

The Processes of Life from Model Mechanics

By: Ken H. Seto

A new physical model of our universe called Model Mechanics has been formulated. Model Mechanics supposes that a stationary substance, called the E-Matrix, occupies all of pure-space (void) in our Universe. Subsequently, we perceive the E-Matrix as space. The E-Matrix, in turn, is composed of E-Strings, which are very thin three-dimensional elastic objects, of diameter estimated at 10^{-35} m. The length of an E-String is not defined. Away from matter, the E-Strings are oriented randomly in all directions. This means that a slice of the E-Matrix in any direction will look the same. Near matter, the E-Strings are more organized: some emanate from the matter, and the number of these passing through a unit area followed the well-known inverse square law of physics. The E-Strings repel each other. This means that there is an unknown outside force that is compacting them together to form the E-Matrix. The repulsive force and the compacting force are in equilibrium. This state of the E-Matrix allows massive matter particles to move freely within it. The motion of a matter particle or S-Particle system in the E-Matrix is called absolute motion. The absolute motion of matter in the E-Matrix will distort the local E-Strings. The E-Strings will recover to the non-distorted state after the passage of the matter particles. Light consists of wave-packets (photons) in neighboring E-Strings as shown in Fig 3.1. On its way toward its target, a wave-packet (photon) will follow the geometries of these neighboring E-Strings. This description of light embodies "duality" as proposed by current physics, *i.e.* light possessing properties of a mass-bearing particle as well as a wave packet.

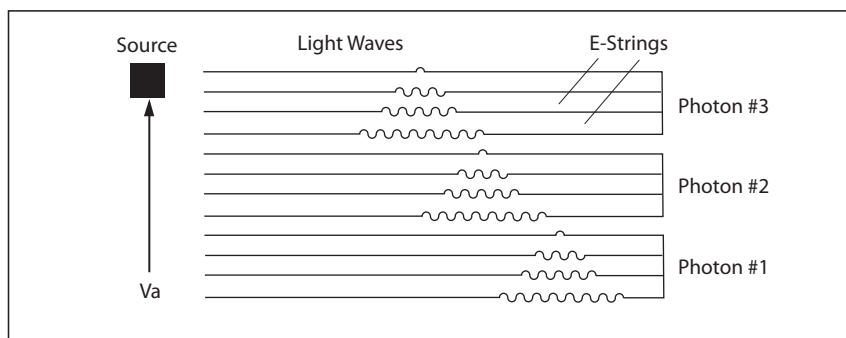


Fig. 3.1 three consecutive Photons emitted from a source in a state of absolute motion in the E-Matrix.

With this description of the E-Matrix (space), the next relevant question is: What is matter? All stable and visible matter is made from three Elementary Particles: the electrons, the up-quarks, and the down-quarks. The protons and neutrons in the nuclei of all the atoms are made from the up-quarks and the down-quarks. The electrons orbit around the nuclei to complete the picture of all the atoms. The three Elementary Particles are, in turn, made from one truly fundamental mass-bearing particle, called the S-Particle. An S-Particle is a three-dimensional spherical object. It is repulsive to the E-Strings surrounding it and therefore its motion in the E-Matrix is maintained. An S-Particle orbiting around an E-String in the helical counterclockwise direction gives rise to a negatively charged particle and an S-Particle orbiting an E-String in the helical clockwise direction gives rise to a positively charged particle.

This completes the Model Mechanical description of our current universe. All the particles, all the forces and all the processes of nature can be derived from this one description. Model Mechanics replaces the math constructs of space-time of Relativity Theories and the fields/virtual particles of Quantum Field Theories with the E-Matrix and the distortions or waves in the E-Matrix. The combination of the physical model of Model Mechanics with the math of Quantum Field Theory (QFT) and the math of General Relativity Theory (GRT) eliminates the incompatibility problem exists between QFT and GRT.

