A New and Sound Way of Making Physics; a Challenge for Excellent Computational Physicists and Programmers

By Ismail German, isoger1@gmail.com, ismail.german@test-dr.com

Abstract: This work is further contribution to that we have published in the past and here we try to describe our model in a way that computer simulations will eventually be possible. We nearly constructed the framework of our previously proposed model to conduct a global picture; without a global picture in mind neither algorithm nor code.

We emphasized the necessity of handling (elementary) particles and fields as an integral entity due to the reason that a charge having a definite rest mass could not produce a field of infinite energy around itself without continuous interaction with the field. Our simple calculations have shown that an electron accelerating another from 1 to 2 F would exhaust its rest mass and a recharge would be inevitable.

We have handled the stability problem in a very naïve way and deduced that about 6% of the emitted particles would turn back, the remaining ones are to be reconstructed from a remaining seed with the help of randomly moving datoms in vacuum.

Regarding the dual character of the electric force the phase of oscillations needs to be quantized and the positioning and movements need to be within a cellular structure.

1. Introduction:

The World has certainly witnessed a dominant illumination in the second half of the last millennium and two great wars in the last century in spite of this quasi-illumination. A second ultimate illumination or very probably a third war seems now to be in pursuit, even though a probable/possible doom may be our predetermined fate independent of whichever of these has occurred [1] .

Considering the possibility of doom being at the gate, we seem to be in real need of a spiritual transformation in addition to a cultural one, but the second is a necessity for all possibilities mentioned in the previous paragraph *. Contemporary science seems to be unable to cope with these serious problems.

Selfishness, greed and apathy were very probably, or at the least partly, a result of our lack of understanding the Universe around us and our connections with it. As Dr. Einstein has also mentioned, our technology has exceeded our humanity and of course our understanding of our environment. Working in the area of micros, on atoms and nuclei, we managed to develop an advanced technology. Beginning with the 20th Century, our problems in understanding the observed phenomena began to increase. We could not understand the physics of small scales and , to cope with , we adopted a rather mathematical

* *I used to think that top environmental problems were biodiversity loss, ecosystem collapse and climate change. I thought that thirty years of good science could address these problems. I was wrong. The top environmental problems are selfishness, greed and apathy, and to deal with these we need a cultural and spiritual transformation. And we scientists don't know how to do that [2].*

abstraction and description of them. That was to some extent due to previously applied social pressure on science and scientists as a result of desire to development or said in another words, economic growth.

On the other hand myths and predictions have warned us against development without enough global understanding. We did not take enough care of them, treating them as old fashioned myths. Under these conditions, having an advanced technology in hand a cultural transformation was due and to be supposed to occur via natural philosophy/physics. Weak efforts to bring water to this mill in have occurred the past. Many weak voices have traveled within the scientific air and all they have shown was that lone wolfs can't save the pack and a choir/band/orchestra is needed *, **. A conductor, good enough instruments and something plausible to conduct are also additional needs.

Life and even the whole Universe seem to be an infinite sequence of repetitive phenomena and, as Dr. Feynman pointed once out, the same equations have the same solutions. Not only in natural philosophy but also in philosophy we seem to have flipped between materialism and idealism in the past two or three centuries. Regarding the first one, now, we seem to have really flipped, though in another sense of the word: Our candidate conclusion seems to be that the Universe is immaterial and all things around are illusions ***.

** It was really because quantum theory, and to a lesser extent relativity theory, were never understood adequately in terms of physical concepts that physics gradually slipped into a practice of talking mostly about the equations....To some extent this began as early as the 1920s when the astronomer Sir James Jeans proposed that God must be mathematician. Heisenberg later gave it enormous boost with his idea that science could no longer visualize atomic reality in terms of physical concepts and that mathematics is the basic expression of our knowledge of reality....Now I don't agree with these developments. In fact, I feel that the current emphasis on mathematics has gone too far [3].*

*** Quantum theory makes the most accurate empirical predictions. Yet it lacks simple, comprehensible physical principles from which it could be uniquely derived. Without such principles, we can have no serious understanding of quantum theory and cannot hope to offer an honest answer—one that's different from a mere "The world just happens to be that way"—to students' penetrating questions of why there is indeterminism in quantum physics, or of where Schrödinger's equation comes from. The standard textbook axioms for the quantum formalism are of a highly abstract nature, involving terms such as "rays in Hilbert space" and "self-adjoint operators." And a vast majority of alternative approaches that attempt to find a set of physical principles behind quantum theory either fall short of uniquely deriving quantum theory from these principles, or are based on abstract mathematical assumptions that themselves call for a more conclusive physical motivation [4].*

**** A fundamental conclusion of the new physics acknowledges that the observer creates the reality. As observers, we are personally involved with the creation of our own reality. Physicists are being forced to admit that the universe is a "mental" construction. Pioneering physicist Sir James Jeans wrote: "The stream of knowledge is heading toward a non-mechanical reality; the universe begins to look more like a great thought than like a great machine. Mind no longer appears to be an accidental intruder into the realm of matter, we ought rather hail it as the creator and governor of the realm of matter. Get over it, and accept the inarguable conclusion. The universe is immaterial-mental and spiritual [5].*

Figure 1 is a good summary in depicting the present situation.

