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Use of femtosecond lasers to encode information

Sivni V.B., *Student*; Hnatenko O.S., *Teacher*
Kharkiv National University of Radio Electronics, Kharkiv, Ukraine

Today, the development of new information security devices is very relevant. High-speed transmission of information over long distances has given rise to the direction of quantum cryptography. Up to this point, there are a large number of methods and techniques of quantum cryptography: polarization encryption, phase encryption, based on entangled states, etc. This paper proposes a method of coding information by changing two interfering femtosecond pulses.There is no secret that using femtosecond lasers it is possible to get supercontinuum, which implies a set of discrete closely spaced spikes of radiation decomposed in the frequency domain. The encryption method consists of cutting out one or several discrete frequencies from the spectrum of the supercontinuum. This makes it possible to form the code first in binary, figure 1.

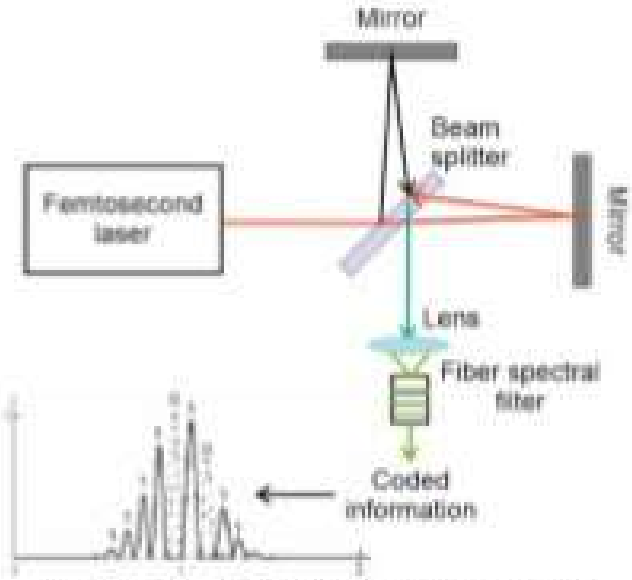

Figure 1 – Quantum information encoding device

For this, a Michelson interferometer is used. By changing the length of one of its shoulders, it changes the interference pattern, which makes it possible to control the spectral characteristic of the laser within small limits. After that, a set of narrow-band frequency filters "Bragg gratings" are used, which are applied directly in the core of the optical fiber. The result of the work is theoretical modeling of the information coding device using quantum effects. The creation of such a device will open up new opportunities for high-speed transmission of classified information over fiber-optic communication lines, as well as the development of THz laser technology.