Chapter 11. Relation between the BSM theory and the modern physics

This chapter provides a brief discussion about the connection of the BSM theory with the theories of the classical and modern physics and the complimentary benefits it may provide. In the same time the BSM theory may exhibit discrepancies from some other theories about the physical interpretation of some natural phenomena. The provided summary should serve as a prelude to the next Chapter 12, where number of cosmological phenomena are analysed from a different point of view.

11.1 BSM theory as a new approach in Physics

The BSM theory does not infringe the achievements of the other theories. Its main concept, however, is more general. Its main goal is to find out the most basic physical laws of the matter and the phases of the matter evolution in the Universe. It accept the concept that all the processes in the Universe are developed in three dimensional space and one direction of time. From the philosophical aspect, this concept is in full harmony with the assumption that the world is real and understandable by the human logic.

In Chapter 2 we introduced the two types of twisted prisms, made respectively of two substances of intrinsic matter (IM). Their apparent properties helped to explained successfully:

- the properties of the CL space,
- the electrical and magnetic field
- the propagation of the quantum waves
- the superconductive state of the matter
- the structure of the elementary particles exhibiting a charge
- the structure of the proton, neutron and electron
- the structure of the atomic nuclei
- the integration of the atoms into molecules
- the molecular oscillations and their signatures by the photoelectron and optical spectra
- the balance conditions between IG(CP) and IG(TP) fields in the molecular system
- the role of IG(TP) and (IG(CP) in the formation of the electrical field and charge unity in the elementary particles
- the relation between the CL space parameters and the know fundamental physical constants.

The twisted prisms, however, are not the lowest level structures of the intrinsic matter (IM). They are formed during some phases of IM evolution. In some phase of this evolution they are involved in a crystalization process, in which the elementary particles are formed. This process is related with the cycle of the galaxy The galaxy according to the developed concept appears to be a self sustained cosmological assembly. Every galaxy has a cycle including an active life, death and birth. The visible matter of the galaxy passes through a recycling process in which the old prisms are recycled to new prisms. Evidently the prisms, are not the most fundamental structures. The intrinsic matter also have own lower level structure, that is different than the structure above the prisms level. Understanding this structure may help to understand the basic fundamental low in the Universe - the Low of Intrinsic Gravitation. The intrinsic property of the IM are possible to be guessed in the process of analysing some specific features of the gravitational latices. They lead to a logical acceptance that the twisted prisms exhibit anisotropic IG field (this has been mentioned in Chapter 2). The hypothetical scenario of all phases of the matter evolution leading to creation of the elementary particles must include a guess about the intrinsic property and the structure of the IM. Such scenario is suggested in the last chapter of the BSM.

In Chapter 2 some of the fundamental laws in the Universe and some guessed properties of the IM has been defined. Let us mention some of the fundamental laws and their derivatives.

Fundamental laws:

(1) The Intrinsic matter exists in two substances, possessing two different intrinsic time constants.

(2) The empty space exists in three dimensions, independently of the matter. Its physical dimensions, however, get a sense only if intrinsic matter is available

(3) The Intrinsic gravitational force between two bodies of IM in empty space is inverse proportional to the cube of the distance between them

(4) The energy is a property of the IM and could not be separated from it

(5) The energy could not be created or lost, it only converts from one form to another.

(6) The intrinsic matter can not be annihilated

(7)The IG potential of any body made of IM is a form of internal energy

(8) The time flows only in one direction

(9)The inertial factor of any structure made of IM depends of the structure geometry and its mutual position to another structure. The structure geometry of the helical structures with internal lattice is quite complicated, but follows a strict logical order.

Derivative law

(10) We live in a CL (Cosmic Lattice) space. The matter we know is a form of existence of the intrinsic matter in one of its phases: a phase of high level matter organization. In this quite stable phase, the global structure of CL space is in a stationary state. The basic apparent properties of the matter in this phase are: the Newtonian gravitation, the electrical and the magnetic fields.

We may consider the above laws as rules in our analysis. Some of them as the law (5) is well known. Most of the other laws has been used more or less in the previous chapters of BSM.

