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Superrelativistic's and tachyonic neutrinos applied in modern nanophysics and nanochemistry – graphene, nano–cage structured materials: clathrates, and nanocrystals

by Imrich Krištof

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Abstract:

This presented publication to discuss about new nanophysical and nanochemical applications in modern nanotechnology, with utilization of superrelativistic and tachyonic neutrinos (hep), high energy particles emitted, for example into the Antarctic Ice Crust (Project AMANDA/Ice Cube) from hard cosmic cascade's hyperons ksí (Ξ), omega ($^{-}\Omega$), lambda (Λ) and subsequently mesons pí (π^0), ká (κ^0), mí (μ), so sunshowers of tauons (super heavy electrons), electrons, photons and neutrinos ν_τ (tau), ν_μ (mí) and electron's neutrinos $\nu_{(e-)}$ and probably the fourth neutrino connected with gauge fields → guage neutrino and gauge bosons. (Comment 1.: Tauon/lepton τ) has meantime life (decay) $3x10^{-13}$ s. With calm mass 1776,84 MeV/c^2, compared with proton: 939 MeV and electron 0,511 MeV).

Tauon si simultaneously lepton and fermion (spin ½). Top–interesting is behaviour of Möbios Graphene Leaf in electromagnetic fields. (Comment 2.: August Ferdinand Möbius (17.11.1790 – 26.9.1868) German mathematician and theoretical astronomer, far descendant by Martin Luther.

Interesting mind–experiment, but also practical nano–chemical experiment is nanoclatrates–plasma nanochemistry and in them incorporated human organic nanowall and nanolandscape of organic nanomaterials of fulvic and humic acids, with interaction of femtolaser (10^{-15} s) in 2D and 3D nanolandscape.

Advised localities of extraction of fulvic and humic organic materials are in geomorphological region called Moravian Karst (20 km on the north from Brno City), concretely the middle zone – Eve's Cave – The Křtiny's creek valley near Adamov.

The significancy of nanoclathrates of humin is like antioxidant and neutralizator of radioactive waste.

Special antioxidant substance, so called "MESIPAN", according to the Czech sci–fi writer Ing. Zdeněk Volný, the novel – The Gate to Eternity (1985).

Suggested experiment with WILSON FOG CHAMBER → hard cosmic rays and accelerated particles and their traces on photographic film. The Super Known Neutrino Event in Nov. 19.,1970) – world's first observation of a neutrino in a hydrogen bubble chamber.

Lattice constant of graphene, carbon nanotubes and Buckminster's fullerens and fullerit can be easily calculated.

Benoît Mandelbrot (The French mathematician (1975)) and Jaromír Korčák (1938), the Czech demograph and geograph were the first in the whole world, who used the fractals and attractors like surface of nanocomposit materials.

Nanoclathrates → Zeolites → Liquid crystals nano and mezoprotons crystals, channeled structures.

Utilization of Alumosilicates (CLAY'S MINERALS) for example Montmorillonit – Illit with NEVERENDING CRYSTAL LATTICE ARE SURFACE FUNCTIONALIZATION ADSORBENTS, SO CALLED SORPTION'S COMPLEX IN SOILS (VERY IMPORTANT COMPOUND OF A SOIL) → LIKE AN INCLUSION COMPLEX → SUPRAMOLECULAR STRUCTURES.

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Attention will be dedicated to applications of research for example, so called Ryden Batteries from UNIVERSITY OF KYUSHU, JAPAN, like a predecessor of confinement of author's pocket tokamak.

Like the last part of an article was chosen chapter dedicated to chemical and physical properties of nanocrystals and quaziparticles like the phonons, exciton–polaritons, polarons and plasmons.

Keywords:

Cosmic hard radiation, cascade hyperons, (hep) high energy particles, Möbius, M. Luther, nanoclathrates fulvic and humin organic acids, Moravian Karst, "mesipan", Mandelbrot and Korčák, fractals, attractors, clay's minerals, Ryden Batteries, quaziparticles.

