Diploma thesis abstract

Mid-infrared femtosecond pulse spectroscopy of molecular resonances in gas media.

The following work is dedicated to ellaboration of femtosecond mid-infrared pulse spectroscopy and termometry of gas media. Pulse spetrometry and termometry of gas media technique based on analysis of spectral and time-domain representations of probe pulse is proposed and tested on carbon dioxide. Numerical modelling of ultrashort infrared pulse propagation in carbon dioxide of atmospheric concentrtion was implemented as well as modelling of characterisation of this pulse based on Frequency Resolved Optical Gating (FROG) technique. It was shown that time profile of the resonant to ro-vibrational levels of linear gas molecule probe pulse retrieved by FROG reveals information about medium under investigation: lets one measure temperature of the medium, absorption spectrum, rotational constants and moments of inertia of gas molecule.

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