The BSM does not contradict to the achievements of the other theories and especially the classical and quantum mechanics. In the present state the mathematical methods for quantitative calculations in BSM are not so developed as in the other long time existing theories. So it may have some weakness in the quantitative analysis. However it possesses very powerful features for a qualitative and physical analysis. It provides understanding of the physical origin of the electric, magnetic and Newton's gravitation. In such aspect, the BSM is able to provide a qualitative physical analysis of any phenomena at very low level. This approach helps to solve many puzzles, which may otherwise require enormous efforts by the methods of the present theories. In the same time the BSM approach uses successfully some results obtained by the quantum mechanics in order to provide detailed explanation of the related physical processes.

11.2 BSM theory and the Classical mechanics

The classical mechanics could be considered as a private case in the BSM concept bout the Universe. The main features characterizing the Classical mechanics from point of view of BSM are the following:

- **The processes are in CL space, where:**

- The Newtonian gravitational force is inverse proportional to the quadrature of the distance

- The gravitational constant G is defined for CL space

- The CL lattice shrinkage around the massive body is not taken into account (it is a feature of the General relativity)

- The inertia is considered as intrinsic property of the moving matter by the classical physics. According to BSM, however, it is defined by the CL structure properties and the features of the helical structures

- the quantum interactions between the CL space and the helical structures are not taken into account by the classical physics

- the time base in BSM and in the classical physics is considered as a constant (the relativistic effects comes from the properties of the CL structure)

The above mentioned features are not apparent from the point of view of the Classical mechanics. They are derived by the BSM.

11.3 BSM theory and the Quantum mechanics

The quantum mechanics could be considered as a mathematical model of the microworld but its concept is not universally valid in a broader space and time extensions. It is quite successful mostly in the matter organization above the atomic level, i.e. the building of matter from atoms. In this aspects it provides very useful mathematical models for studying the chemical compounds. Among one of the most successful achievements is the theoretical calculations of the atomic and molecular spectra. The accepted so far atomic concept, based on the Bohr atomic model, was able to explain successfully the atomic spectra up to some level. The success is due to the proper selection of the orbits *s, p d*, ... with the number of selection rules. The quantum mechanics could not provide convincing physical ex-

planation for many of the rules it uses. The BSM model was able to identify the physical concept for some of the rules. In the same time BSM found also a number of discrepancies, arising from attempts to explain some properties of the real atoms with the quantum mechanical models.

The application of the methods of the QM at subatomic level, related to the particle physics, however, leads to a huge deviation from the reality. This is valid especially for a models, such as the "standard model of the atomic nucleus" using the "quark model", the "quantum chromodynamics" and so on. The classification of the particles into leptons, fermions and bosons and using this attribute as a physical one in fact led to deviation of the suggested models from the reality.

The BSM analysis shows that QM methods are successful due to the concept of energy calculations in quantum units. In the Balmer model developed in Chapter 7, it has been shown, that **the energy levels of the processes inside the Bohr surface, measured in quantum units are equal to the energy levels outside the Bohr surface estimated by the Bohr planetary model.** We may refer to this feature as an **energy estimation equivalence in quantum unit (EEEQU).** The same principle is confirmed in the analysis of the molecular oscillations, provided in Chapter 9.

From the point of view of BSM the **EEEQU** feature is implicitly used by the quantum mechanics. Using also the concept of the uncertainty principle, the quantum mechanics was able to develop sophisticated models by using the Shrodinger equation and hamiltonians. The concept of the uncertainty principle is introduced by Heisenberg. This concept is useful while the internal structure of the electron and its behaviour in CL space are unknown. While the CL space existence and its parameters are missed, the QM models and methods are not able to operate with reference units for time and length. In such way the relativistic formulation of this two parameters obtains some logical sense with the adoption of the uncertainty principle. This principle is adopted as a **first postulate** in the quantum mechanics according to the formulation:

The state of a quantum-mechanical system is completely specified by a function $\Psi(r,t)$*, that depends on the coordinates of the particle and on the time. This function, called the wave function or the state function, has the important property that the* $\Psi'(r,t)\Psi(r,t)dxdydz$ *is the probability that the particle lies in the volume element dxdydz, located at r, at time t.*

.....

