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The invention relates to optoelectronics, in particular to fiber-optic alarm systems and unauthorized intervention localization methods, and can be used for protecting buildings and territories, chemical and radioactive waste storehouses, as well as military, industrial and other objects.

The fiber-optic alarm system comprises a multimode optical fiber, as a sensor fiber, one end of which is connected by means of a light beam injection device to a coherent light source, the other end of the fiber is connected by means of a CCD-receiver to a warning alarm shaping module, consisting of a computer, comprising a numerical differentiator of speckle image matrixes, an adder of the signal difference of two successively recorded speckle images and a comparator, connected in parallel to a warning alarm triggering level setting unit, at the same time the system is provided with a second optical fiber, as a reference fiber, one end of which is connected to the first fiber via an optical divider 50/50, the other end is connected via another CCD-receiver to the warning alarm shaping module.

The method for localization of unauthorized intrusion, implemented using the above-defined system, consists in pixel-by-pixel processing the speckle images from a remote field, comparing each current frame of the image captured by the CCD with the immediately preceding frame of the speckle image, is pixel-by-pixel calculated the difference between these two images, if the difference exceeds the predetermined level, a warning alarm is triggered, whereas in the sensor fiber is formed the distribution of propagation modes in the optical fiber, for which the output signal S_1 is directly proportional to the deformation force P and the distance from the fiber input end to the unauthorized access point L: $S_1=k_1PL$, where k_1 is the proportionality coefficient, in the reference fiber is formed the distribution of modes, for which the output signal S_2 depends only on the deformation force P: $S_2=k_2P$, where k_2 is the proportionality coefficient, the comparator shapes a warning alarm U as the ratio of two values S_1 and S_2: $U=S_1/S_2=kL$, where k is the proportionality coefficient, $k=k_1/k_2$, and is determined the intrusion place from the relation: $L=U\cdot k^{-1}$, displaying the intrusion location on the screen relative to the input end of the fiber-optic input.

Claims: 2
Fig.: 6