# Research activities in Russan Federation for non-ionizing radiation health

## *Annual report of Russian National Committee on Non-Ionizing Radiation Protection for the WHO International EMF Project (2018/2019)*

THE PRINCIPAL ELECTROMAGNETIC SAFETY, RADIOBIOLOGY AND EMF HYGIENE RESEARCHES

Prof. **Zhavoronkov** (Medical Radiological Center, Obninsk), conducts an experimental study of the repeated and chronic effects of non-thermal electromagnetic fields on behavior, performance, cognitive functions of the brain and reproductive functions of animals. It uses 1.8 GHz radiation and broadband radiation from several generators.

Professor **Nikitina** (Northwestern Scientific Center for Hygiene and Public Health, Petersburg) conduct a study of electromagnetic fields created by means of maritime radio communications and radar on modern civilian ships. Nikitina and her colleagues perform predictive prediction of radio frequency electromagnetic fields on open decks. Continued studies of the electromagnetic environment in the workplace with a PC. The purpose of the study was to measure and evaluate the EMF generated by the internal antennas of mobile communications, DECT radio communications, and test laboratory antennas used in checking modems.

The State Surveillance Service for Sanitary and Epidemiological Well-being analyzes methodological documents on the determination of EMF levels generated by antennas by digital television and radio broadcasting, mobile radio base stations, and other radiating equipment whose antennas create EMF in the environment.

Professor **Spodobaev** and colleagues (Radio Institute, Samara) analyze the state of electromagnetic safety of telecommunication systems.

Dr. **Nikitina** and professor **Pokhodzey** researches effects of a weakened geomagnetic field on health. Professor **Gurfinkel** and colleagues (Moscow University) simulate magnetic storms on the cardiovascular system.

Prof **Lukyanova** (Federal Medical-Biological Agency, Moscow) explores the neurophysiological mechanism of action of weak constant magnetic and electromagnetic fields — which way (directly or reflexively) do EMI act on the brain tissue; which of the main nervous processes (inhibition or activation) dominates in the CNS reaction.

Dr. **Mordachev** (Minsk Communications Institute, Minsk, Belarus) has developed a new concept for assessing the electromagnetic environment. A technique for estimating the level of the electromagnetic background created by wireless information services for the population is proposed. This technique is based on the forecast of the total traffic terrestrial density created by these systems, which is connected with the level of electromagnetic loading on territory in observation point vicinity; the quality of intranetwork electromagnetic compatibility, the radiochannels spectral efficiency and degree of development of their infrastructure are also taken into account.

Dr. Oleg **Grigoriev** and colleagues (Center for Electromagnetic Safety, Moscow) are developing a database of bioeffects of physical factors of a non-ionizing electromagnetic nature. The purpose of this work is to create a system for predicting the biomedical effects of physical factors of a non-ionizing electromagnetic nature, including new technologies, based on the extrapolation of a data array.

The joint research of the **Center for Electromagnetic Safety** and the **Center for Strategic Planning of the Ministry of Health** is dedicated to criteria for the assessment of an electromagnetic situation near power lines. Settlement modeling has been executed and the actual data is characterizing a condition of the electric and magnetic field in the territory near power lines of 500 kV and 220 kV.

The research of the impact of the power-frequency magnetic eld from power lines in the apartments on the example of the building under construction located at distance of 60 m from the power line of 500 kV is reported (Dr. **Procofieva**). Values of the magnetic flux density at the borders of sanitary-protective zones of power lines were shown to meet Russian sanitary limits. At the same time outside this zone to the adjacent residential areas, there was the excess in the performance of the magnetic flux density according to the recommended by the IARC Monograph.

Dr. **Goshin** conducts studies of the electromagnetic environment in the clinics of the Ministry of Health, the results will be published next year.

A historical review of the first phase of research on the biological effects of electric current and electromagnetism was completed this year (Dr. Oleg **Grigoriev**, Dr. Victoria **Alekseeva**). The first studies of the biological effects of electromagnetism in Russia began in the mid-19th century. Early researchers (Professor Danilevsky, Dr. Kostin) focused on the response of the nervous system to electromagnetic radiation.

The All-Russian **Conference** "Actual problems of radiobiology and hygiene of non-ionizing radiation" will be held November 12-13, 2019 in Moscow www.bioEMF.ru. The conference organize by the Russian Academy of Sciences, the Scientific Council on Radiobiology and the Russian National Committee on Non-ionizing Radiation Protection (RusCNIRP). It is planned to discuss the prospects for the development of research in radiobiology and hygiene of non-ionizing radiation. This is the 30th conference devoted to the research of biomedical effects of the electromagnetic field, which has been held in Russia since 1935.

Electromagnetic safety for children in the use of new technologies in education was discussed in the Parliament, in the Public Chamber, in the commission of the Commissioner for Children's Rights under the **President**. The discussion showed great attention of society, parents and teachers to the electromagnetic safety of children.

The Academy of Sciences has developed a research program to ensure child-friendly digital technologies in education (Professor **Kuchma**, Institute of Hygiene and Child and Adolescent Health). Electromagnetic safety of children using new technologies will be explored in this program.

The Russian National Committee on Non-Ionizing Radiation Protection has nominated the RF EMF for the **IARC** perspective monographs plan. Dr. Oleg **Grigoriev** participated in the **Advisory Group** to Recommend Priorities for IARC Monographs during 2020-2024.

RusCNIRP has created the instruction for parents «**UV Sun Safety and Health**» and published it on the web-page, on social nets and on the web of Consul under the Commissioner for Children's Rights under the President.

## PRINCIPAL PAPERS AND MONOGRAPH 2018/2019

"**Criteria for Microwave Damage**". Professor **Zhavoronkov** and Professor **Petin**. Monograph. Moscow, 2018.

This monograph contains new experimental data on the peculiarities of the action of microwaves at the molecular, cellular and organism levels. The authors discuss data on the effects of the electromagnetic field of mobile communications on human health. They concluded that it was necessary to introduce electromagnetic safety limits for children and adolescents.

"**Mobile Phone and Health**". Professor **Zubarev**. Monograph. Moscow, 2019.

The monograph analyzes the use of electromagnetic fields in radio communication systems, particularly in mobile communications, where the main parameter of the system is the quality of communication. The quality of the mobile communication system depends on the power of the emitted signal, which is harmful for the human body during prolonged use of a mobile phone. The author has developed a safety note when using a mobile phone.

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