Abstract:
Nonlinear optics is the area of high field optics, where the dependence of polarization of matter on the electric field of optical radiation cannot be considered as linear. This has important implications for practise, since the superposition principle is no longer valid in nonlinear optics. Thus it is possible to influence light, propagating through material, by another intensive radiation. Nonlinear optical phenomena are important especially for laser technology because they allow to generate light at different wavelengths using various interactions.
This thesis is focused on the study of the sum-frequency generation in the far ultraviolet (UV) region of the spectrum. As the radiation source the femtosecond laser system was used. The aim of the study was to theoretically describe generation by nonlinear wave equation and to calculate the dependence of phase-matching angle on generated wavelength. Theoretical results were then verified experimentally in the laboratory. Also the energy of generated pulses and sum-frequency generation efficiency were measured for pulses in spectral region 215-250 nm. The generated pulses will further serve to excite electron-hole pairs in the diamond.