Postulate 1 says that the state of a quantum-mechanical system such as two electrons is completely specified by this function and nothing else is required. (D. A. McQuarrie, Quantum chemistry,1983 p.p. 115)

From the formulation of the first postulate we see, that the mentioned above **EEEQU** feature is implicitly used, because the quantum mechanics operates only with quantum energies, but this feature appears hidden.

One question may arise: Why the probability is used? The answer is:

1) Undermining the existence of the CL space by the QM, the transition of the electron in the atom is associated with immediate emission (absorption) of a photon. In the QM atomic model the concept of electron cloud is accepted in agreement with the uncertainty principle. The need to use probability comes automatically after the adoption of the uncertainty principle.

2) according to the Relativity, the physical attributes space and time are mutual dependent. Then there is not absolute time base, and the orbital position of the electron could not be defined at any time moment.

From the BSM analysis it becomes evident, that the CL space and time are both well defined. The BSM concept, however, provides two distinguishable units for the space:

node distance - as an absolute space unit for length

λ_{SPM} **- as an quantum space unit for length**

For the Earth local frame $\lambda_{SPM} = \lambda_c$

The basic **quantum unit for time** in CL space is

$$t_{SPM} = \frac{1}{\nu_{SPM}} = \frac{\lambda_{SPM}}{c} \qquad (11.1)$$

From Eq. (11.1) we see, that the quantum units of space and time are mutual dependable. The ν_{SPM}, however is defined by the resonance frequency ν_R, and the latter by the intrinsic time constants.

We see, that when using the quantum unit for space λ_{SPM} and for time t_{SPM}, an ambiguity exists between them, as they are mutually dependable. The QM, however, uses these units. For this reason the concept of space and time in QM becomes inseparable. This problem leads to big puzzles, especially in the area of subatomic (elementary) particles. The high potential energies locked in the helical structures and their internal lattice structures additionally contribute to the puzzles. These energies, handled by the intrinsic matter are misidentified as energy-mass conversion in absolute sense. In many cases relativistic corrections are used, but this does not solve the problem in full. Another problem is with the overusing or misusing of the uncertainty principle. It was introduced in the quantum mechanical model for mathematical explanation of particular effect in the atomic scale. BSM concept clearly shows when this principle is valid and when it is not.

The BSM theory avoids the mentioned above problems, by providing the analysis in absolute scale, defined by the CL node distance for length and t_{SPM} for time. Unveiling the very fine structure of the atomic particles, the electron and the CL space, the BSM is able to provide analysis, without need of the uncertainty principle, at all. In order to verify the results, BSM uses experimental data from different fields, whose connection is possible if the problems are approached from the lower level. One example of such approach is the use of CMB background experimental data, the universal gas equation, the dynamical CL pressure and the derived mass equation for determination of the approximate value of proton structure envelope (in Chapter 5). Then the more accurate value of the proton's parameter is obtained by cross correlated calculations involving the masses of the muon, pion, kaon and the magnetic moments of electron, muon and pion (in Chapter 6). The obtained data are additionally cross validated with the experimental data about tau lepton, W and Z bosons. Then using the obtain geometrical parameters and the derived mass equation the dimensions of the proton (neutron) pion and kaon are verified. The obtained dimensions mach well when synthesizing molecules (in Chapter 9), using the chemical bonds connected by quantum orbits, which shape and dimensions has been determined based on the quantum motion conditions of the electron. Finally, the synthesized molecules by BSM approach match quite well with the VSEPR model of the molecules. The obtained interatomic distances in the synthesized molecules match with the distances, obtained by experimental way.

One of the most successful application of the QM, perhaps is in the area of molecular spectra. The applied concept of rigid and not rigid rotor, also, is not completely adequate to the reality, but it is corrected by number of constants. These constants are obtained by the experiments, and the QM model provides pretty good results for optical spectra. From a BSM point of view, the QM model of the molecular spectra is a good mathematical model, but the underlying concept is not adequate to the real physical structure of the molecule.

