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**EQUIPMENT AND TECHNOLOGIES OF LOW INTENSITY  
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Ukraine, <sup>2)</sup>Center of Family Medicine «Adonis-O», Kyiv, Ukraine<sup>3)</sup>National O.Bogomolets medical university, Kyiv, Ukraine  
OP291@meta.ua**АПАРАТУРА ТА ТЕХНОЛОГІЇ НИЗЬКОІНТЕНСИВОЇ МІЛІМЕТРОВОЇ  
ТЕРАПІЇ****Яненко О. П.<sup>1)</sup>, д.т.н., професор, Пeregудов С. М.<sup>1)</sup>, Федотова І. В.<sup>2)</sup>,  
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Millimeter wave signals are widely used in biology and medicine at the last 20-30 years with the advent of electronic devices generating this range. The first experiments on the effects of mm-signals in living organisms are carried out using standard test generator G4-141, G4-142 in the frequency range from 37.5 to 78.33 GHz. Detection of positive changes in the body of experimental animals under the influence of mm-radiation caused expanding of the research in the human body.

The largest contribution to this research, and the development and implementation of medical equipment and treatment technologies with mm-signals made teams led by Academician Devyatkov N.D. (Moscow) and Prof. S.P. Sit'ko (Kyiv). Directions of researches conducted by these groups have focused on determining the parameters of mm-signals for therapeutic intervention on the patients and the list of diseases and their treatment technology. As a result, the first specialized medical devices for mm-range therapy (*synonym*: millimeter wave therapy; millimeter therapy) «ЯВЬ» («Yav») and «Поріг-1» («Porig-1») and appropriate technologies for their use in medical practice were created. However, the parameters of these devices (signal type, operating frequency, output power) significantly differed among themselves, and therefore have differences, and even in the names of treatment technologies. So the technologies developed by Kyiv specialists combined with name – Quantum medicine because they use extremely

<sup>1</sup> Електронний варіант статті: <http://radar.kpi.ua/index.php/radiotechnique/article/view/951>

low power as noise so harmonic signals [1].

The authors attempt a joint analysis of hardware providing and treatment technologies using mm- range signals.

**Main body**  
**Hardware providing**

Currently, therapy with mm-range signals use about 25-30 types of specialized medical equipment [2]. There are several ways for generating apparatus of mm-range medical devices development:

- create sets of harmonic signals with fixed operating frequencies, «ЯВЬ-1» («Yav-1»), «Електроніка-КВЧ» («Electronika-KVCh»), «РАМЕД-ЭКСПЕРТ» («RAMED-Expert»);

- create «broadband generators» of the harmonic signals, «АМРТ-01» («AMRT-01»), «АМРТ-02» («AMRT-02»), later types of devices «Електроніка» («Electronics»), «АМТ-Коверт-04» («AMT-Covert-04»), «ARIA-SC»;

- the creation of broadband devices of noise signals «Пориг-1» («Porig-1»), «Пориг-3» («Porig-3»), «Арцах» («Artsakh»), «Шлем» («Shlem»);

- the creation of combined devices generating as noise so harmonic signals, «АМРТ-01» («AMRT-01»), «Арцах» («Artsakh»);

- the use of additional modes of quasi noise signals generated due to «spectrum spilling» of the harmonic signals, sweep within the operating frequency range «АМТ-Коверт-04» («AMT-04-Kovert»), «ARIA-SC». This mode is easily implemented in new devices with embedded microprocessor (microcomputer).

The main types of such devices and their parameters are given in Table 1.

Table 1. Apparatus for millimeter therapy

<b>Name of the device</b>	<b>Country of origin</b>	<b>Type of signal</b>	<b>Operating range, GHz</b>	<b>Output power, W (Power spectral density, W/Hz)</b>
АМРТ-01	Ukraine, Kharkiv	harmonic, noise	58-62 53-78	$\geq 3 \cdot 10^{-3}$
«Електроніка-КВЧ-101» (2 modification)	Ukraine, Kyiv	— " —	59-63 57-65	$\geq 5 \cdot 10^{-3}$ $\geq 5 \cdot 10^{-5}$
Арцах (4 modification)	Armenia, YRFE NAS	— " —	59-61, 42-95	( $\geq 10^{-19}$ )
АМРТ-02	Ukraine, Kharkiv	harmonic, quasi noise	52...62	$\geq 1 \cdot 10^{-4}$
«ARIA-SC»	Ukraine, Kharkiv	— " —	53...64	$\geq 5 \cdot 10^{-5}$
ЛДК «Шарм», «ЯВЬ»	Russia, Ukraine	— " —	42,2; 53,5	$\geq 1 \cdot 10^{-2}$

