

# Two – colour laser light scattering in laser – induced plasma diagnostics

## *Thesis abstract*

The thesis concerns results of the two – colour laser light scattering method development for laser – induced plasma diagnostics in gases. Presented spectra of the light scattered on plasma were registered using the setup containing a grating spectrometer and an ICCD camera or using the interferometric setup based on a Fabry – Pérot etalon. Furthermore, in the setup used for detection of light, an optical parametric amplifier was used, which resulted in significant increase of the signal to noise ratio. Collected spectra were analyzed using Rayleigh and Thomson scattering models and differential cross sections for scattering processes, both taken from the literature and calculated from first principles.

The developed experimental setup allows one to measure of electron concentration, its temperature, temperature of heavy particles (so called ion temperature) and concentration of atoms in ground state or in excited states. Based on performed plasma diagnostics, it was confirmed, that the plasma was not all the time in the local thermodynamic equilibrium state.