Highlights:

This article is new–minded in these strategic focuses (fields): maybe in the first in a popular–science and tech–science literature has interfaced an author's acquaintances from wide–spread circles of natural sciences, for example from nanochemistry – analytical chemistry – astrophysics – nanophysics – geology – maths – geography to crystallography and theoretical physics and these syn–math–chem–phys sciences have very important role in application science to expand in the practical hi–technology and has developed the wide–spread science–tech base. The goal of this work will be a new nanochemistry and nanophysics propositions to construct a new hi–tech materials, mainly the antioxidant nano surface clathrates with humic and fulvic acids to neutralization of radioactive wastes and surface structure of confinement of author's microtokamak's, and many more applications in nanotech–science.

Author used (applied) his acquaintances from study of Biology–geology and geography and Applied physics – astrophysics at the Masaryk University, Brno.

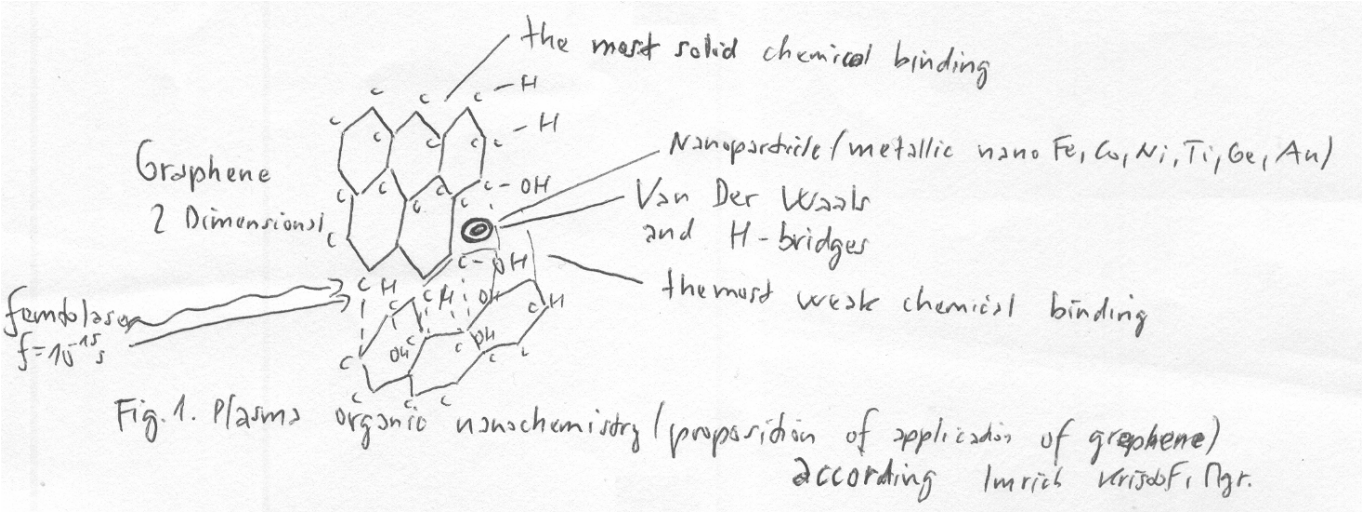

Fig. 1. Plasma organic nanochemistry (proposition of applications of graphene), according Imrich Krištof, Mgr.

