Some words about fundamental problems of physics

CONCLUSION

COMPARATIVE TABLE

of two physical models:

WAVE
and
STANDARD

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Physical theories of the Wave Model (WM), including the Dynamic Model (DM) of elementary particles (DM) and the Shell-Wave Model of the atom (SWM), originally introduced in 1996 by L. G. Kreidik and G. P. Shpenkov in the book "*Alternative Picture of the World* ", proved to be the key to solving many problems in physics.

A postulate on the wave nature of the Universe is in the basis of the WM. The elementary particles are considered as dynamic micro-objects, namely, as the spherical wave micro formations pulsating at certain frequencies - extremely high and extremely low simultaneously. Wave exchange at these frequencies determines all types of fundamental interactions. The nature of the mass and charge of elementary particles was revealed, and other fundamentally important discoveries were made. The results exceeded all expectations. Based on these data the WM can be rightfully considered as a viable alternative to abstract mathematical theories of the Standard Model (SM), dominant at the present time in physics.

Details on the WM can be found in the references to each of the 10 parts of the notes, as well as at the end of the Table below that compares the features of two models, Standard and Wave. The comparative table illustrates the undeniable advantages of the WM, in what could easily sure everyone looking at it.

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	Advantages of the theories of the Wave Model (WM): The Dynamic Model (DM) of elementary particles and Shell-Wave Model (SWM) of atoms, solutions of the wave equation $\Delta\hat{\Psi} - \frac{1}{c^2}\frac{\partial^2\hat{\Psi}}{\partial t^2} = 0$ ***What does it follow from the DM?***	***Comments on capability of the Standard Model (SM)*** including Schrödinger's QM, Dirac's QED, and QCD, ***with respect to enumerated points at issue***
1	***The origin of mass*** The mass has the field ***associated*** character: $m = \frac{4\pi\varepsilon_0 r^3}{1 + k_e^2 r^2}$; where $\varepsilon_0 = 1 g \cdot cm^{-3}$, $k_e = \omega_e / c$ (see # 5). ***The rest mass does not exist***	***Unknown***
2	***The nature of electric charges. The charge is the rate of mass exchange:*** $Q = dm/dt$	***Unknown***
3	***The relation between the mass and charge***: $Q = m\omega_e$	***Unknown***
4	***The objective central ("electric") charge of an electron:*** $e = 1.70269155 \cdot 10^{-9}\ g \cdot s^{-1}$ Electron is ***an elementary quantum of the rate of mass exchange***	***Incorrect dimensionality and value***: $e = 1.602176462 \cdot 10^{-19}\ C$ (SI), where $1C = \frac{c_r}{10}\frac{1}{\sqrt{10^9}} kg^{1/2} m^{3/2} s^{-1}$, $c_r = 2.99792458 \cdot 10^{10}$ or in the CGSE system $e = 4.803204197 \cdot 10^{-10}\ CGSE_q$ $(g^{1/2} \cdot cm^{3/2} \cdot s^{-1})$

5	***The fundamental frequency*** of the subatomic and atomic levels: $\omega_e = e/m_e = 1.869162559 \cdot 10^{18}\, s^{-1}$	***Unknown***
6	***Static fields do not exist in Nature*** "Electrostatic" fields are, actually, exofrequency fields of the fundamental frequency ω_e (see # 5)	***Unknown***
7	The objective ***transversal*** ("magnetic") ***charge*** of an electron on the Bohr orbit: $e_H = \frac{\upsilon_0}{c} e$	***Unknown***
8	***The fundamental wave radius***: $\lambda\!\!\!^{-}_e = c/\omega_e = 1.603886492 \cdot 10^{-8}\, cm$	***Unknown***
9	***The ratio of electron's orbital magnetic moment***, $\mu_{e,orb} = e\upsilon_0 r_0 / c$, ***to its orbital moment of momentum***, $\hbar = m_e \upsilon_0 r_0$: $\frac{\mu_{e,orb}}{\hbar} = \frac{e}{m_e c} = \frac{1}{\lambda\!\!\!^{-}_e} = k_e$	***Incorrect value*** $\frac{\mu_{e,orb}}{\hbar} = \frac{e}{2m_e c}$
10	***The magnetic moment of an electron***: $\mu_e = \frac{\upsilon_0}{c} e(r_0 + \delta r_0) = -1855.877359 \cdot 10^{-26}\, J \cdot T^{-1}$; $\upsilon_0 = 2.187691263 \cdot 10^8\, cm \cdot s^{-1}$ is the Bohr speed	***Incorrect value*** $\mu_e = (1 + \alpha_e)\frac{e\hbar}{2m_e c} =$ $= -928.476410(80) \cdot 10^{-26}\, J \cdot T^{-1}$