Relying on many achievements of the QM methods, especially about the atomic and molecular spectra, a common opinion arises, that the well developed mathematical models describes **uniquely** the real atom, its substructure and the structure of molecules. The atomic nucleus according to QM is considered quite small, and all electron orbitals are around it. This concept has been supported by the scattering experiments so far. BSM theory, however, found out that the present scattering models do not take into account very important parameters of the vacuum structure and particle structures. This have led to enormous discrepancies between the calculated physical dimensions of the atomic nuclei and the real ones. The orbitals of the hydrogen atom, presented as probability density plots became well accepted pictures, but from the BSM we see, that they are not real. **The conclusion is, that we can not plot the wavefunction for a particular atomic element, and claiming this is a real view of the atom**.

In the field of particle physics, the estimation of the subatomic masses of the particles leads to a confusion. One of the reason is that the process of the helical structure modification has not be known. More specifically the process of twisting of the FOHSs, that is attended with simultaneous change of the newtonian mass of the particles was unknown. The mass of the kaon also is falsely estimated due to its different geometry from pions, muons and electron and its jet propulsion force providing a trust force in the direction of its motion.

The internal lattice structure of the FOHS was also unknown. The obtained energies from the destruction of these structures were identified as "bosons' " neutral currents", tau leptons, quarks, neutrinos. Some kind of neutrino has been attributed to the process of neutron-proton (and reverse type) conversion, that according to BSM is simply a more or less twisting of the helical structures, affecting the volume of their FOHS and consequently - their newtonian mass. The misidentification of such conversion process further reflects to some astronomical and cosmological problems. One example for this is the well known Solar neutrino problem.

One additional misleadings from the present concepts of the modern theories, related to the QM methods, particle physics, and affecting the cosmology is the interpretation of the well known Einstein equation:

$$E = mc^2 \qquad (11.2)$$

According to BSM, the above equation provides equivalence between newtonian mass in CL space and energy. So in other words the Einstein equation provides equivalence between the Newtonian mass and the energy necessary for its destruction.

However, in the existed so far physical concept, the mass (newtonian type) is considered as intrinsic property of the matter. So the conversion of the (newtonian) mass into energy is considered as a matter annihilation. For this reason a matter annihilation property is assigned to the Einstein equation (11.2). While the equation is completely correct, its interpretation is wrong. **The matter could not annihilate. Only the Newtonian mass may disappear (due to a process of destruction) or an electron's - positron's charge may disappear with emission of 2 gamma quants** (forming undetectable neutral particle, that later may appear as emerging from a Dirac see)**.**

The wrong interpretation of the Einstein equation leads to significant deviation of the process of matter understanding from the reality. The invoked problems spans from the particle physics to the cosmology. Number of problems are evident even from pure theoretical interpretation, because they contradict to one of the very basic laws: the low of conservation of energy. If accepting the concept of matter annihilation it follows immediately that:

(1) the matter could be converted to a pure energy

(2) the pure energy may exists without the matter

The both statements are wrong. BSM shows that the energy conservation is valid in all phases of matter organisation. The methods of the quantum mechanics also relies on the energy conservation principle.

The misinterpretation of Eq. (11.2) led to number of wrong consequences. For example, it supported the concept that the emitted photon is a pure energy, able to travel billions of years in empty space (away of any matter). The concept of the zero time of the photon is only a easy way to avoid any physical explanation. If we accept this concept, the following logical question arises: What are the physical factors, keeping the constant speed of the photon, far away from any mass object? Neither quantum mechanics, neither the relativistic theory is able to provide a reasonable answer of this question.

Let see some aspects of the BSM interpretation of the Einstein equation. It shows disappearance only of the Newton's mass, but not the intrinsic matter. So the equation in fact indicates only an energy transfer between different systems. It may appear in few different cases:

- destruction of the FOHSs of an elementary particle;
- atomic nuclear synthesis or decay

In the first case the FOHS is crashed and the released internal CL(T) structure undergoes consecutive modifications leading to production of neutrino particles (rectangular nodes of 6 prisms). This nodes are only slightly different than the CL folded nodes and can pass freely through the atomic matter. The disappearance of FOHS volume, means disappearance of the forces opposing the Static CL pressure, so the newtonian mass vanishes.