Name of the device	Country of origin	Type of signal	Operating range, GHz	Output power, W (Power spectral density, W/Hz)
«Стелла 2»	Russia, Tomsk	—"—	59...63	$\geq 1 \cdot 10^{-4}$
«Поріг-3», (4 modification)	Ukraine, Kyiv	noise	53...78	$(10^{-17} - 10^{-19})$
«Коверт-01»	Russia, Moscow	—"—	53...78	$(\geq 1 \cdot 10^{-20})$
MU-2001	Switzerland	—"—	42...78	$(\geq 1 \cdot 10^{-21})$
«Электроника-КВЧ-011, 013»	Ukraine, Kyiv	quasi noise	57...65	$\geq 5 \cdot 10^{-5}$

Fig. 1 shows the distribution of power and frequency range of devices for mm-range therapy.

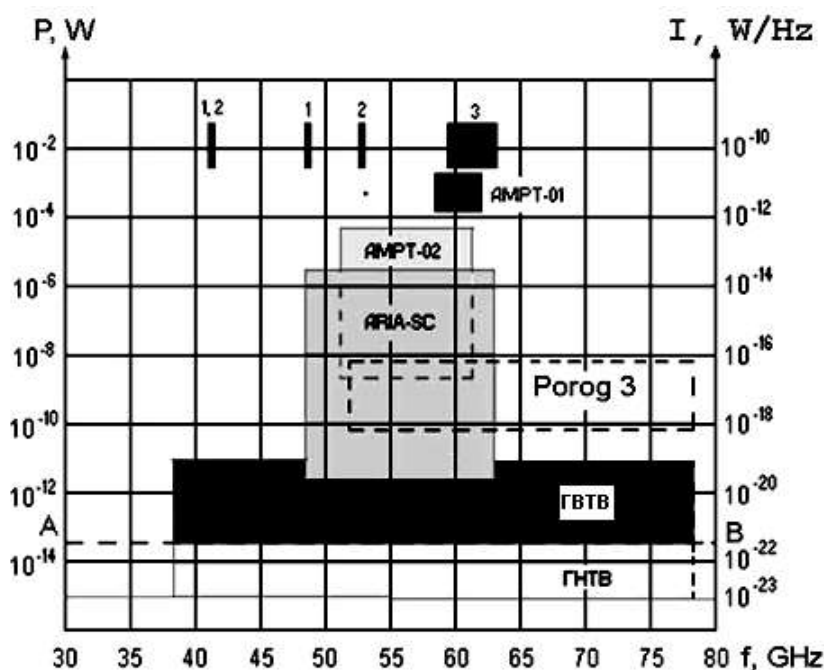


Fig. 1. Power distribution and frequency range of millimeter wave therapy devices: 1 – «ЯВЬ» («Yav-1»); 2 – «Аленушка» («Alionushka»), 3 – «Электроника-КВЧ» («Elektronika-KVCh»); ГВТВ – «Поріг-ВТ» («Porig-VT»); ГНТВ – «Поріг-НТ» («Porig-NT»); the line AB – power level natural human radiation

The information about the feasibility of the submillimeter range signals usage in practice of medicine has appeared recently.

### Treatment technologies

The use of mm-range signals in the practical medicine stimulated the emergence of several types of medical technologies that practically used [1]. Classifi-

cation of the main technological directions of mm-range signals treatment is shown in Fig. 2.

Despite the different names, these technologies have in common is that their use of millimeter wave signals using low intensity level reaches  $10^{-20}$ - $10^{-21}$  W / Hz·cm<sup>2</sup> [2].

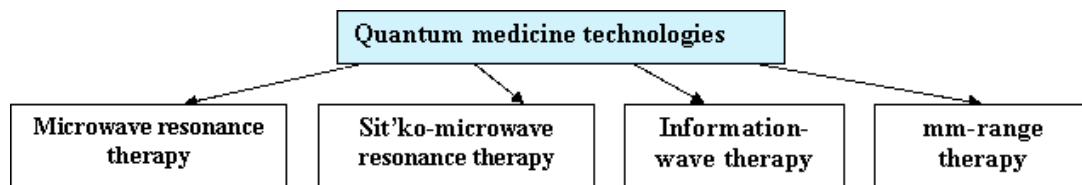


Fig. 2. Classification of main technologies of quantum – medicine

The most common among these technology areas is microwave resonance therapy, which by order of the Ministry of Health of Ukraine № 136 from 06.22.1989, is officially recommended for implementation in the hospitals of the country in separate cabinets [3]. The use of this therapy is characterized by a general positive impact on the functional systems of the human body, and therefore used in various areas of practical medicine (fig. 3).

