

Modified differential optical absorption spectroscopy system for low atmospheric components concentration measurements

V.I. Salin¹, S.A. Chernouss², I.A. Balashov³, A.V. Lukin⁴

¹*Unstitute of complex testing of optical –electronic devices, Sosnoviy Bor*

²*Polar Geophysical Institute of KSC RAS, Apatity*

³*Vavilov State Optical Institute, St._Petersburg*

Ground based differential optical absorption spectroscopy (DOAS) is under consideration. The main idea of the modification is in designing of simple and rather sensitive monitoring system that will be not expensive but good enough for practical using. The main idea is the same as proposed before by DOAS designers. The DOAS system consist of nonselective light transmitter and optical receiver units with several selective photo-detectors. Concentration of atmospheric gases or pollutants can be evaluated from the measurements of light beam attenuation in strong absorption spectral bands of atmospheric species.. Significant difference of the proposed system from mentioned DOAS systems is in using pulsed light source instead of Cw arc lamp. For this purpose can be employed Xe flash lamps that are used in lasers. Our calculations give the positive effect in sensitivity about 2-3 orders. Coupling of diffraction grating spectrometer and fiber optics wave guides can be used as photo-receiver unit. The system could be used in any settlements where atmospheric monitoring is needed. The most sophisticated observations of pollutants and atmospheric species are provided in UV spectral range. This ground based system could be used for calibration of remote sensing satellite data.