Possibilities of using electrons Bose-condensate measurements in the environmental health risk monitoring system

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Abstract. The paper considers the possibility of using superconducting quantum potential and gravity detectors to monitor electron Bose condensate in the environment, which is the main factor of environmental influence on the body homeostatic regulation, determining the levels of morbidity and mortality. It is shown that gravimetric measurements using superconducting detectors with non-local sensitivity to the electronic component of the environment can provide the sensitivity and spatial coverage required for creating a system for monitoring public health risks with respect to the background of electrons Bose-condensate.

1. Introduction
The human body is in continuous electronic exchange interaction with the environment, maintaining the state of the associated water phase at a certain level [1]. The possibilities of maintaining the electronic disequilibrium of an organism are determined by its electron-acceptor ability and depend on the state of the natural background of the electron Bose-condensates, the presence of which is justified by R. F. Avramenko [2]. The physical state of the electron Bose-condensate and its properties are determined by the effects of electron delocalization, and in relation to water structures – by the properties of high-temperature superconductivity of the associated water phase [1], one of the physical manifestations of which is antigravity. According to the theoretical provisions of D. Fiscalletti [3, 4], the gravitational component of the electron Bose-condensate determines the space-temporal variety of deep processes occurring in the environment. Considering the noted internal relationship between gravity and the intensity of delocalized electrons (quantum potential [5]), it is possible to compare the results of measurements of gravity and quantum potential with each other in relation to the processes occurring in the environment.

2. Methods
An electron Bose-condensate detector has been developed for measuring the quantum potential. The detector is based on the superconductivity of nitrogen-vacancy NV⁻ centres in diamond. It allows measuring the spectral components of quantum fluctuations in the electron Bose-condensate background in the environment and non-local diagnosing the quantum-coupled objects quantum state in the environment, including:

- non-local control of the quantum state of water treatment processes,
- non-local activation of quantum-coupled objects (drinking water),
- the electronic component systems states of the human and animal body.
Moreover, it allows solving scientific problems of studying non-local interaction and monitoring the background of an electron Bose-condensate in the environment (Fig. 1) [1].

**Figure 1.** Diagram of an electron Bose-condensate sensor connected to 1 input (antenna device) of ZET 410 preamplifier: 1 – microgranules of technical diamond with saturation of vacancy NV defects ensuring the maintenance of a high-temperature superconducting state, 2 – sensor space filled with graphite powder forming normal conductivity (current conversion of delocalized electrons), 3 – collector electrode, 4 – water vessel (sensor).

The diamond-graphite sensor is compressed into a sealed cylindrical polymer container. Poynting vectors ($\mathbf{S}$) of the diamond and water sensors are collinear (orientational mutual influence of interacting spin states of chains of water associates and spin glass from NV centres).

The input signal from a passive sensor (diamond-graphite) is fed to a differential amplifier with a switchable gain ($SG = 100 / 1000$) (Table 1). From the output of the amplifier, the output signal goes to the input of ADC/DAC modules (for example, ZET 210). The ADC signal is converted (fast Fourier transform) and processed by software in accordance with the ZetLab software product.

| Parameter                          | Value                        |
|-----------------------------------|------------------------------|
| Number of channels                | 2                            |
| The volume of the diamond-graphite composition, $\text{cm}^3$ | 0.65                         |
| Analog input type                 | differential                 |
| Bandwidth, -3 dB                  | 0…20 kHz                    |
| Input current range               | $\pm 0.1$-$10\mu$A           |
| Nominal input impedance of the amplifier | 1 $\text{M}\Omega$          |
| Switchable gain (SG)              | 100 / 1000                   |
| Self-noise level at GF 1000       | -73 dB                       |
| Inter-channel penetration         | $< -72$ dB                   |
| Output load capacity              | $< 20$ mA                    |
| Analog output type                | Asymmetrical (with common «ground») |
| Bandwidth, at -3 dB               | 0…100 kHz (limitation of recording equipment) |
Quantum potential detectors based on superconductivity of nitrogen-vacancy NV centres are capable of non-local interaction with an electron Bose-condensate, which provides the possibility for their potential use in a system for monitoring the natural background of an electron Bose-condensate, which affects morbidity [1]. In this regard, it is advisable to compare the possibilities of measuring gravity in systems for monitoring geophysical processes, which are also carried out using superconducting sensors.

3. Results
Superconducting gravimeters (SG) are currently used in a variety of geophysical applications. SG allow identifying the redistribution of groundwater, which significantly changes the gravitational field. In particular, the gravimeter records the water redistribution in the ground, most of which occurs in the unsaturated zone located above the gravimeter [6]. Under intense surface precipitation, gravity decreases within a radius of about 400 m around the instrument (due to nonlocality of electron interaction) [7].

Similar processes of gravity reduction are recorded in areas prone to seismic activity [8]. Atmospheric manifestations accompanying strong earthquakes in the form of variations in atmospheric pressure and acoustic-gravity waves [9] reflect a single electronic mechanism of self-organized movement of electrically active air flows [10], which is the basis of the lithospheric-atmospheric phenomena [11]. SG are also powerful tools for monitoring and studying active volcanoes and can provide unique information about the processes that cause volcanic activity, allowing significant changes detection in the delocalized electrons flux with antigravity properties [12].

After earthquakes, there are psychosomatic conditions, a decrease in resistance to infectious diseases, an increase in the influenza incidence and other acute respiratory viral infections, exacerbating in the short term for about 2-3 months [13, 14]. In the dynamics of morbidity in earthquake areas, there are periods of its strengthening and weakening. Thus, after the main earthquake, there is a sharp increase in the number of patients with hypertensive crises, strokes, and myocardial infarction [15], which is obviously a consequence of the electron Bose-condensate dynamic processes, also recorded by changes in gravity. In favour of such an interpretation, one should also consider temporary changes in exacerbations of cardiovascular system not only on the day of a seismic event (0) manifestation, but also 3 days before and 3 days after it, which characterizes these biological responses as non-local (leading and delayed) reaction to the impact characteristic of electron Bose-condensate macroscopic systems [16]. An increase in the risk of mortality occurs also in stagnant anticyclonic phenomena [17], when electron-deficient states of the atmosphere and lithosphere are observed, associated with non-local flow of the electronic component into the zones of cyclonic activity manifestation and with artificial influence on the electronic component of the environment in the processes of ionospheric plasma excitation [1]. The relationship between gravitational anomalies and the population health, revealed as a result of numerous studies, allows us to consider them as possible candidates (together with a quantum potential sensor) in health risk monitoring systems.

4. Conclusion
Measurements of quantum potential, as well as gravity, carried out using superconducting sensors, create potential opportunities for their use in public health risk monitoring systems, which provides spatial (regional) identification of the main geophysical factor affecting the electronic deficiency incidence of the environment. In the context of the relationship between morbidity and geophysical anomalies, the founder of heliobiology Chizhevsky A.L. summarized the material on the relationship between solar activity and epidemics, mortality from various diseases, the frequency of exacerbations of nervous diseases, etc. [18]. Chizhevsky A. L. identified these interdependencies based on statistical data, and recent studies have established causal relationships between morbidity and mortality with changes in the background of electron Bose-condensate [1]. Obviously, the COVID-19 pandemic is not exception in this series, since the distribution of the mortality rate from this virus across the world [19] reflects regional changes in the background of electron Bose-condensate, which is more likely due to non-local (in the Western direction) electron-acceptor influence of monopolar charge installations operating in some countries of the Arabian Peninsula.
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