As it follows from the figure the mean contrast of the speckle pattern for the second filter decreases essentially quickly. It has been noted, that in the first approximation the relationship of contrast from coordinate may be presented as linear one. Thus, derivation from the mean contrast changes may be considered as some parameter, which characterizes a spectral range of illuminating radiation.

Thus, one can state, that space distribution of mean contrast of the speckle-field, its changes in dependence on the space from the center of speckle-pattern to the observation point gives us complete information about spectral range of radiation, illuminating the scattering object. Obviously this statement is true, at least, when quasimonochromatic approximation is satisfied.

Ivanchuk M.A.

STATISTICAL ANALYSIS OF THE CONTINGENCY TABLES IN MEDICAL RESEARCHES

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Sometimes in medical research there are situations when the result of research cannot be described numerically, they can only be said whether symptoms are present or not. In this case, the results are presented in the form of contingency tables. It is a special type of frequency distribution table, where two variables are shown simultaneously. Contingency tableindicates the number of persons in each experimental group who have or do not have the symptom. In this case, for statistical analysis of medical research results the use of Pearson $\chi 2$ test,Fisher's exact test, odds ratio, relative risk or McNemar testare recommended. Each test has its advantages and disadvantages, and the choice of test depends on the task.

The Pearson criterion χ^2can be used for both 2×2 and larger tables. When analyzing 2x2 tables, the value in each cell should not be less than 10. If at least one cell has a value less than 5, use Fisher exact test.Fisher's exact test is used to compare small samples. It can be used in cases where the cells in table 2x2 contain zero values, that is, if the test characteristic did not occur in one of the groups or, conversely, was present in all patients in one of the groups.The odds ratio is an estimation ofarelative risk in case-control studies. Odds ratio is one of the main ways to numerically describe how the absence or presence of a particular trait is related to the presence of the factor under study in the statistical group. It is used only for case-control comparisons.Relative risk is used to determine the risk of some sign in patients who are exposed to the risk factor relative to the control group. McNemar test is used to compare dependent samples (for example before-after treatment).

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CdTe-BASED X / γ-RADIATION DETECTORS OF SPECTROMETRIC TYPE

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Increasing the number of areas of practical use of high-energy radiation in medicine and other areas, strengthening the requirements for the safety of such radiation for both patients and medical staff – all this raises the question of improving the spectrometric and dosimetric characteristics of X- and γ-radiation detectors. Modern radiology requires X-ray and gamma-ray detectors that can detect not only the presence of radiation, but also determine the energy of its quantum andintensity. The efficiency of converting the absorbed energy into a useful electrical signal for semiconductor detectors of high-energy radiation depends on such factors as dark current through the structure, lifetime of charge carriers, carrier mobility, and the time of charge carrier collection.

Dark current is influenced by both the mechanism of charge transfer through the structure and, in fact, by the resistivity of the bulk part of the single crystal. To ensure the energy resolution of a semiconductor detector of high-energy quanta of electromagnetic energy, it is necessary to achieve the highest possible signal-to-noise ratio. The number of generated electron-hole pairs during the absorption of one high-energy quantum is determined by the probability of its absorption by chemical elements that are a part of a chemical compound of the single crystal - the so-called ionization energy of the electron-hole pair - is a useful signal. Dark current of the detector is noise for such a system. Most efforts to increase the signal-to-noise ratio are aimed at reducing dark current, because increasing the useful component of the signal requires a change in the material of the base single crystals.One of the ways to reduce dark current of the structure is to increase the resistivity of the material, which is achieved by the technology of obtaining single crystals (the presence of its own defects in the crystal lattice, the method and depth of doping). Another way is to choose the mode of operation of the device, which is determined by the technology and nature of electrical contacts of the studied structures. The technology of creating electrical contacts determines their type and mechanisms of current transfer through the structure, which, together with the technology of obtaining single crystals, affecting the value of their resistivity, changes dark current of the structure. The main material for semiconductor detectors of X- / γ-radiation with an extended range of quantum energy (up to ~ 1 MeV and above) in comparison with silicon detectors is CdTe and solid solutions based on it. The first reason for this is that the band gap Eg of cadmium telluride is sufficient to use detectors at room temperature without significant thermal generation of carriers. The second reason is high density of the compound and a large atomic number of its elements providing conditions for effective detection of X / γ radiation. Finally, high radiation resistance of broadband II – VI compounds, compared to other commercially available semiconductors (Ge, Si, III – V compounds), allows the operation of devices based on them in conditions of harsh irradiation. CdTe-based solid solutions are one way to improve spectral resolution.Significant progress has been made in the production of detectors based on semi-insulating CdTe single crystals with good spectrometric properties in the form of diodes with p-i-n structure and Schottky diodes. However, high-energy resolution radiation detectors based on cadmium telluride with Schottky contacts show instability with long-term application of bias voltage due to the phenomenon of polarization. The stability of functional parameters is a critical factor for the practical application of electronic devices. The ability to form metal-semiconductor contacts with the desired properties (ohmic or blocking contacts) is a key requirement in the manufacture of cadmium-based detectors. That is a reason of great practical importance in the development of new technologies for the manufacture of high quality electrical contacts.

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EXTRACTOR FOR THESTEM OF ARTIFICIAL JOINT

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In case of shaking of an artificial femoral joint, or in case of occurrence of a bone crack in a place of installation of an artificial joint there is a necessity of its full replacement. For this operation it is necessary to have a convenient, easily installed clamp that covers the neck of the endoprosthesis' leg and allows you to quickly remove the hinge.

Existing devices are imperfect, require the use of auxiliary tools to install and fix the device, which covers the neck of the endoprosthesis' leg in the landing area of the endoprosthesis' ball of the femoral joint. This requires additional operating space, as the socket wrench has its large physical dimensions and is directed coaxially with the axis of the cone, which does not coincide with the main axis of the endoprosthesis of the artificial hip joint, and therefore with the axis of the main tool rod.

Such designs create certain inconveniences associated with the use of auxiliary tools and the possibility of failure of the device from the cone during extraction, and consist of many sufficiently small tool parts, and if any of them is lost, it can't be used functionally any more. Some of them are quite complex to be made and expensive.

To eliminate these shortcomings and their negative impact, an extractor for the leg of the artificial hip joint was developed, which is represented in the figure. It is known that the neck of the endoprosthesis of the artificial hip joint has a diameter of 13 mm, and the cones under the ball part