Model Mechanics has the following postulates:

1. The E-Matrix is a stationary and structured light-conducting medium. It occupies all of pure space (pure void). It is comprised of very thin and elastic E-Strings and these E-Strings are

repulsive to each other. There is an outside compacting force that compresses these E-Strings together to form the E-Matrix.

2. The S-Particle is the only truly fundamental particle existing in our universe. The different orbiting motions of the S-Particles around the E-String(s) give rise to all the visible and stable particles in our universe.
3. All the processes of nature are the results of different absolute motions of the S-Particles or S-Particle systems in the E-Matrix.
4. All the forces of nature are the results of the S-Particles or S-Particle systems reacting to the distortions or waves in the E-Strings to which they are confined. The distortions or waves in the E-Strings, in turn, are the results of the absolute motions of the interacting S-Particles or S-Particle systems in the E-Matrix.
5. All the stable and visible matters are the results of orbiting motions of the S-Particles around specific E-String(s).

Forces Based on Absolute Motions

The idea that absolute motion of interacting particles in the same direction gives rise to an attractive force, while absolute motion of interacting particles in the opposite directions gives rise to a repulsive force, is derived from the familiar electric current experiments in parallel wires. These experiments show that when electric currents are flowing in the wires in the same direction, the wires are attracted to each other, and when the currents are flowing in the opposite direction, the wires repel each other. Figs. 3.2 and 3.3 illustrate these experiments graphically. The absolute motions of the electrons in the same direction cause distortions in the E-Matrix that pulls the wires together--an attractive force. Conversely, the directions of absolute motion of the electrons in the opposite directions will cause distortion in the E-Matrix that pulls the wires apart--a repulsive force.

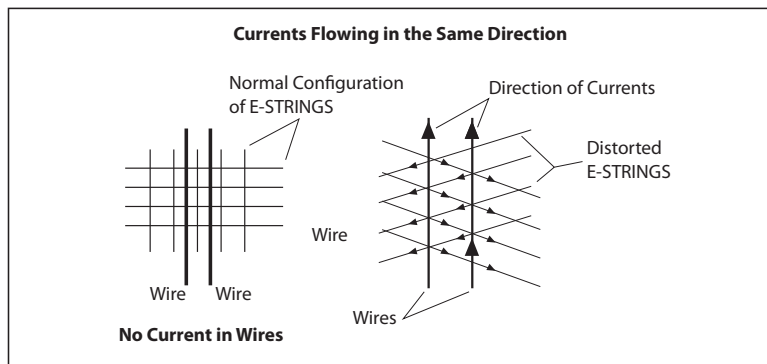


Fig. 3.2: Currents (electrons) in the wires are flowing in the same direction, and therefore the force between the electrons is attractive. The right diagram that shows that the tension created in the E-Strings by the absolute motions of the electrons is pulling the wires together.

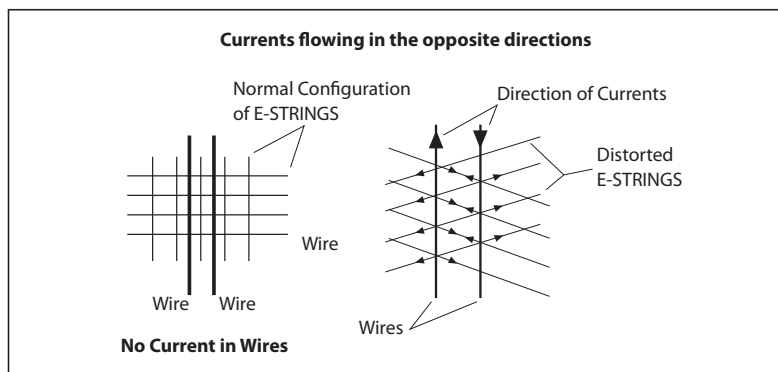


Fig. 3.3: Currents (electrons) in the wires are flowing in the opposite direction, and therefore the force between the electrons and thus the wires is repulsive. The right diagram shows that the tension created in the E-Strings by the absolute motions of the electrons is pulling the wires apart.