In one of the cases, considered so far as annihilation, the process is even mistakenly identified. This is the reaction between the electron and free positron, discussed in Chapter 3.

$$e^- + e^+ \rightarrow h\nu \text{ (511 KeV)}$$

This process does not lead to destruction of any FOHS. The obtained combined structure possesses a proximity locked E-field so it appears as a

neutral in the far field. Its newtonian mass is 1.22 MeV, but its neutrality make it undetectable in the experiments. Such outcome is not expected by the QM model and proper experiments for identification of the obtained small neutral particles are not provided at all.

Summary *of the discrepancies between QM model and BSM model of the atomic particles and space*:

(a) The CL space structure is not considered in the QM models

(b) The dimensions of the proton and neutron adopted by QM are quite distinct from the reality

(c) The QM models does not take into account the geometry of the proton and neutron structures

(d) The identified by BSM quantum quasishrink space around the proton is not considered in QM models

(e) According to BSM, the values of q, h, ε_o, μ_o are accurately valid only for the space outside of the Bohr surface.

(f) The IG field in the range of the atomic nucleus is not taken into account by QM models, but Wan der Waals forces are accepted

(g) The quantum motion of the electron as an oscillating three body system is not taken into account by QM models

(h) The real orbits according to BSM pass through the proton club, while at QM model of the atom, they are orbiting around the whole nucleus

The feature (e) may not affect, the QM model, because it is based on the Bohr atomic model of Hydrogen. According to this model the ground orbit is a_o, and all other orbits are larger, i. e. they are outside of the Bohr surface. Consequently the orbital model operates with q, h, ε_o, μ_o parameters defined for the external space. In such case the quantum quasishrink effect is left hidden, but the model operates with correct quantum energy levels.

Acknowledgement

Despite the number of discrepancies, for some applications the Quantum Mechanics play a leading role in the physical advances in the 20-th century. The achievements in the area of the atomic and molecular spectra are remarkable. Number of other areas are also contributed by the QM methods: the lasers, the quantum chemistry, NMR. EPR, crystalography. The major advantage of the QM methods is the possibility for accurate quantitative calculations. The other branches, as the particle physics, and the nuclear models, despite the above mentioned discrepancy of their theoretical models, provide some useful physical parameters. Some physical constants or atomic parameters are obtained with amazing accuracy. Many of this parameters, when carefully selected appear useful for interpretation from other new theories. This is the case with the obtained masses of the particles: proton, neutron, pions, muon, kaons. In the area of high energy collision reactions, the "masses" of the tau lepton, W and Z bosons are also useful parameters, but they must be regarded as energies corresponding to some destructive processes. In such aspect they are successfully used in the BSM analysis. BSM find also the physical meaning of some parameters from the electroweak theory, such as the effective mixing parameter $\sin^2\theta_w$ and the Fermi constant G_F (Chapter 6).

The BSM rely mostly on the fundamental physical constants determined experimentally with very high accuracy. This constants are heavily involved in the calculations of the structural dimensions of the subatomic particles and the parameters of CL space.

The author of BSM feels obliged to acknowledge the great efforts contributed by numerous physicists involved in the determination of these physical parameters.

11.4 BSM theory and the Theory of Relativity (TR).

The BSM incorporates in full the concept of the General and Special relativity. The most of the discrepancies are of logical interpretation. The BSM, however, appears more general than the relativistic theory, because:

- The concepts and postulates of the relativistic theory are valid only for a normal (not disturbed) CL space.

- The concept of the BSM includes the normal CL space, disturbed CL space and pure void (in a classical sense) space.

Under the category "disturbed CL space" here we must understand not electric or magnetic

field, but structural disturbance of the CL node arrangement. Such process, for example appears temporally in the nuclear weapon explosion. It may occur in small scale even in a powerful chemical explosion. (It is known that in such conditions the solid metals show behaviour as flowing liquid, without breaking).

The concept of the empty space has different logical interpretation by BSM, than by TR. According to TR the space between distant stars and galaxies appears empty, while according to BSM it is filled by CL lattice. In such space BSM is able to provide physical explanation of inertia, Newton's gravitation, EM fields, quantum features, light velocity and all relativistic phenomena, proposed by Special and General Relativity. It gives a possibility to analyse the proposed by TR postulates and concepts and conditions for their validity. These issues has been touched and discussed in different places of the present course of BSM theory.