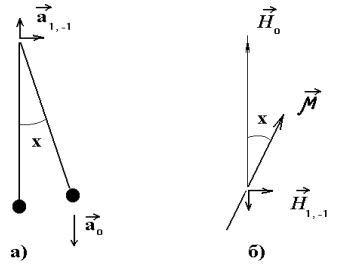
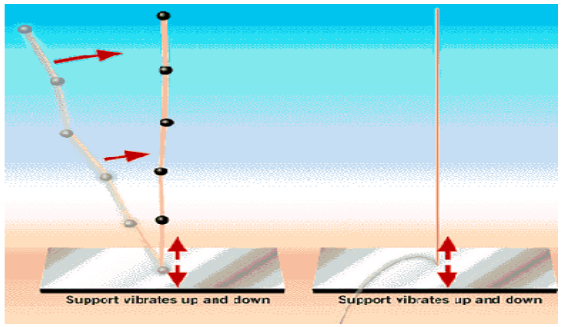
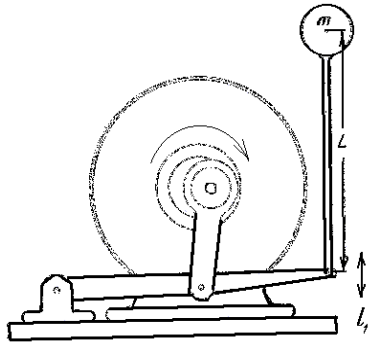
Nonlinear pendulum – model of real nonlinear systems

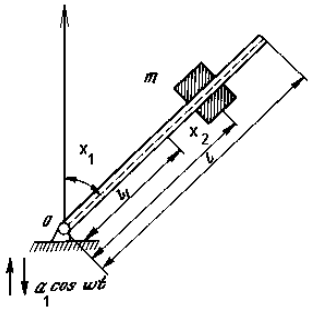
Resonanse in physic, chemistry and biology

$$x'' + \varepsilon_r\, x' + (\varepsilon_0 + \varepsilon_1 \cos\tau)\sin x - \varepsilon_{-1}\cos(\tau + \varphi)\cos x = 0$$









XIV century, Bombay; Andrew Stephenson, 1908 — P.L. Kapitsa, 1951 — V.N. Chelomei, 1956

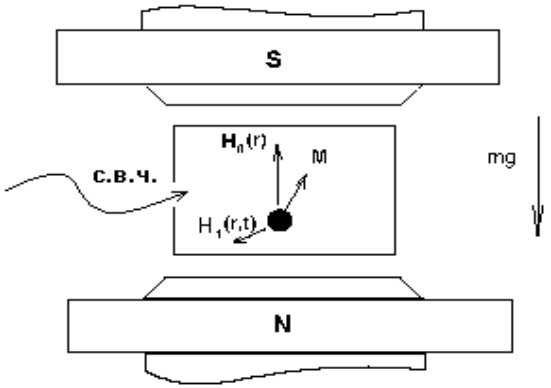
$$S = (\alpha/2\pi)\int_{\pi}^{\alpha} L\, d\tau$$

Resonance as the most stable state of motion in nature

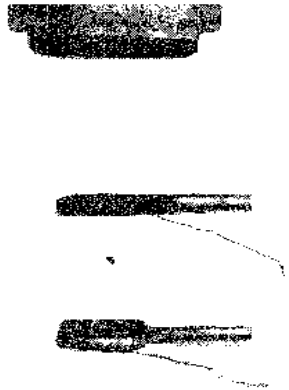
1974…1984…1987…1988…2018

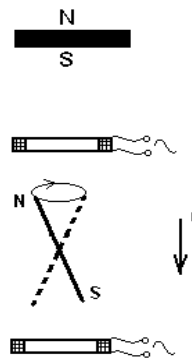
$$S = \sum_{n=1}^{\infty} n^2\alpha^2 r_n^2/4 - y_0^2/2 + (1/2)\sum_{k_1,k_2,..=-\infty}^{+\infty}\prod_{n=1}^{+\infty} Jk_n(r_n)\sum_{\beta=-1}^{+1}\varepsilon_\xi\,\delta_\beta^{\pm\beta}\,(1+\delta_\beta^0)\cos\Big[x_0+\sum_{n=1}^{\infty}k_n(\pi/2-\delta_\beta^{\pm1}\psi_n)-\delta_\beta^{-1}(\pi/2\pm\varphi)\Big],\quad \sum_{N=1}^{\infty}k_n n\alpha$$

New scientific and applied results in the field of resonance effect of fields on nonlinear physical and biological systems