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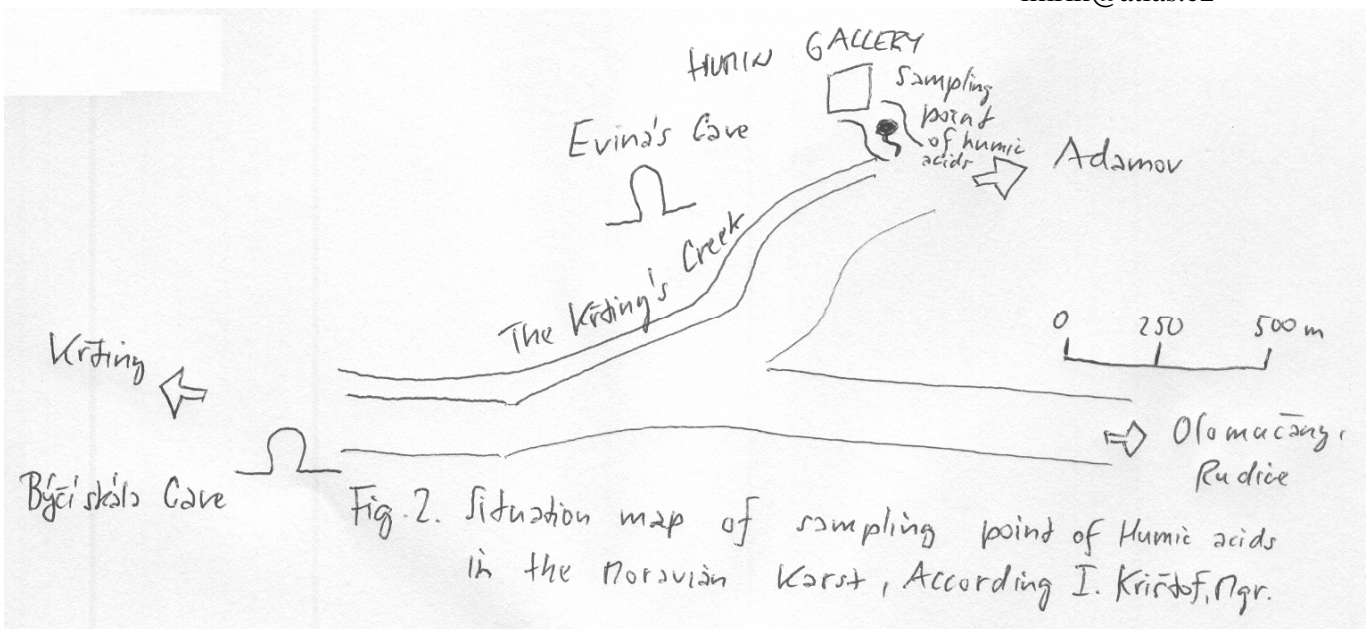

Fig. 2. Situation map of sampling point of Humic acids in the Moravian Karst, according I. Krištof, Mgr.

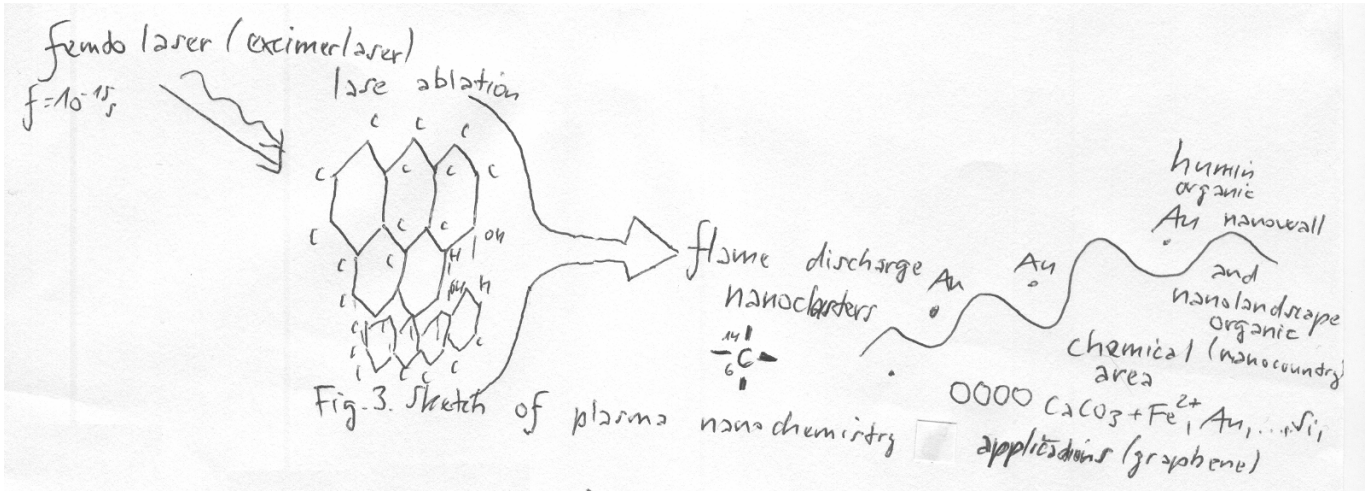

Fig. 3. Sketch of plasma nanochemistry applications (graphene).