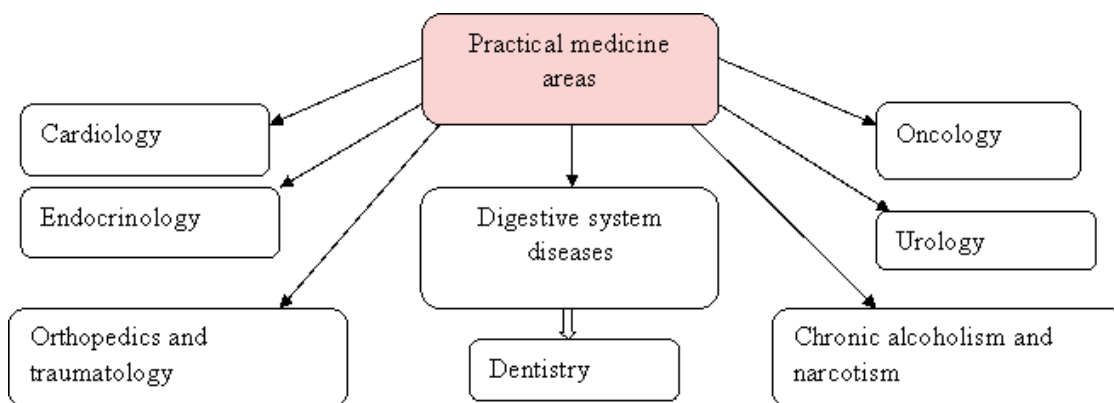


Fig. 3. Applications areas of Quantum Medicine

The most practical checking of the effectiveness of microwave resonance therapy was conducted in such areas of the medical practice: orthopedics and traumatology, gastroenterology, hematology, oncology. Promising is the use of microwave resonance therapy in cardiology in acute coronary disease – heart attacks, strokes and other diseases of the cardiovascular system.

The experience of the Ambulance and infarction branch Department of the National Medical Academy for Advanced Training on over 100 patients in which microwave resonance therapy was used, along with the use of pharmacological agents significantly improves patients' state: decreases blood pressure, decreases tachycardia, stroke and minute cardiac output, as peripheral vascular resistance normalizes [3]. In addition, the use of new medicine technology dramatically increases the effectiveness of pharmaceuticals.

The use of microwave resonance therapy in endocrinology at stages I-II of diabetes mellitus and insulin-independent diabetes with manifestations of diabetic

macro- and microangiopathies, polyneuropathy normalizes hemodynamic parameters in the lower extremities, increased pulse blood current, improves the conduction of nerve impulses in peripheral nerves.

Quantum medicine technologies are effective in treatment of pain and paraesthetic syndromes in Dentistry. We have experience of good effect of microwave resonance therapy using in treatment of glossodynia (burning mouth syndrome) and in neuropathy of inferior alveolar nerve.

In addition, new medicine technologies give a therapeutic effect without the deductive use of drugs, which reduces the load side and a negative impact on the patient of pharmaceutical therapy. Microwave resonance therapy can be widely used in the hospital and in the outpatient treatment of diabetes. The course of treatment is 10-15 sessions duration of 30-50 minutes. The method provides high efficiency in the treatment of stomach ulcers, enshrined on clinical examination in more than 6000 patients [3]. The results of treatment show favorably high therapeutic effect – complete healing of gastric ulcers by gastroduodenoscopy observed in 80-85% of patients.

Table 2. Microwave resonance therapy treatment results

<b>Disease</b>	<b>Increase (%)</b>	<b>Recovery (%)</b>
Alcoholism	90	40
Aseptic necrosis of the femoral head	98	60
Asthma	85	60
Broncho-obstructive syndrome	90	82
Vegetative dystonia	85	70
Gastritis, gastroduodenitis	95	89
Cerebral Palsy	100	60
Osteochondrosis	94	70
Polyarthritis	80	67
Diabetes mellitus	80	63
Trophic ulcers	92	68
Ulcer of stomach and duodenum	98	90
Other pathology	60-95	35-90

The process of treatment (10-15 sessions) accompanied by relief of pain syndromes, the normalization of the secretory and motor functions of the stomach, decreasing the concentration of hydrochloric acid and the volume of gastric juice. Concentration of the adrenaline and cortisol in the blood decreases, and levels of prolactin and aldosterone increases, which ensures normalization of fluid and electrolyte metabolism.