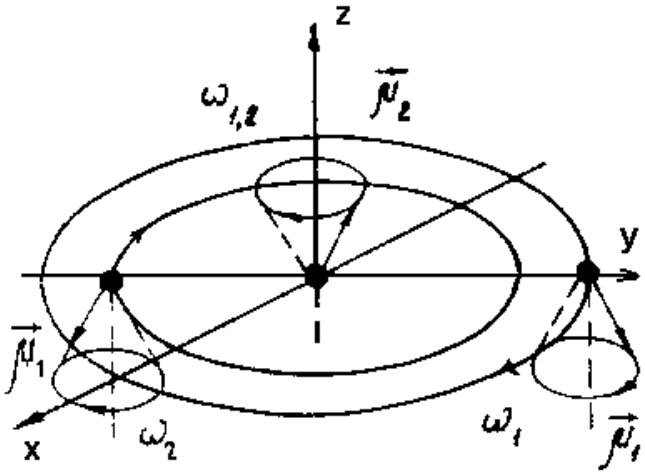


***Levitation of single crystals YIG at f.m.r.* (1974)**

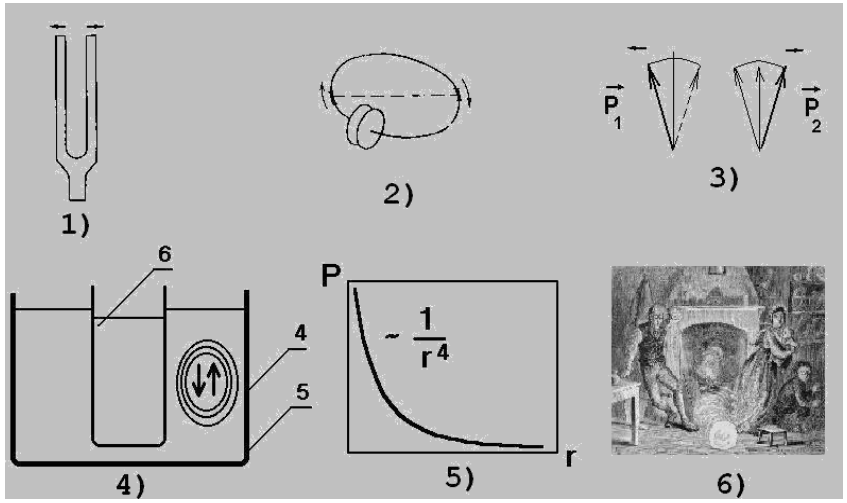




***Levitation of the Sm-Co particle at resonance* (1987)**



RM (Resonance Microcluster) - Solution Problems "1/R^3" (1984)
http://www.ikar.udm.ru/sb22.htm



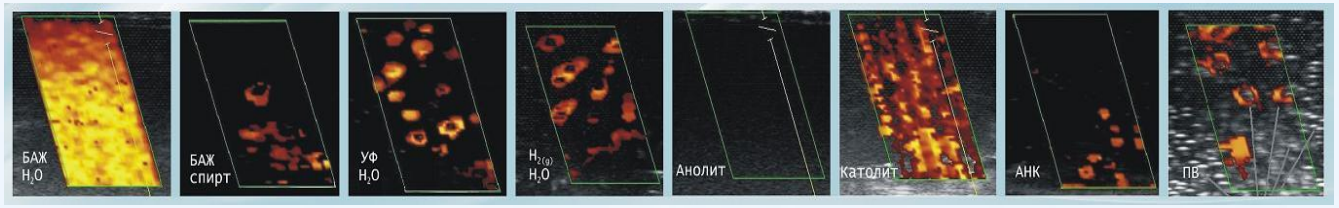
Examples of weakly emitting resonance systems: 1 – tuning-fork; 2 - LC-circuit; 3 - resonant microcluster of two dipoles; 4, 5 – noncontact activation of water, 6 - ball lightning. ***http://www.ikar.udm.ru/sb15-12.htm***

Basis of the technology, how it works, and our USP: at the heart of our development – Global Resonant Nonlinear Tesla (GRNT).