Comment 3: Extracted humin respectively nanoclathrates of humin – antioxidant / special antioxidant organic matter → so called "mesipan" according. Ing. Zdeněk Volný in The Gate to Eternity (1985).

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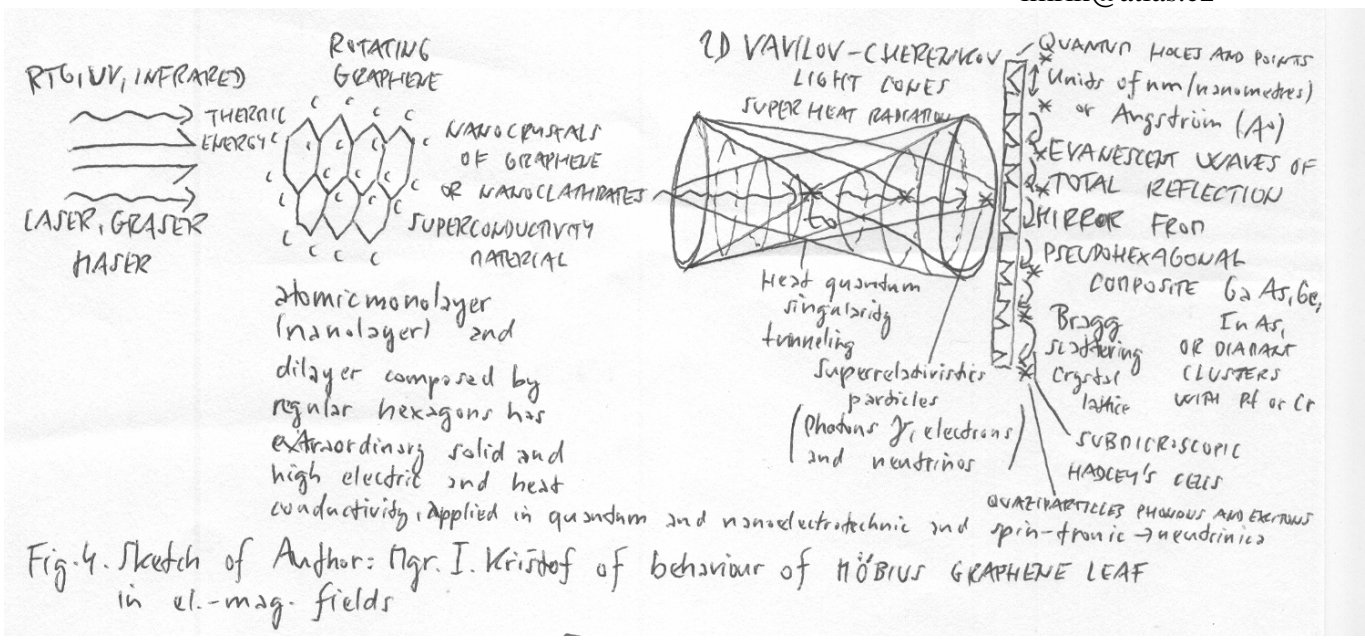

Fig. 4. Sketch of Author: Mgr. I. Krištof of behaviour of MÖBIUS GRAPHENE LEAF in el.-mag. fields

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2. INTRODUCTION

The most important and the most developed science discipline of a modern hi–tech–science is namely in the Czech Republic, approximately the last few decades nano–tech–science, concretely nanophysics and nanochemistry, which (may) will be developed in the future to the new hi–tech science like spin–tronics and according the author of this article the neutrinics.