11	***The proper magnetic moment of an electron (electron "spin" magnetic moment)***: $\mu_s = \frac{r_e}{z_{p,q}}\sqrt{\frac{2Rh_e}{m_0 c}} = -5.50792\cdot 10^{-29}\ J\cdot T^{-1}$	***Incorrect value*** $\mu_s = \mu_B = \frac{e\hbar}{2m_e c} =$ $= -927.400947(80)\cdot 10^{-26}\ J\cdot T^{-1}$
12	The radius of an electron shell (***electron's radius***): $r_e = \sqrt{\frac{m_e}{4\pi\varepsilon_0}} = 4.17052597\cdot 10^{-10}\ cm$; $\varepsilon_0 = 1 g\cdot cm^{-3}$, $m_e = 9.10938253\cdot 10^{-28}\ g$	***Unknown*** Considered as a ***point like*** particle. ***Classical electron radius*** is $r_e = \left(\frac{\upsilon_0}{c}\right)^2 r_0 =$ $2.817940325\cdot 10^{-13}\ cm$
13	The radius of a proton shell (***proton's radius***): $r_p = 0.528421703\cdot 10^{-8}\ cm$ (calculated from the ***formula of mass***, see # 1)	***Unknown*** Proton ***rms charge radius*** is $r_p = 0.8750(68)\cdot 10^{-13}\ cm$
14	***The fundamental frequency of the gravity field***: $\omega_g = \sqrt{4\pi\varepsilon_0 G} = 9.158082264\cdot 10^{-4}\ s^{-1}$; $G = 6.6742\cdot 10^{-8}\ g^{-1}\cdot cm^3\cdot s^{-2}$, $\varepsilon_0 = 1 g\cdot cm^{-3}$	***Unknown***

15	***The fundamental wave radius of the gravity field:*** $\lambda_g = c/\omega_g = 327.4 Mkm$	***Unknown***
16	**The gravitational spectrum of nucleon wave shells:** $r = \lambda_g z_{m,n}$; $z_{m,n}$ are roots of Bessel functions	***Unknown***
17	***The background spectrum of the hydrogen atom***: $\frac{1}{\lambda} = R\left(\frac{1}{n^2} - \frac{1}{(n+\delta n)^2}\right)$; $\delta n = \delta r / r_0$	***Unknown***
18	***The nature of the Lamb shift***: the shift is precisely equal to the frequency gaps between the nearest spectral terms of the background spectrum (see # 17)	***An erroneous concept*** based on an influence of the invented (non-existed) virtual particles
19	***The precise derivation of binding energy*** in atoms ***without use*** of the relation $\Delta E = \Delta m \cdot c^2$	***Unable***
20	***The physical meaning of the speed*** of light c in the relation $E_0 = m_0 c^2$; m_0 is the ***associated mass*** of a particle (see # 1). Speed of light c is ***the basis wave speed of exchange of matter-space-time at the subatomic level.***	***Unknown*** m_0 is the "*rest*" mass.

21	***Internal spatial structure of atoms***, *i. e.*, the disposition of nucleons in atoms (The latter defines the structural variety at the molecular level in Nature: "***genetic code***")	The fixed (strictly geometrical) disposition of nucleons is ***Unknown***
22	***The g-lepton structure of nucleons***: ***Proton*** and ***Neutron*** are similar in g-lepton structure to isotopes $^{28}_{14}Si$ and $^{29}_{14}Si$, respectively, according to Shell-Nodal Atomic Model ($m_g = 68.22 m_e$)	***Quark structure*** (does not similar to crystal)
23	***Crystal structure of solids***, including forbidden by mathematical laws of crystallography	***Unable***
24	***The structure of all isotopes and their relative masses*** (including limiting masses: minimal and maximal for every isotope)	***Unable***
25	***The nature of Mendeleyev's Periodic Law***: the similarity of nodal structure of external atomic nucleon shells.	***Different explanation:*** electron structure of atoms
26	***The fine structure constant physical meaning***: the scale correlation between basis and superstructure of wave (between oscillatory and wave processes in waves)	***Unknown***
27	***The unified description*** of ***electromagnetic***, ***gravitational***, and ***strong*** (***nuclear***) ***interactions***	***Unable***

