Identification of trinitrotoluene (TNT) in the far IR region using a parametric laser

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Abstract. Computational and experimental studies of the amplitude-time and spectroscopic characteristics of an IR parametric laser based on mercury thiogallate with frequency tuning in the range from 5 to 9 microns, an output energy of 10 MJ and a spectral emission width of ≤ 0,7 cm-1 have been carried out. A multifunctional IR parametric laser complex for remote detection and identification of atmospheric gases, including explosive and chemically aggressive substances in the range of electromagnetic wavelengths from 1,41–9,07 microns, by differential absorption and dispersing has been developed, created and tested. The paper presents the results of computational and experimental studies on remote determination of spectroscopic characteristics of the most famous explosives TNT, RDX, PETN. It shows the possibility of highly sensitive determination of the concentration (~1 ppm) of explosives using a multifunctional optical system based on an IR parametric laser.

Keywords: infrared parametric laser, explosives, differential absorption and dispersing, vibrational-rotational spectrum

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