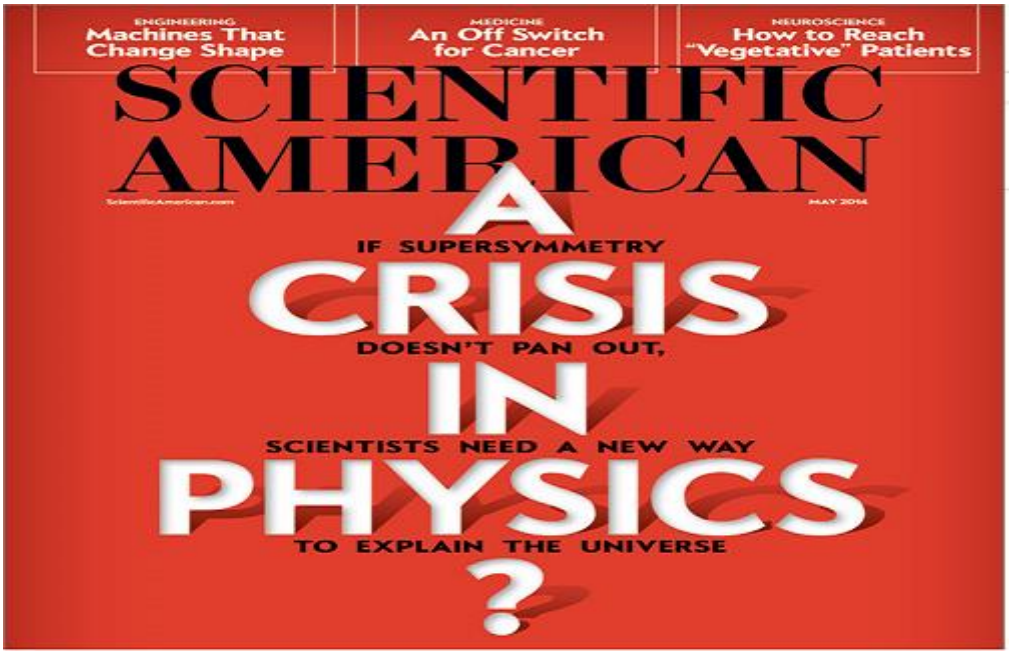

Figure 1: A related issue of Scientific American [6]. A blog, though the blogger may not be an expert in the field, do also contain pretty plausible arguments, and a good deal of nonsense, regarding the situation [7].

Considering the two distinct states of this complex flip-flop, the ones mentioned above, the case may be that Spencer is right, the truth is in between: Universe is material and our understanding mental/spiritual. Setting this aside, let us first mention that early deviations from classical understanding and adopting a pragmatic approach began much earlier, with electricity and magnetism.

2. Classical Electrodynamics and Electromagnetic Waves.

An excellent history of classical electrodynamics is given in [8]. Figure 2, taken from this reference, depicts the time-dependent discovery rate. The topic is almost closed by early 20th Century.

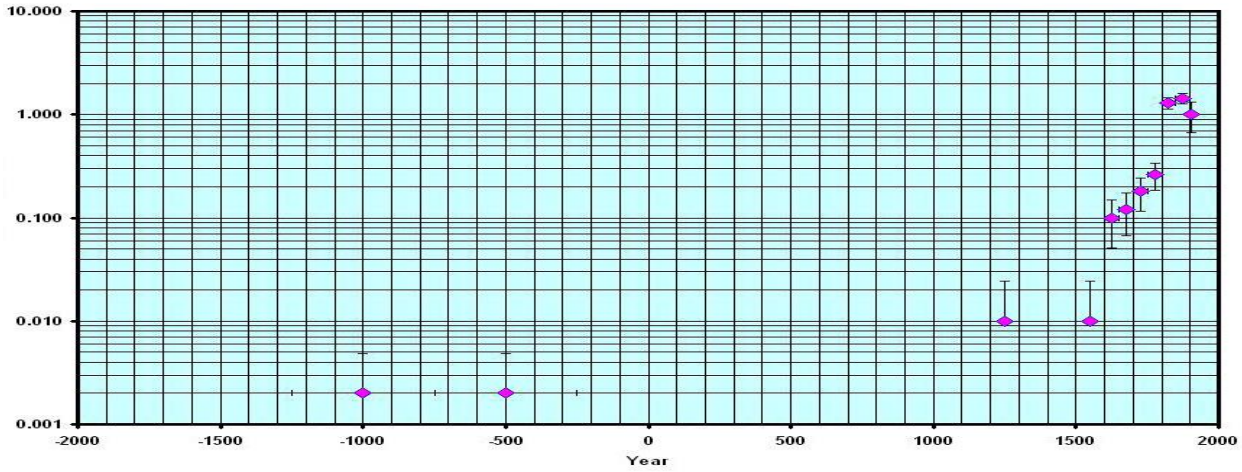

Figure 2: Rate of time-dependent discoveries in classical electrodynamics.