- *Including contact and noncontact activation of water solutions. Based on the transfer of liquids into a non-equilibrium thermodynamic state, including a resonant micro-cluster structure with energy and super-coherent electromagnetic radiation.*

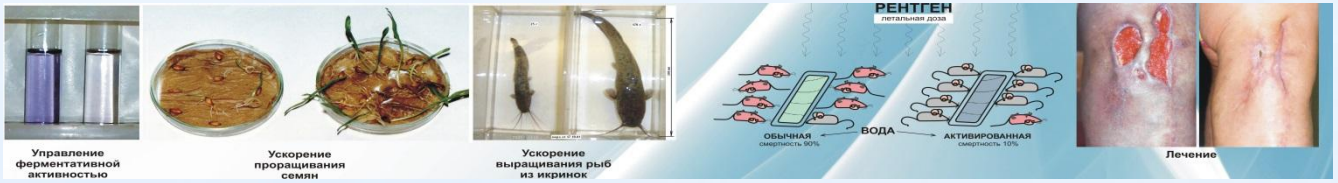
- *The use of RNT practically does not change the chemical composition of the water and brings nothing but energy, which creates a radiant field, and destroys the mechanisms of cellular and inorganic binders. Based on these technologies the created disinfecting agent removes deposits and prevents their reintroduction. Our USP : the timeframe the water stays in this state.*

1. Detection of resonant micro-clusters in activated aqueous solutions

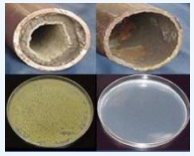


2. Micrographs of solids obtained by contactless activation (AM-RNT)

3. Effect of activated media on bio-systems



Key applications that can be targeted with GRNT, and the benefits

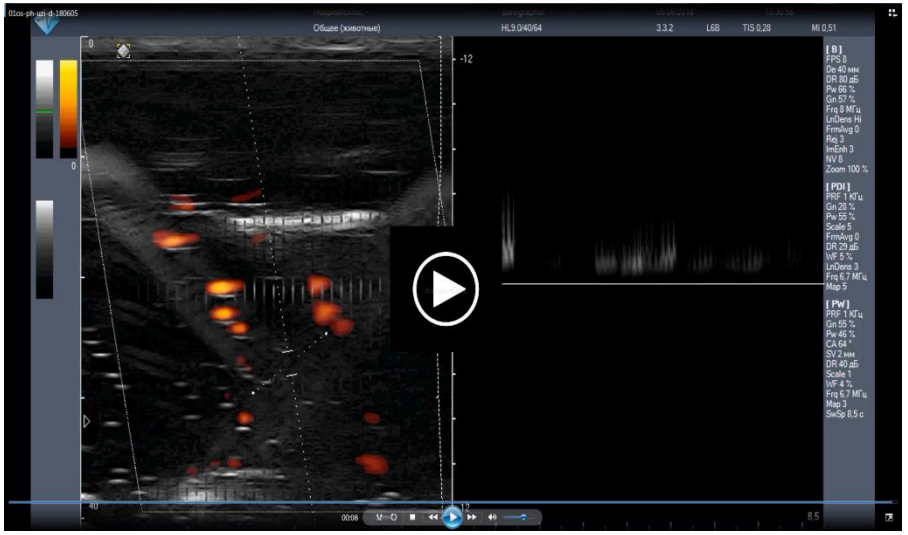
GRNT	Key Applications	Key Benefits
	Drinking Water	▪ Disinfects water and improves its quality ▪ Can be used in municipal or home systems
	Fish Farms	▪ Reduces mortality and improves nutrient intakes, increasing growth rate
	 Cleaning Pipes	▪ Cleans out pipes , superior to sodium hypochlorite by > 300x
	Healthcare	▪ Can help to heal wounds quicker ▪ Improves circulatory system

Key applications that can be targeted with GRNT, and the benefits

GRNT	Key Applications	Key Benefits
	Hydroponics	▪ Improves crop yield and quality, conserves energy, reduces costs
	Poultry Farms	▪ Reduces mortality and improves nutrient intakes, increasing growth rate, eliminates need for chemical disinfectants
	Yogurt production	▪ Improves quality, enhances assimilation by the the body, ▪ reduced time to market
	Healthcare	▪ Wide range of applications: cancer and diabetes treatment, use as an antiseptic, improves blood circulation

The physical nature of ball lightning in gases and in liquids

“Ball-Lightning“ in Gases –
http://eng.ikar.udm.ru/sb/sb15-9e.htm



“Ball-Lightning“ in Water –
http://eng.ikar.udm.ru/sb/sb51-1.htm

“… So, in certain parts of the environment, there may be a localization of processes in the form of ... dissipative structures ... arising in different nonlinear media …”.

/Kurdyumov S.P. http://ikar.udm.ru/c_n_aw.htm/

Video: **01os-ph-uzi-d-180605.mp4** - “Ball-Lightning", 3-dimensional dissipative structures - plasmoids in water http://ikar.udm.ru/c_n_aw.htm
after установок "ИКАР" (мод.01os + мод.01ph) on ultrasound-Doppler,
Congress in Moscow 05.06.18-07.06.18