tonometers (Pascal, ORA and Corvis) will be presented and discussed.

Wednesday, 5 Mehr 1396 (Sep . 27, 2017), 14:00-15:00

Seminar Room (classroom A), Farmanieh Building, IPM