The problem is that particles and fields are being handled as separate entities , an integral handlings fails which was prone to fail before the properties of elementary particles were discovered *. Let us investigate further via some simple calculations regarding the electric forces between two stable particles, electron and proton (disregarding magnetic force for the time being and assuming one of the particles are forced to stay at rest).

Electron's mass: 9.1×10^{-31} kg

Proton's mass: 1.67×10^{-27} kg

Magnitude of the force at 1 F : 230 N

Magnitude of the force at 2 F : 57.5 N

Focusing on classical e-e interaction:

Average acceleration and force between 1 and 2 F: 12.86×10^{31} m/s^2 and 115 N

Time required for displacement: $.39 \times 10^{-23}$ s

Final velocity if initial is 0: 12.86×10^{31} m/s^2 x $.39 \times 10^{-23}$ s = 5.07×10^{8} m/s

Kin. E. : $.5 \times 9.1 \times 10^{-31}$ kg x 25.72×10^{16} Joule = 1.17×10^{-13} Joule

E=force x way=115 N x 10^{-15} m = 1.15×10^{-13} Joule

r. m. energy of electron = 0.82×10^{-13} Joule

That is, more energy than the rest mass energy of an electron is needed to accelerate an electron at rest from 1 to 2 F under the force of another electron forced to stay at rest. This energy is supplied by the field which was previously vacuum and created by the presence of the charge of an electron, a point particle without any structure, and how this energy is created is obscure. Quite an interesting scientific description of the event.

If a proton forced to stay at rest accelerates the electron only about 1 promil of its rest mass energy will be required to achieve the same effect.

3. Quantum Electrodynamics

"QED is a complex and highly mathematical theory that paints a picture of light that is counter-intuitive to everyday human experience. According to QED theory, light exists in a duality consisting of both particle and wave-like properties. More specifically, QED asserts that electromagnetism results from the quantum behavior of the photon, the fundamental "particle" responsible for the transmission electromagnetic radiation. According to QED theory, a seeming particle vacuum actually consists of electron-positron fields. An electron-positron pair (positrons are the positively charged antiparticle to electrons) comes into existence when photons interact with these fields. In turn, QED also accounts for the subsequent interactions of these electrons, positrons, and photons.

* *Scientists are unsure of exactly how the waves and the particles relate to each other [9].*

Photons, unlike other "solid" particles, are thought to be "virtual particles" constantly exchanged between charged particles such as electrons. Indeed, according to QED theory the forces of **electricity and magnetism** (i.e., the fundamental electromagnetic force) stem from the common exchange of virtual photons between particles and only under special circumstances do photons become observable as light.

According to QED theory, "virtual photons" are more like the wavelike disturbances on the surface of **water** after it is touched. The virtual photons are passed back and forth between the charged particles much like basketball players might pass a ball between them as they run down the court. As virtual particles, photons cannot be observed because they would violate the laws regarding the conservation of energy and momentum. Only in their veiled or hidden state do photons act as mediators of force between particles. The "force" caused by the exchange of virtual photons causes charged particles to change their velocity (speed and/or direction of travel) as they absorb or emit virtual photons [10]."

A formal summary is to be found in [11].