Promising is the use of microwave resonance therapy technology and Sitko-Microwave resonance therapy in the treatment of cancer patients in stage III-IV, who received standard treatment [1, 4]. If the cancer disease is characterized by

significant pain, which is facilitated by the use or docked pharmaceuticals containing narcotic substances with following violations. The method allows decrease the dose of narcotic medicines.

Quantum medicine technologies can be a good alternative to pharmacological methods of pain relief, with a significant improvement in the «quality» of life. The example of more than 40 cancer patients in stage III-IV who received standard treatment and were treated at the Center of quantum medicine «Відгук» («Vidguk») [2, 4] shows that Sitko-method provides quick anesthetic effect, even for a few minutes, common state of patients improves; after treatment course of 10-20 sessions 85% of cancer patients report decrease of pain during 10 and more days [4]. After using of MRT immune-modulating effect was received: the amount and subpopulation correlation of immunocompetent cells normalized, their functional activity increased. In fact, quantum medicine technologies effectiveness does not yield to traditional medicinal preparations.

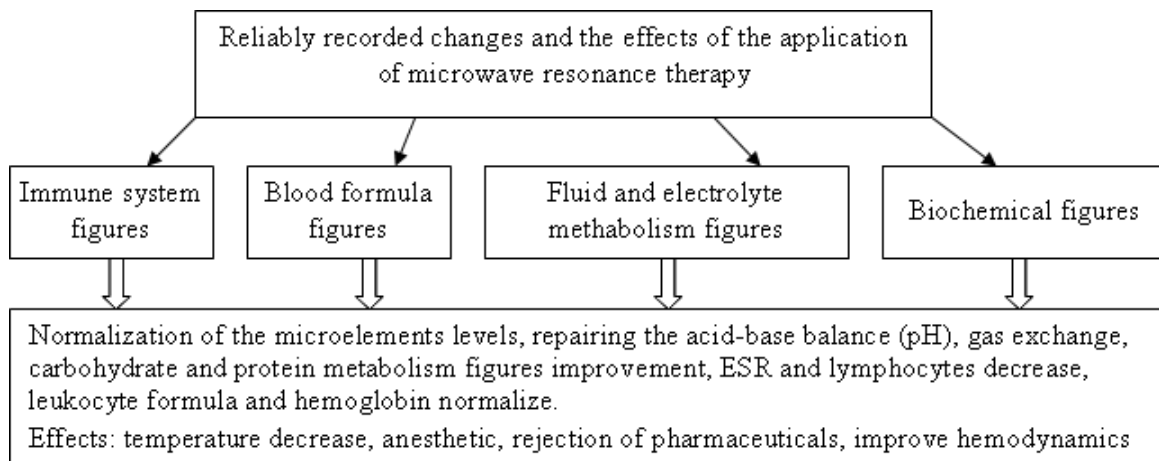


Fig. 4. Effects of Quantum Medicine

At the last time diseases of bronchial pulmonary system become widespread. Microwave resonance therapy can be a good assistant in the treatment of nonspecific lung diseases with bronchial obstructive syndrome because bronchodilator medicines usage in great quantity can lead complications. Its technologies allow receive positive effect without complications in acute and chronic bronchitis, pneumonia, asthma, in breath insufficiency I-II stages. In these cases use of microwave resonance therapy improve health in more than 80% patients simultaneously to abolition of pharmaceutical medicines.

### Conclusions

Quantum medicine technologies are widely used in various fields of practical medicine as a separate type of treatment, or in combination with other methods of influence on the patient.

Medical apparatus for microwave resonance therapy are characterized by low output power ( $10^{-6}$ - $10^{-13}$  W) and use mostly 37,5-78,3 GHz frequency range and is sufficiently safe for both the patient and for staff.

Further development of the considered therapeutic areas is possible through the creation of a new generation of equipment that would provide feedback to the patient and self-adjusting output parameters, as well as mastery of higher frequency millimeter range waves.

