

ANNOTATION FOR MASTER'S THESIS

"Quantum spectroscopy by means of waveguide source of spectrally entangled photon pairs"

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In the master's work, the features of the use of a waveguide source of spectrally entangled photon pairs in spectroscopy were investigated. Simulation and direct measurement of the correlation characteristics of the obtained non-classical states of light were carried out. It was shown that the generated states could be used to implement linear and nonlinear quantum spectroscopy. The conditions for the generation of spectrally entangled broadband two-photon states and strongly tuned frequency-correlated photon pairs were considered in detail. It has been shown that spectrally entangled states exhibit non-classical second-order interference effects, which depend on the joint spectral amplitude of a two-photon wave packet. So, it allows us to relate the observed interference patterns to the degree of spectral correlation. Test experiments on quantum linear absorption spectroscopy were carried out. Evaluation of the signal-to-noise ratio showed that the method is highly resistant to background radiation and can be used with low fluxes of photons, which eliminates the photodamage of photosensitive, for example, biological, samples.