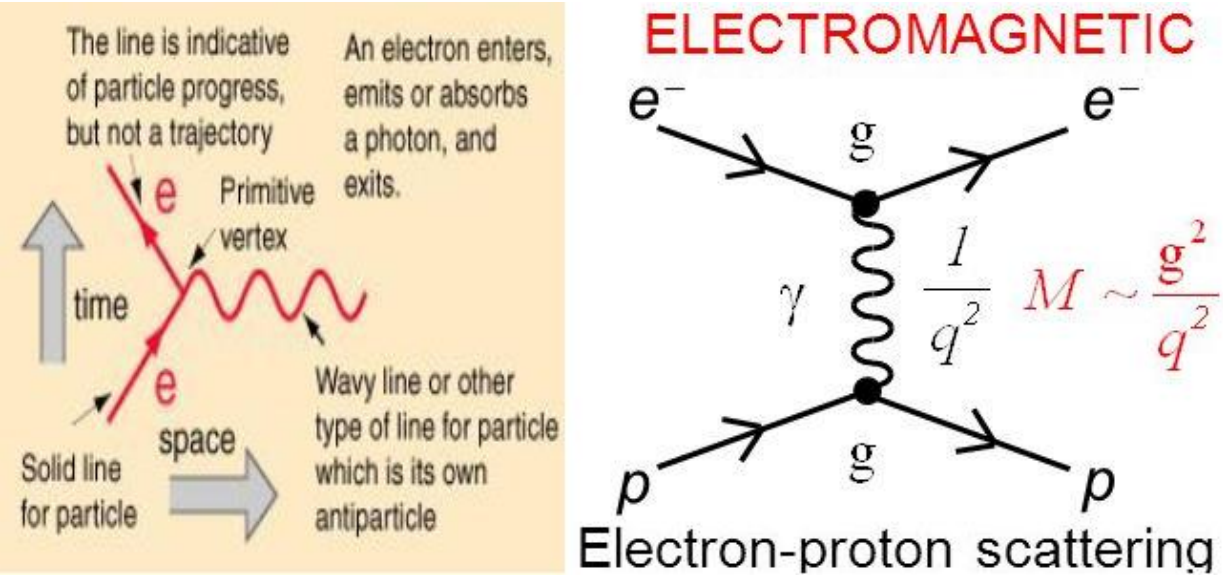

Figure 3: An extremely brief summary of quantum electrodynamics.

Our objections:

- It is counter intuitive and heavily mathematical. Mathematical abstractions of different groups of phenomena are rather hard to unify.
- It is not to be understood. One of its main constructors has said he does not understand quantum mechanics and consequently QED. QED is based on operator algebra of QM [12].
- Exchanged photons are virtual with unknown structures. They need to be in ϒ band and the number of exchanges are to be pretty high. How they are emitted from structureless point particles like electrons and what kind of changes are to be made within the structure of the particle is obscure.
- The energies needed are pretty high and a particle emitting these energies is supposed to consume itself up, especially if the emitted photons are somehow not replaced. Two particles may

exchange photons and can stay as they originally were in case they are in the near vicinity of each other. The field, on the other hand, is all around of each particle and long range. A great deal of energy that did work or emitted to vacuum to create the field would not turn back.

- It is pretty hard to imagine the explanation of an attractive force via particle exchange among the particles.

Mathias Frisch states good thoughts in "Inconsistency, Asymmetry, and Non-Locality: A philosophical Investigation of Classical Electrodynamics" [13]. Another work to be cited may be [14]. This section is to be concluded by stating that raising objections is easy but replacing the established work is extremely hard. Hope is computational physics.

4. Our Proposal

Our proposal has a history, is based on some observations and it of course has a body.

4.1. History

The idea of an atom as the smallest indivisible moving particle is first stated by Democritus. Narratives are pretty controversial due to lack of written documents from that time. Google search with "Democritus' atom" is of help.

Newton seems to have shown interest to the subject since he is known to have had investigated the problem of sphere packing. It can hardly be a result of a practical need of cannon ball storage due to the fact that cannon balls are stored on flat surfaces and the art is practical.

Our interest on the idea that matter is made up of extremely tiny, hard, indivisible spheres moving with the velocity of light goes back to 1968. The first calculations were made in 1974 [15]. The trial to attain **Huygens' obliquity factor** was made in 2002 [16].

4.2. Simplest Classical Facts

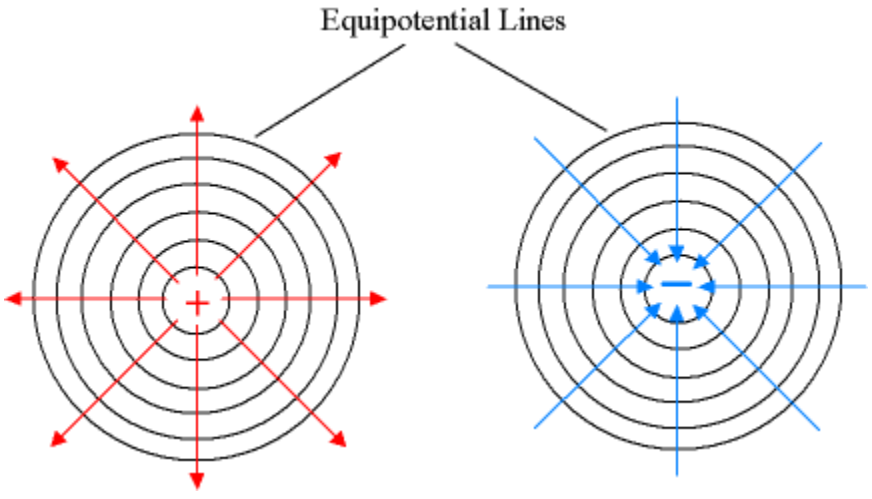

Figure 4: Equipotential lines and field lines for single charges of both kind.

Regarding Figure 4:

- Fields around charges do have much more energy than the rest mass energy of the charges.
- If charges are creating the fields via repetitive emission of particles, they need substitution from the space around them.
- Equipotential lines are result of $1/r^2$ forces and have spherical in forms. They indicate that the energy (the number of outgoing particles) is conserved if any surface covering the total volume around the charge is taken into account.
- Field lines are tangents to the differential areas on the surfaces of the spheres formed by equipotential lines.
- At any point, an imaginary charge of a certain kind (the same kind with the creator of the field) is supposed to feel a repulsive force and the other an attractive.