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*Яненко О. П., Перегудов С. М., Федотова І. В., Головчанска О. Д. Апаратура та технології низькоінтенсивної міліметрової терапії. Освоєння діапазону міліметрових довжин хвиль призвело до появи генеруючих пристроїв різних типів та їх використання у багатьох галузях науки і техніки, в тому числі й в практичній медицині. Як показали численні клінічні дослідження, стійкий терапевтичний ефект при лікуванні різноманітних нозологій за допомогою електромагнітних шумових сигналів спостерігається вже при рівнях інтенсивності  $10^{-12}$ - $10^{-10}$  Вт/Гц·см<sup>2</sup>, що порівняно з енергією окремих квантів електромагнітного випромінювання міліметрового діапазону. Цей напрямок медицини, започаткованого проф. С.П. Сітько, відомий як «квантова медицина». Провідними технологіями квантової медицини є міліметрова терапія, мікрохвильова резонансна терапія та інформаційно-хвильова терапія, які використовують низько інтенсивні сигнали на рівні  $10^{-6}$ - $10^{-13}$  Вт. Результати клінічних досліджень довели доцільність використання в лікувальних технологіях генераторів низько інтенсивних сигналів "Поріг-3", "Поріг-3М", "Поріг-НТ", «ARIA-SC», та "АМРТ-02». Використання подібних генераторів перспективно в ортопедії, стоматології, ендокринології, урології, гастроентерології та інших напрямках практичної медицини та приводить до покращення показників імунної, бронхо-легеневої, серцево-судинної та інших систем, сприяє відновленню гомеостазу людського організму*

**Ключові слова:** *низько інтенсивні сигнали, міліметрова терапія, квантова медицина, апаратурне забезпечення*

*Яненко А. Ф., Перегудов С. Н., Федотова И. В., Головчанская А. Д. Аппаратура и технологии низкоинтенсивной миллиметровой терапии. Освоение диапазона миллиметровых волн привело к появлению генерирующих устройств различных типов и их использования в различных областях науки и техники, в том числе и в медицине. Как показали многочисленные клинические исследования стойкий терапевтический эффект при лечении различных нозологий с помощью электромагнитных шумовых сигналов фиксируется на уровнях интенсивности  $10^{-10}$ - $10^{-12}$  Вт/Гц·см<sup>2</sup>, что сопоставимо с энергией квантов электромагнитного излучения миллиметрового диапазона. Это*

направление, развиваемое проф. С.П.Ситко, известно под названием "квантовая медицина". Ведущими технологиями квантовой медицины являются: миллиметровая терапия, микроволновая резонансная терапия (МРТ) и информационно-волновая терапия, которые используют низкоинтенсивные сигналы уровня  $10^{-6}$ - $10^{-13}$  Вт. Результаты клинических исследований подтвердили целесообразность использования в лечебных технологиях генераторов низкоинтенсивных сигналов – "Порог-3", "Порог-3М", "Порог-НТ", "ARIA-SC", "АМРТ-2". Использование подобных генераторов перспективно в ортопедии, эндокринологии, урологии, гастроэнтерологии и других направлениях практической медицины. Применение их приводит к улучшению показателей иммунной, бронхо-легочной, сердечно-сосудистой и других систем, способствует восстановлению гомеостазу человеческого организма.

**Ключевые слова:** низко интенсивные сигналы, миллиметровая терапия, квантовая медицина, аппаратное обеспечение

*O. Yanenko, S. Peregudov, I. Fedotova, O. Golovchanska* **Equipment and technologies of low intensity millimeter therapy.**

*Introduction.* Mastering the millimeter range of wavelengths has led to appearance of different types devices and their usage in many fields of science and technology, including the practical medicine. As shown by numerous clinical studies, persistent therapeutic effect in the treatment of different diseases by electromagnetic noise signals observed even at levels of intensity  $10^{-12}$ - $10^{-10}$  W / Hz/sm<sup>2</sup> that is comparable to energy of individual quanta of mm-range of electromagnetic radiation. Thus this area of medicine is known as a quantum medicine, which is a practical realization of the fundamental direction of "Physics of the Alive" launched Ukrainian scientist Professor S. Sitko.

*Main body.* Leading technologies of Quantum Medicine are microwave resonance therapy and Sit'ko-microwave resonance therapy. Results of clinical studies have proven the feasibility of quantum medicine technologies using noise generators "Porig-3", "Porig-3M", "Porig-НТ", developed with the participation of authors and monochromatic generators "Aria-SC" and "AMRT-02" – development of Kharkiv scientists. Devices can be used as individually and together, for example, in Sitko-medicine technology. Guidelines and approaches of MRT using for treatment of pathological processes virtually all organs and systems of the human body: endocrine, bronchopulmonary and cardiovascular, digestive, reproductive, urinary, support – skeletal system lesions of traumatic and other origin – are developed currently. It was established that the use of MRT improves the immune and cardiovascular systems, both directly and indirectly, through neurohumoral regulation and restoration of homeostasis of the organism.

*Conclusions.* Thus, quantum medicine that is based on the effects of low-intensity millimeter wave signals are promising direction of applied medicine with the appropriate hardware can be used to treat a wide range of diseases of the human body.

**Keywords:** low intensity signals, millimeter therapy, quantum medicine, equipment.