28	***The nature of the spherical harmonics of wave and Schrodinger equations*** The spherical harmonics define polar-azimuthal coordinates of nodes and antinodes of standing spherical waves	***Unknown*** As a result, an introduction in quantum mechanics of the conceptually unfounded notion of hybridization of atomic orbitals
29	***The nature of integer and fractional quantization in quantum Hall effect*** The nature of quantization in the Hall conductance (the resistance quantum) is naturally uncovered as an internal feature of atomic structures considered as wave formations, without accounting an influence of external magnetic fields. ***The deduced spectrum of fundamental resistances*** $R_e = \frac{h}{e^2}\frac{m}{n}$	***Fitting theory in the spirit of the virtual particles of quantum electrodynamics*** Modern explanation is based on an imaginary quantum-mechanical fluid of a hypothetical new form and on a many body wave function. It predicts that the elementary excitations involve pseudo-particle charge carriers with charges that are fractions of the electronic charge.
30	***Precise derivation of the neutron magnetic moment*** $\mu_n(th) = \frac{e\upsilon_0}{c}\left[\left(\bar{\lambda}_e + \frac{r_0}{y_{0,12}}\right)\sqrt{\frac{2Rh}{m_0 c}} + \frac{r_e}{j_{0,12}}\sqrt{\frac{2Rh_e}{m_0 c}}\right]$ $\mu_n(th) = -0.96623513 \cdot 10^{-26}\ J \cdot T^{-1}$	***Unable***
31	***Precise derivation of the proton magnetic moment*** $\mu_p(th) = \frac{(e+\Delta e_p)\upsilon_0}{c}\left(\bar{\lambda}_e + r_0 \frac{1}{\beta}\frac{(a'_{0,11} + y_{0,12})}{2(a'_{0,11} y_{0,12})}\right)\sqrt{\frac{2Rh}{m_0 c}}$ $\mu_p(th) = 1.410606662 \cdot 10^{-26}\ J \cdot T^{-1}$	***Unable***

32	***Objective (true) dimensionalities of physical quantities in integer powers of units of matter (g), space (cm), and time (s):*** *Electric charge,* $[q]=[m]/[t]=g\cdot s^{-1}$ *Electric current,* $[I]=[q]/[t]=g\cdot s^{-2}$ *Circulation,* $[\Gamma]=[I]/[c]=g\cdot cm^{-1}\cdot s^{-1}$ *Electric field strength,* $[E]=[F]/[q]=cm\cdot s^{-1}$ *Magnetic field strength,* $[B]=[F]/[q]=cm\cdot s^{-1}$ *Electric field momentum density,* $[D]=[\varepsilon_0][E]=g\cdot cm^{-2}\cdot s^{-1}$ *Magnetic field momentum density,* $[H]=[\varepsilon_0][B]=g\cdot cm^{-2}\cdot s^{-1}$ *Potential,* $[U]=[F][l]/[q]=cm^2\cdot s^{-1}$ *Resistance,* $[R]=[U]/[I]=g^{-1}\cdot cm^2\cdot s$ *Conductance,* $[G]=[R]^{-1}=g\cdot cm^{-2}\cdot s^{-1}$ *Resistivity,* $[\rho]=[R][l]=g^{-1}\cdot cm^3\cdot s$ *Conductivity,* $[\sigma]=[\rho]^{-1}=g\cdot cm^{-3}\cdot s^{-1}$ *Inductance,* $[L]=[U][t]/[I]=g^{-1}\cdot cm^2\cdot s^2$ *Other physical quantities of electromagnetism contained electric charge, current, and their derivatives with corrected dimensionalities.*	***Incorrect dimensionalities*** *(subjective, phenomenological)* *Accepted in contemporary physics, the* ***dimensionalities of physical quantities of electromagnetism, based on the erroneous dimensionalities of electric charge, current, and their derivatives,*** *are* ***erroneous***
33	***The Fundamental Period of the Decimal Code of the Universe*** $\Delta=2\pi\lg e=2.7287527...$	***Unknown***

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See also: http://shpenkov.janmax.com/selectedpub.asp

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