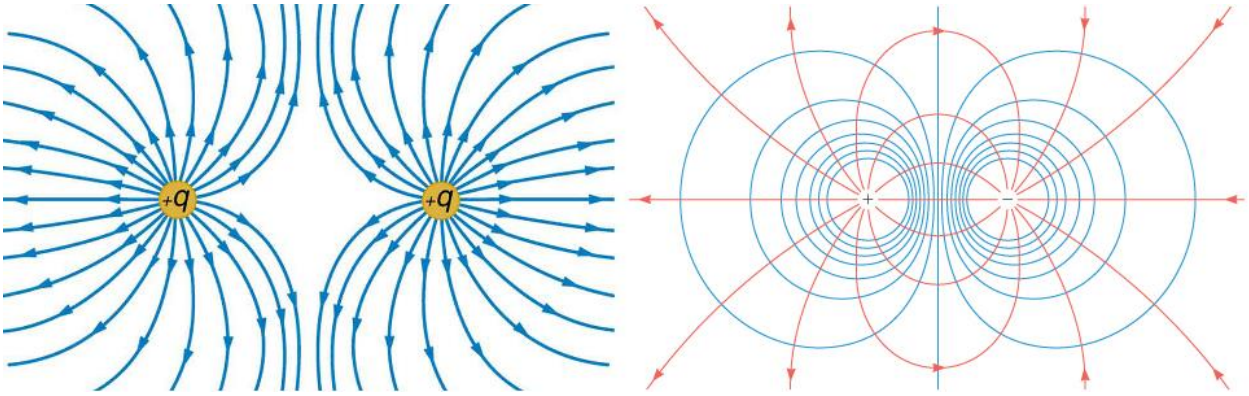

Figure 5: Field lines around charges of the same kind and equipotential lines and field lines around 2 charges of different kinds. If charges change sign, field lines change direction [17].

In case of Figure 5, an imaginary charge feels the resultant force as a result of linearity (superposition principle). Again repulsive and attractive forces are present at any point. To feel the due force is the duty of the imaginary charge placed at the point. That of course means we can't deal with direct simple bombardment, the mechanism is bit more complicated.

Regarding all these, a good amount of sound thoughts are to be found in [18]. Especially to be noted are:

- As sketched in Figure 6, the resultant forces are in effect.
- "*We know that the effects of an electric field propagate at a finite speed – that of light. If we could suddenly introduce an identical charge nearby another, the existing charge would not respond immediately. Instead there would be a brief pause before the existing charge began accelerating away. This would seem to indicate there is something physically moving from one charge to the other and then striking that second charge with a force.*"
- *"Could what we describe as an electric field be in fact, not just be an abstract mathematical entity, but an actual flow of material that moves outward from a charge and imparts a force on other charges when it hits them? On one hand this sounds logical because it explains why there would a delayed effect if the 'material' moved at the speed of light. It would also explain how an electric force is exerted at a distance: it isn't, the force is applied directly when the material meets/hits the other charge. On the other hand it sounds illogical because the material is not coming from anywhere. It flows out of the particle, yes, but without first coming*

into it from somewhere else. So what if the electric field 'material' was not coming from elsewhere but being generated 'on the fly'? That is, it was continuously being produced and then ejected?"

The situation is not that simple though, as we will see in our proposal.

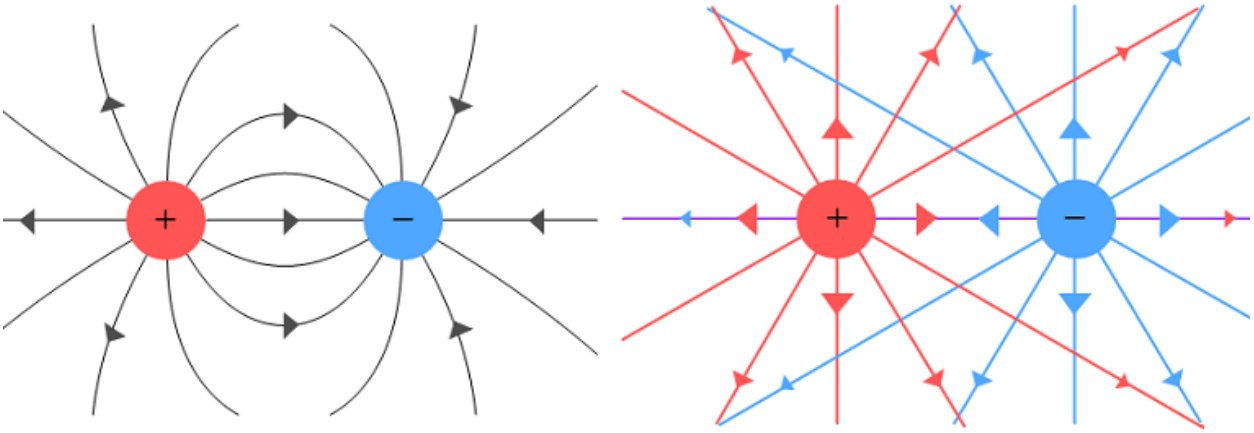

Figure 6: Figure to show that the field lines are results of resultant forces. It is to be noted that blue ones are in reality inwards.

