

## ANNOTATION FOR UNDERGRADUATE THESIS

### **“TRANSFORMATION OF FEMTOSECOND PULSES IN PHOTONIC CRYSTAL FIBERS FOR MULTIPHOTON MICROSCOPY”**

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Biosensors are often used for researches of living tissues *in vivo*. They allow to investigate many environmental parameters by their absorption and radiation spectrums. Genetically encoded fluorescent sensor Sypher3s has appeared after a lot of developments in this area of science. It allows to investigate the acidity of the medium by a ratio metric method consisting in finding the absorption ratio of different spectral ranges. The found ratio is related with the pH of the medium.

The method considered in this work is as follows: the radiation of the popular ultrashort pulses generator on a Ti:Sapphire crystal transforms to satisfy the necessary for studies conditions. This laser is useful for our purposes, in particular, because it has the desired radiation spectral range determined by the two-photon excitation spectrum of Sypher3s sensor. The pulses propagate through the photonic crystal fiber for the nonlinear optic spectral broadening, which allows to receive continuum lying in the necessary for studies spectral ranges. So, it is possible to prepare the radiation, which has the temporal, spectral and spatial characteristics fully satisfying the requirements dictated by the measurement procedure.