Upper showed hi–tech–nanosciences supposed good awareness not only maths, physics and chemistry, but too good insight to the quantum mechnics, quantum chemistry, astrophysics, quantum electrodynamics, quantum chromodynamics and spintronics and atomic chemistry, geology, glaciology, geography and other geosciences,

The pilot works about Vavilov–Cherenkov's radiation wrote Pavel Alexejevič Čerenkov (28.7.1904 – 6.1.1990) and Igor C. Tamm (8.7.1895 – 12.4.1971) and with L. V. Grošev are Nobel Price Winners for physics in the year 1958. Cherenkov studied under leading significant Russian physicist S. I. VAVILOV (24.3.1891 – 25.1.1951), known for his work about "hot" and "cold lightning" and luminescence.

In 1960's and 1970's Sir Roger Penrose (*8.8.1931), the English mathematician, physicist, deployed the theory of light cones' and with it's connected theory of "Racehorse" and "Daddy" Paradox. Author of this article met him in April 2006 in Kurt Gödel's days in Brno.

The Second region of discoveries is developed nowadays nanosciences is a Discovery and creation of grapheme by Andrej Geim (*21.10.1958) and Konstantin Novoselov (*23.8.1974) the Nobel Prize Winners for physics in 2010.

3. STUDY PROBLEMMA

The goal of studied problemma is definition of condition and measuring of a lifetime of quaziparticles and antiparticles (symmetric paricles), superrelativistic particles, phonons (acoustic, optic, longwaves, shortwaves), exciton–polariton. For this study is an important a braking radiation – an event, during the tunneling charged particles (the most probability by transitioning of electrons and neutrino's oscillation by matters or atmosphere reborn secondary RTG or γ (Gamma) radiation.

Nanoclathrates respectively covalent non–binding chemical compounds – clathrates were discovered by Neil Bartlett (15.9.1932 – 5.8.2008) English–American chemist.

Very important for this study problemma of radiaton are Feschbach's rezonances → kinetic energy of colliding atoms is equal to Energy of bounded states of molecula or supermolecula.

Next research is focused on new mind experiment, which is illustrated by Fig. 5.

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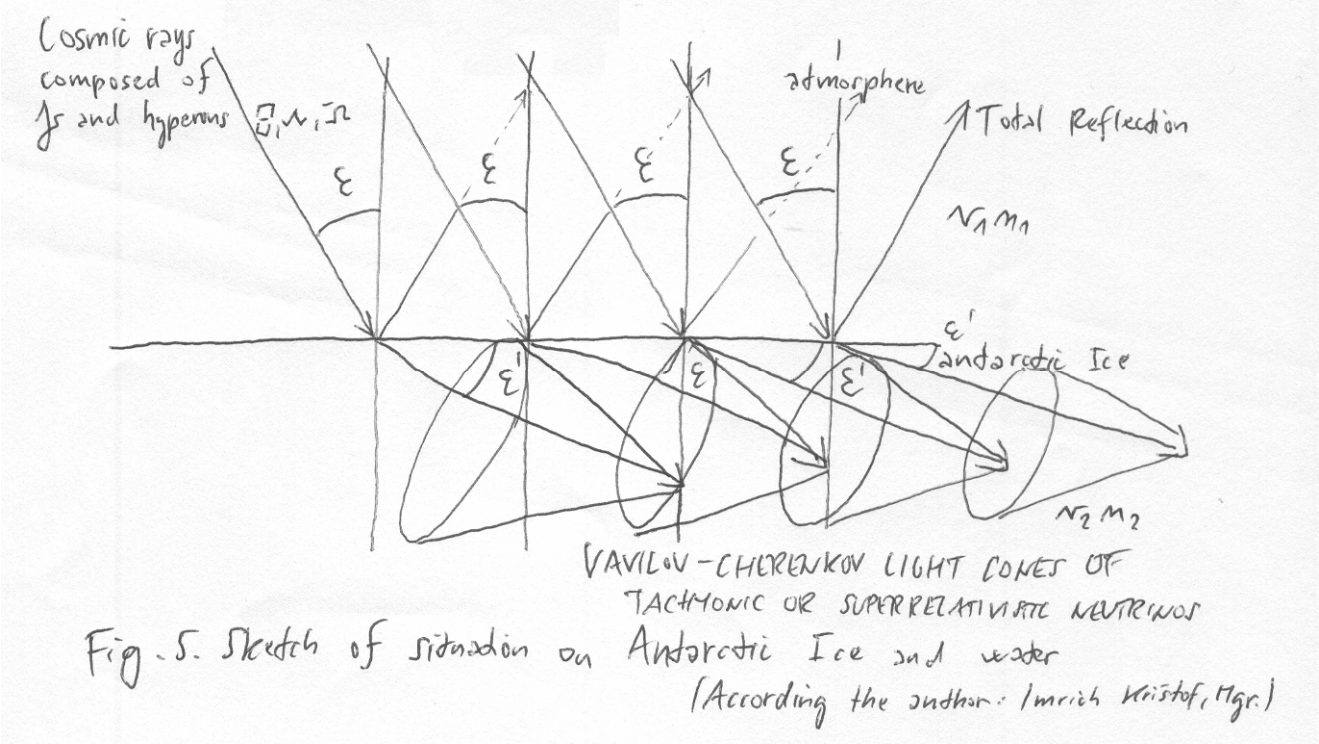