In addition to these, in the simplest case considered, we also need to be able to construct transverse waves by shaking any kind of charge up and down, since light (an e-m wave) is polarizable.

4.3. The Proposal

Figure 7: Cat and off-springs.

Regarding the simple charged particle case (Figure 4) we first need replacement of the emitted particles via the space around which is a necessity. Figure 6 is a good symbolic way of stating this fact. The total volume of off-springs is greater than the volume of the cat but the source is well known.
We of course in addition need a mechanism to account for the dual character of the electric force. Let us give a try. We are first to begin with replacement/regeneration.

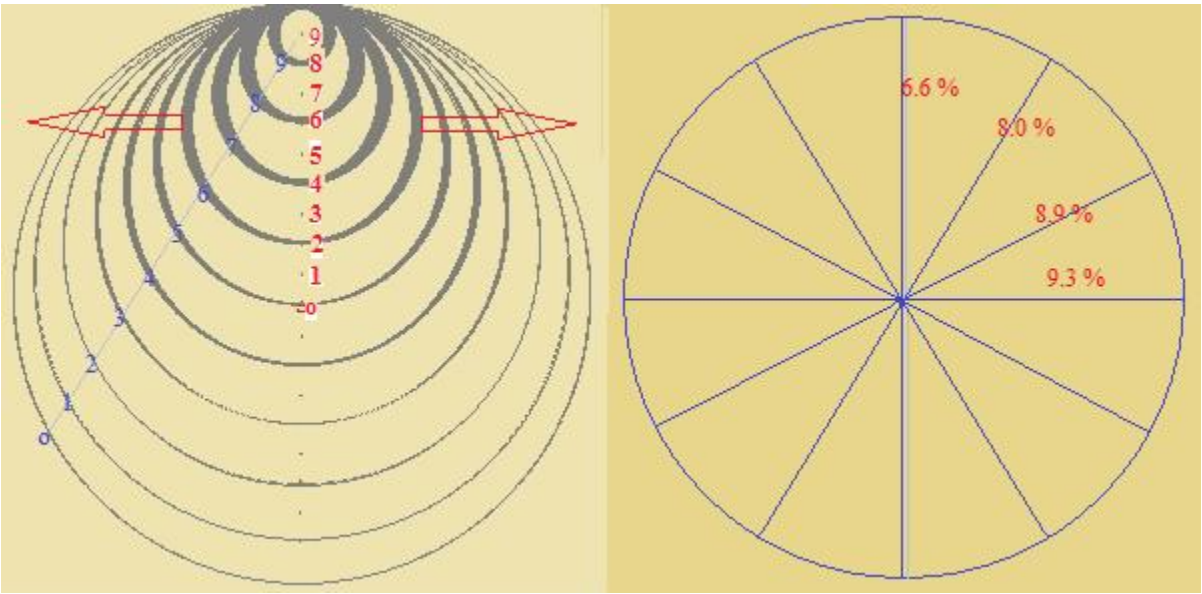

Figure 8: Our unit cell first introduced in [16]. The part at left depicts the case of an additional assumption that 0-momentum collisions are made in 10 discrete steps. The case is further simplified by the constraint that after collisions there exist 12 discrete directions. The part of the figure at right giving the normalized scattering probabilities has up-down and right-left symmetry regarding probability values.

We previously introduced the concept of unit cell to attain the Huygens' Obliquity Factor [16]. The cell is a sphere (circle in 2-dimensions) with a definite diameter in which the emitted particle, (datom after Democritus' Atom), makes a 0-momentum collision with certainty. To this end we assumed an exponentially increasing 0-momentum collision probability and the discrete case of 10 equidistant collision points gives us the left part of the figure. Particle will be on one of the circles shown, moving directly outwards. Time elapsed is of course time of travel of the emitted particle from origin, "o", to point 10 which is not marked in the figure. Note that for each particle scattered to a definite direction, there will be another particle going in the opposite direction with respect to the center of the collision and each particle will be traveling directly out of this center.
We have introduced the concept of datom and vacuum consisting of moving datoms in sections 4 and 5 of one of our previous works [19]. That charges, elementary particles, are to be considered as spherically formed bundles acting like harmonic oscillators is also mentioned previously. Figure 9 tries to depict the concept without individual datoms being drawn.
One of the references given has a pretty good animation that depicts the situation [18]. We can't repeat it here but we tend to deduce from the previously given data that almost all of the mass of the particle,

the ordered part embedded on vacuum, is to be consumed at each burst. A seed should be remaining which reconstructs the ordered particle with the help of the particles returning back after the burst and the random vacuum around. Such a scheme is to be simulated.
Regarding the number of the returning datoms we may only say that they will be about 6% of the emitted at each burst based on the figure given as Figure 8. In continuous case much lesser will come directly back but there will be a good amount of coming datoms back via indirect ways.
It will erroneous to think that without a 0-momentum collision a particle, datom, would be entering the charge with certainity; not only a visit but time of the visit, they both, are important.

