One of many dual-modal imaging agent are magnetic QDs. As is well-known four different architectures of magnetic QDs that have been reported to date (Fig.) Each of which synthesized using a wet chemical procedure, in which the magnetic core is synthesized prior to the attachment of the semiconductor material.Moreover, types of combination both materials give us possibilities a number of ways for changing different properties of magnetic QD.

Galushko K.S.

POYNTING VECTOR COMPONENTS OF QUASIMONOCHROMATIC FIELD

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The study of the angular momentum, energy currents, which create it in the polychromatic waves, are on the first stage. At the same time, such an investigation has quite good perspectives, first of all, in fundamental aspects. One of them is related with the statement, that the value of angular momentum must be connected with the coherence characteristics of a polychromatic wave. The existence of such relationship is obvious. As it is known the angular momentum may be separated into orbital and spin part. At least, this statement follows from the fact, that the spin angular momentum is defined by the determinate circulation of the field vector. Naturally, the "level of such determinancy" must be connected with coherency.

Let us consider the quasimonochromatic wave, which is additionally obeyed the paraxial approximation.

Correspondingly, under this assumption, the instantaneous Poynting vector may be derived similarly to one of strongly coherent case: A_i, Φ_i are interpreted according to Eq. (1), A_i^l, Φ_i^l – partial derivatives of $A_i(t)$ and $\Phi_i(t)$, $i,l = x,y$.

It can be rather easily illustrated, that under our assumptions the following expressions as the "base" of averaging procedure take place

Thus it can be stated that the notation of averaged Poynting components of quasichromatic wave is the same for strongly monochromatic wave with corresponding determinate parameters.

The terms in the square brackets of the 1-st and 2-nd equations can be called as structure or orbital transversal part of field energy density. Just these terms, in coherent case, are responsible for appearance of orbital momentum in the area of vortex (scalar field) or C-point, point of circular polarization, in inhomogeneously polarized field.

The last terms in the expressions of transversal components causes of spin energy currents, which define the spin angular momentum of the field.

Correspondingly, if one takes into account, that angular momentum density is defined as follows: one can state that for polychromatic beam (similarly to coherent case), at least, for the wave with narrow spectrum and when paraxial approximation is satisfied, the total angular momentum may be divided on the orbital and spin parts.

Gutsul O.V.

INFLUENCE OF INFRASONIC OSCILLATIONS ON LIQUID FLOW IN CAPILLARIES

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To study the effect of infrasonic oscillations on the flow rate of liquids with different electrical conductivity, we designed a hydromechanical generator of infrasonic periodic oscillations with the ability to smoothly adjust the amplitude and period of oscillations in the range of 0,5–50 sec. The process of fluid flow in the capillary was studied by the electrode method on a computerized installation described in.

During the experiment, the dependence of *I(t)* at *U=const* was measured using digital voltammeters B7-21, which were connected to the computer via interface adapters, and the compiled program allowed to observe the graphical time dependences of the experimental $I = f_1(t)$ and computational $1/I = f_2(t)$ functions at $U = const$.

The results of studies of the influence of infrasound on the process of fluid boundary flow in the capillary are shown in Fig.

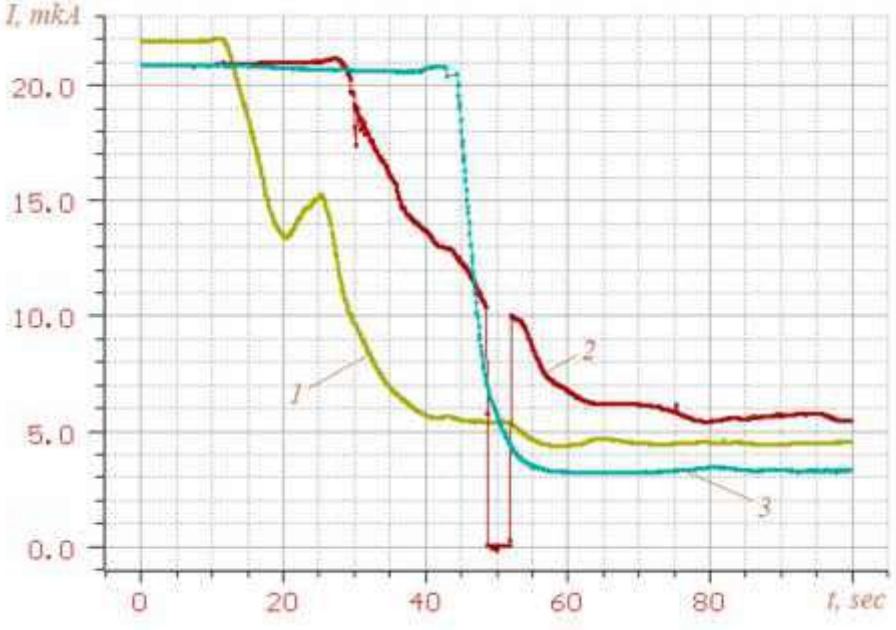

Fig. Time dependences of the electric current I (t) through the liquid in the capillary during the flow of the boundary of liquids with different given concentrations of ions: 1 - in the presence of resonance of infrasonic oscillations with the capillary; 2 - in the absence of resonance; 3 - in the absence of infrasonic oscillations.

Infrasonic oscillations lead to a decrease in the velocity of fluid in the capillaries. When approaching the resonance of infrasonic oscillations with the capillary, there is a short-term rupture of the fluid boundary or even a change in the direction of fluid flow in the capillary.

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STATISTICAL ANALYSIS OF MEDICAL-PSYCHOLOGICAL RESEARCH

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One of the features of psychological research is the process of measuring the results of the experiment. Unlike medical research, which typically uses physical units of measurement, most variables in psychological research are not unambiguous or easy to measure. To describe the procedures of psychological measurement in psychological research four types of measurement scales are used: nominative, ordinal, interval, and scale of equal relations. Statistical analysis of the results of medical and psychological research depends on the type of scale in which the studied trait was measured.

The nominative scale is a scale that classifies by name. Conjugacy tables are used to describe and analyze nominative scales. An ordinal scale is a scale that classifies on the principle of "more or less". Statistical analysis of ordinal scales is performed using non-parametric criteria. The interval scale is a scale according to which each of the possible values of the feature is at the same distance from the other value. The scale of equal relations has all the properties of nominative, ordinal, and interval scales. To analyze the results of the study, which were measured in interval scales or in scales of equal relations, one uses parametric or nonparametric criteria depending on the distribution of a random variable.

Correct application of statistical analysis is the key to obtaining reliable results of medical and psychological research.