Fig. 5. Sketch of situation on Antarctic Ice and water (According the author: Imrich Krištof, Mgr.)

This Fig. 5. is connected with so called Snell's principle:

$$\frac{\sin\alpha}{\sin\beta}=\frac{v_1}{v_2}=\frac{n_2}{n_1}$$ (Optical principle)

$$\frac{\sin\varepsilon}{\sin\varepsilon'}=\frac{v_1}{v_2}=\frac{n_2}{n_1},\quad \textit{where } v_1 < v_2$$

$$\frac{\sin\varepsilon_1}{\sin\varepsilon_2}=\frac{c_1}{c_2}=n$$ (Acoustic principle)

- FOSFORESCENCE
- PHOTOEMISSION (PHOTOEFFECT)
- PHOTOLUMINISCENCE
- PHOTOLYSE
- PHOTOCONDUCTIVITY
- THERMOLUNINISCENCE
- TRIBOLUMINISCENCE

- FORCES
  - LORENTZ
  - VAN DER WAALS

- EVENTS
  - HOLOGRAPHY (COHERENT RADIATION)
  - MIGRATION OF ELECTRONS, PLASMONS, POLARITONS AND POLARONS

- MATERIALS: ION CRYSTALS

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4. METHODS

Fractals and attractors defined by Bernoît Mandelbrot (1975) and Czech geograpgh Jaromír Korčák (1938), from latine fractue (fragments).

Fractals have the most important atribute – selfsimilarity – example of organic's fractal is ROMANESCO (specie of cauliflower), Cantor's grups → Sierpinsky's – Mengerov's Sponge.

In 1976 Mandelbrot by formulation of hypothesis, that fractals singularities of equations of Navier–Stokes and Euler are fractals in book Fractal Geometry of Nature.

Moon's craters – Madlebrot application – slices of "fractal's emmental's cheese" with circles accidental holes, Scalar Brown's motion approximations.

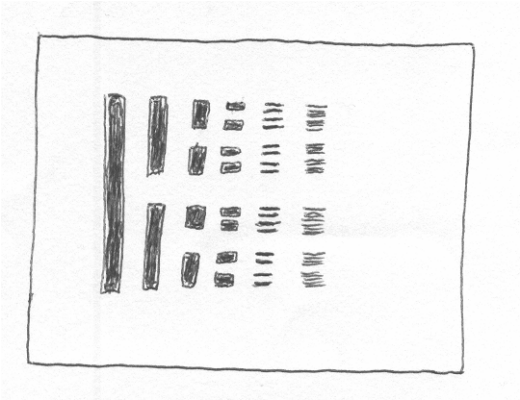

Fig. 6. The Cantor's Rod D = $\log_3 2$ ~ 0,63, ilustred by I. Krištof, Mgr.