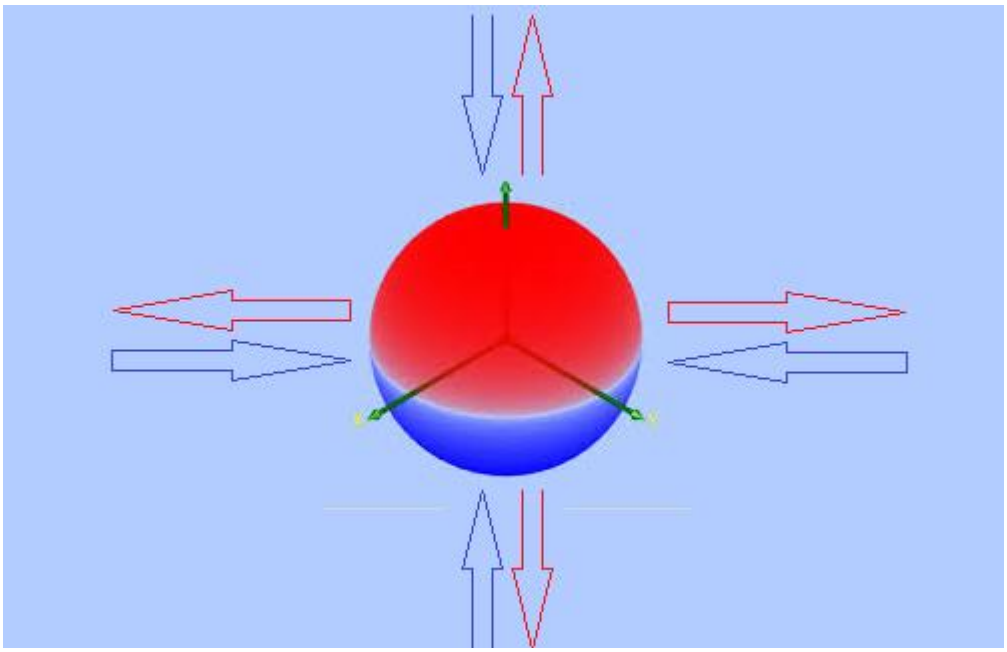

Figure 9: We want to consider (elementary) particles as ordered spherical forms embedded on vacuum, a space in which datoms move randomly in each direction. The random vacuum has a certain density of datoms. To cope with astrophysics we may assume that particles having an ordered structure is about 15% denser than the vacuum.
The ordered spherical forms we mention may have been and still being created in space where the dark matter density, the number of datoms per unit volume, is higher than we have now around. They will cease to exist, due to failing support, if density gets much lower than we have now around.
Regarding charges, the dual character of the forces, we have thought of quantized phase for about two decades. It was pretty easy to guess that the particles should be some kind of harmonic oscillators and phase of oscillations could be different which would create high pressure regions among and outside of charges. This was natural to expect in case of presence of 0-momentum collisions due to the fact that the particles making collisions will remain longer in the region.
The problem is that phase alone changes as the particle moves and it can’t be a solution alone. This we have mentioned in one of our posts to a Yahoo Group, Digital Physics/Digital Philosophy about 15 years ago.

The problem is resolved in case the particles move in discrete quantas, over a cellular region as depicted in Figure 10. It took us more than 15 years to persuade ourselves about this cellular motion.

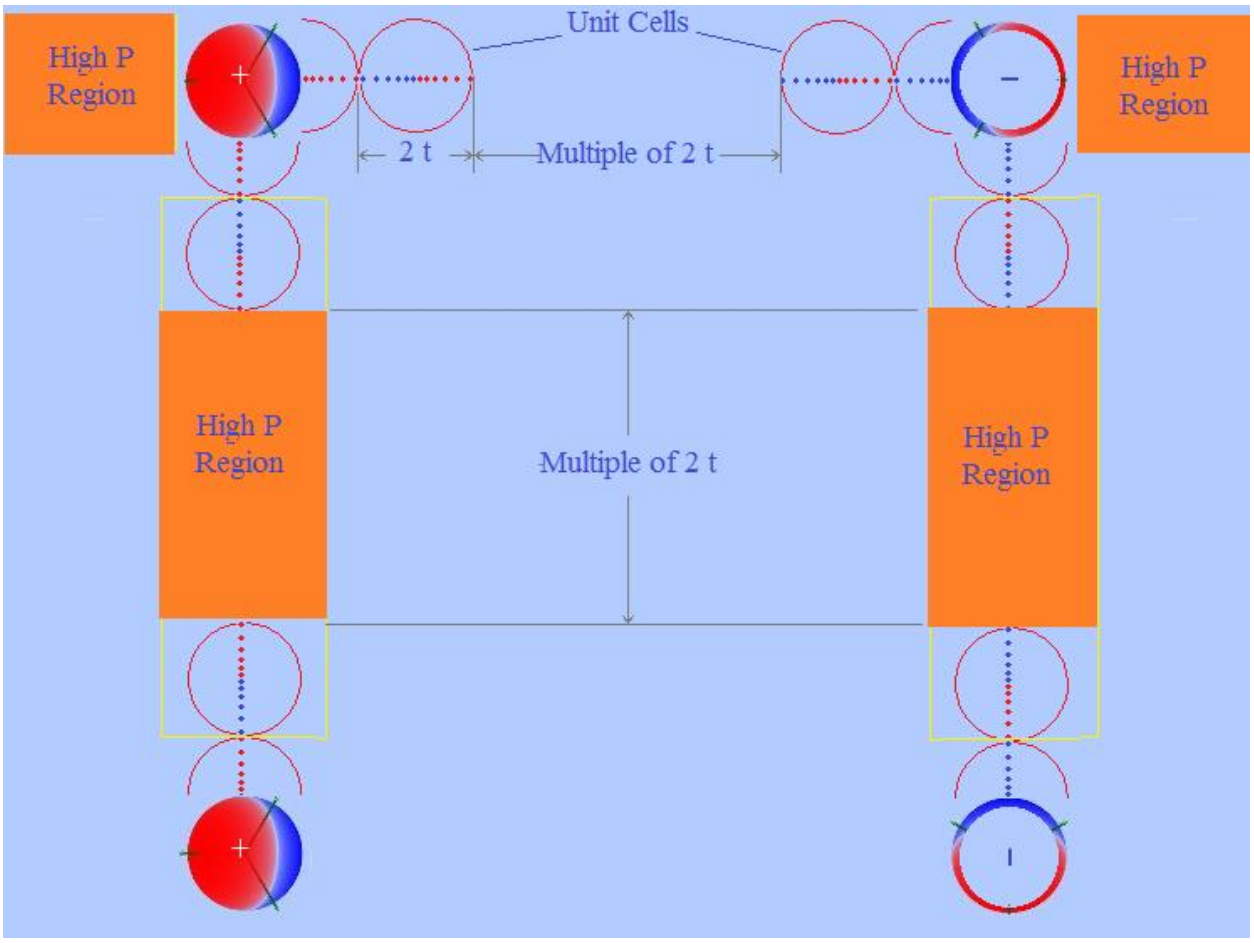

Figure 10: A possible scheme responsible for the dual character of the electric force in case of discrete calculations. The "+" and "-" signed charges are on cells and do oscillate with 180^0 phase difference. Calculations nearly replacing the continuous case are beyond our computational capabilities. We will certainly try our best to make calculations with higher densities and smaller steps in the near future.

[1] http://www.jpost.com/Opinion/The-2nd-Holocaust-How-we-can-prevent-it-453063

[2] http://futureactionculture.tumblr.com/post/96154730961/selfishness-greed-and-apathy

[3] http://claesjohnson.blogspot.com.tr/2013/08/quantum-contradictions-17-david-bohm.html

[4] https://books.google.com.tr/books?id=YV1ClauzQ6YC&pg=PT53&lpg=PT53&dq=Quantum+theory, … p. 41

[5] http://www.collective-evolution.com/2014/11/11/consciousness-creates-reality-physicists-admit-the-universe-is-immaterial-mental-spiritual/

[6] http://www.scientificamerican.com/article/supersymmetry-and-the-crisis-in-physics/

[7] https://ronmamita.wordpress.com/2015/03/26/science-is-embarrassing-itself-and-will-only-get-worse/

[8] http://web.hep.uiuc.edu/home/serrede/P435/Lecture Notes/A Brief History of Electromagnetism.pdf

[9] http://www.qrg.northwestern.edu/projects/vss/docs/space-environment/2-what-is-electromagnetic-radiation.html

[10] http://www.encyclopedia.com/topic/quantum_electrodynamics.aspx

[11] http://www.damtp.cam.ac.uk/user/tong/qft/six.pdf

[12] http://hermes.ffn.ub.es/luisnavarro/nuevo_maletin/Feynman_QED_1949.pdf

[13] https://books.google.com.tr/books?id=aPdgBwAAQBAJ&pg=PT57&lpg=PT57&dq= …

[14] https://arxiv.org/ftp/arxiv/papers/1201/1201.5536.pdf

[15] http://www.test-dr.com/YAYINLARIMIZ/pap2.doc

[16] http://www.test-dr.com/YAYINLARIMIZ/pap3.doc

[17] http://alumnus.caltech.edu/~muresan/projects/esfields/field.html

[18] http://www.alternativephysics.org/book/ElectricFields.htm

[19] https://www.academia.edu/s/2e7c3d0071