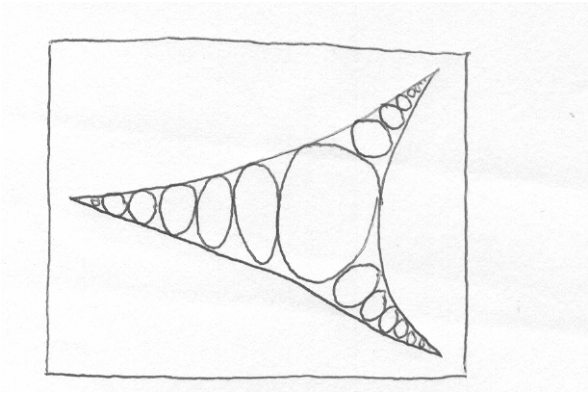

Fig. 7. Fractal of nanocomposite material according the B. Mandelbrot, ilustred by I. Krištof, Mgr.

Sir Roger Penrose Light Cones:

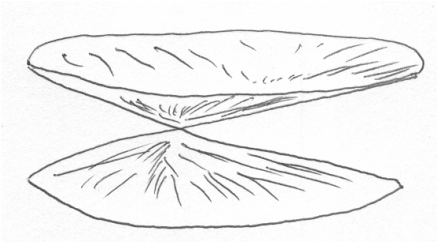

Fig. 8. The null cone redrawn so that the space and time scales are just slightly closer to these of normal experience, ilustred by I. Krištof, Mgr. According Sir Roger Penrose.

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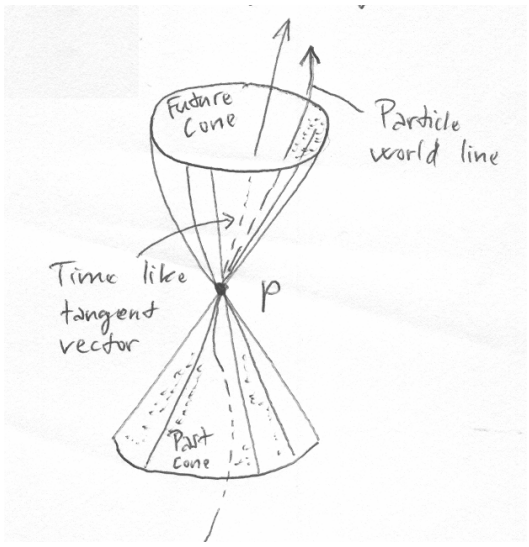

Fig. 9. The past cone and the future cone. Ilustred by I. Krištof, Mgr. According Sir Roger Penrose.

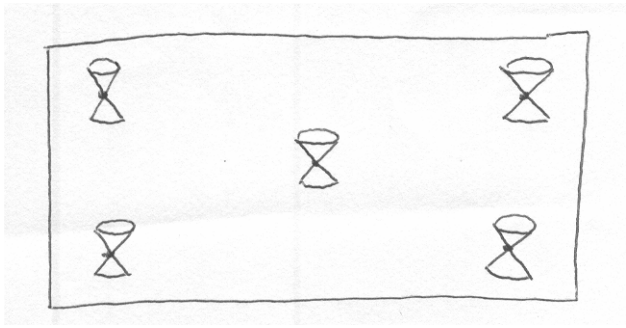

Fig. 10. MINKOWSKI SPACE M is flat and its null cones are uniformly arranged, depicted here as all being parallel.

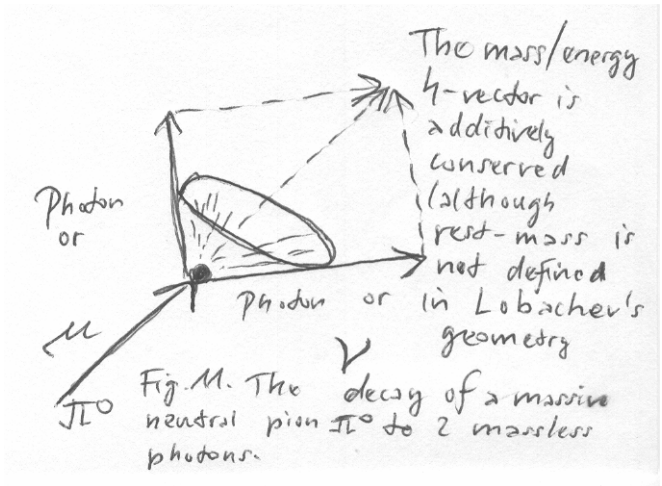

Fig. 11. The decay of a massive neutral pion π^0 to 2 massless photons.

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5. RESULTS

Very important for a physical–chemical properties of nanomaterials is ION–RADIUS (according Pauling) in nanometers (10^{-9} m)

Ion	r [nm]	Ion	r [nm]	Ion	r [nm]	Ion	r [nm]
Li^+	0,068	Be^{2+}	0,031	B^{3+}	0,020	C^{4+}	0,015
Na^+	0,095	Mg^{2+}	0,065	Al^{3+}	0,050	Si^{4+}	0,041
K^+	0,133	Ca^{2+}	0,099	Sc^{3+}	0,081	Ti^{4+}	0,068
Cu^+	0,096	Zn^{2+}	0,074	Ga^{3+}	0,062	Ge^{4+}	0,053
Rb^+	0,148	Sr^{2+}	0,113	Y^{3+}	0,093	Zr^{4+}	0,080
Ag^+	0,126	Cd^{2+}	0,097	In^{3+}	0,081	Hf^{4+}	0,078[1)]
Cs^+	0,169	Ba^{2+}	0,135	La^{3+}	0,115	Th^{4+}	0,102
Au^+	0,137	Hg^{2+}	0,110	Tl^{3+}	0,095	V^{4+}	0,059
Tl^+	0,144	Pb^{2+}	0,121[1)]	Ti^{3+}	0,076	Mo^{4+}	0,066
NH_4^+	0,148	Ti^{2+}	0,080[2)]	V^{3+}	0,065	Ce^{4+}	0,101
H^-	0,208	V^{2+}	0,072	Bi^{3+}	0,096[1)]		
F^-	0,136	Cr^{2+}	0,083[2)]	Cr^{3+}	0,063[1)]		
Cl^-	0,181	Mn^{2+}	0,080	Mn^{3+}	0,066[1)]		
Br^-	0,195	Fe^{2+}	0,080	Fe^{3+}	0,064[1)]		
I^-	0,216	Co^{2+}	0,072	Co^{3+}	0,063[1)]		
		Ni^{2+}	0,069	Ce^{3+}	0,107[1)]		
		Eu^{2+}	0,124	Eu^{3+}	0,113		
		O^{2-}	0,140				
		S^{2-}	0,184				

1) Ahrens (1952)
2) Goldschmidt (1926).

Comment 3: On disorder composed by conductivity electron and lattice polarization (clouds of phonons) we can see like a quaziparticle polaron.

Comment 4: In the cause of weak binding is possible binding state of an electron and the hole described like an object similar the hydrogen (quaziparticle), which is called Wannier's exciton. The speed of exciton is nearby a speed of thermic electrons.

Comment 5: Luminiscence is an emission in visible or to its nearby region of spectrum. Has two stages: excitation of electrons and emission of photons. We can excitate by light, by electron ray, by chemical reaction, by electric field or by mechanic deformation and we can speak then about fotoluminiscence, cathodoluminiscence, chemiluminiscence, electroluminescence and tribolumininiscence. Emission during excitation is called fluorescence, if on light $\tau_R > 10^{-8}$ s → fosforescence.

Comment 6: Disorders in crystals we can divided on basic atomic disorders (dotted, lined and surfaced), thermic (phonons) and electron's (electrons and holes) and on specialized disorders, which involved elementary excitations (quaziparticles) and its interactions (excitons, polarons, polaritons, plasmons, magnons etc).

6. CONCLUSIONS

It is evident that the significance of nanomaterials: nanographens, nanocrystals, nanotubes, nanofibres, nanoclusters and nanoclathrates will be growth in nearby future. Namely nano–tech–science applications in medicine, electro–technic sciences, nanoindustry, and creation of nanometallic materials not only on the Earth, but too in cosmic space (International Space Station) Alpha on the orbit, or on the terraforming regions on the Moon, Mars or other bodies of the Solar System will be lead to incorporating hi–tech technologies (spin–tronics or neutrinic's) to the modern life of Mankind.

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