Extending the Model Mechanics interpretations of the results of the electric-current experiments to include the orbiting motions of the S-Particles around the E-Strings will enable us to explain all the nuclear forces between the interacting up quarks and down quarks. This interpretation becomes the most important concept of Model Mechanics and it enables Model Mechanics to unite all the forces of nature naturally.

Cosmological Repulsive Effect (CRE) Force

Current physics posits that there are four forces of Nature: the electromagnetic force, the nuclear weak and strong forces, and gravity. Model Mechanics posits that there is a fifth force of Nature; the new force being the CRE force (Cosmological Repulsive Effect Force). As the name implies, the CRE force between any two objects is repulsive. While the CRE force is new to physicists, it is not new to experiments; it is what we commonly refer to as inertia. In other words, the resistance between two objects to change their state of absolute motion is the CRE force between them. The CRE force between any two objects moving in the same direction in the E-Matrix is always repulsive, and it is derived from the confinement of the interacting objects to the diverging structure of the E-Matrix.

The CRE force played an important role in the formation of our Universe, and is continuing to do so today. The repulsive CRE force, along with the attractive electromagnetic force between gravitating objects shaped the primeval Universe into the Universe that we see today. The CRE force also played an important role in the manifestation of the nuclear weak force. Without the CRE force, there would be no nuclear weak force. It is the CRE force that initiates the radioactive decay of atoms. Perhaps, the most important function of the CRE force will be a role, in combination with the electromagnetic force, in the processes of life.

Model Mechanics predicted the repulsive CRE force in 1993. However, it was not discovered until 1998 when two independent groups of astronomers discovered that the Universe at the far reached regions is in a state of accelerated expansion. This observation is in direct conflict with the prediction of GRT. In order to explain this observation, astronomers are now re-introducing the discarded repulsive Cosmological Constant to the GRT equation. The CRE force eliminates the need for this ad hoc approach.

The Force of Gravity (DTG)

Newton posited that gravity is a force, but he did not provide a mechanism for it. Newton's gravity model involved the unexplained phenomenon of action-at-a-distance, which was troublesome for the physicists of his time. Also, Newton's equation for gravity was eventually found to be slightly inconsistent with observations. Recognizing the deficiencies in Newton's theory, Einstein formulated GRT, which is not a theory of force, but rather a theory of space-time, amounting to an extension of SRT to include gravity.

Model Mechanics enabled us to formulate a new theory of gravity called Doppler Theory of Gravity (DTG). Like Newton's theory of gravity, DTG also treats gravity as a force but with an identified mechanism. Based on the provisions of Model Mechanics, the mechanism of gravity between two objects A and B moving in the stationary E-Matrix is as follows:

1. As the Universe expands both A and B are expanding in the same direction, this gives rise to an attractive force them.
2. The global structure of the stationary E-Matrix is divergent. Both A and B are confined to this global divergent structure as they travel in the stationary E-Matrix. This gives rise to the repulsive CRE force between A and B globally.
3. The force of gravity between A and B is the combined result of items 1 and 2 above. It is noteworthy that gravity is the sum of an attractive and a repulsive force acting on both A and B. This explains why the force of gravity is so weak compared to the electromagnetic and nuclear forces.
4. The above description for gravity suggests that the Newtonian equation for gravity can be modified to make it consistent with observations as follows:

$$F_g = \left(\frac{F_{ab}}{F_{aa}} \right) \left(G \frac{M_a M_b (j_a) \cdot (\pm j_b)}{r^2} \right) \quad (3.1)$$

$F_{aa} = f_{aa}$ = Frequency of a standard elementary light source in A's frame as measured by A.

F_{ab} = Transverse Doppler Frequency of an identical standard elementary light source in B's frame as measured by A.

The dot product $(j_a) \cdot (\pm j_b)$ in Eq. (3.1) expresses the concept that not all objects in the Universe attract each other gravitationally. A positive dot product represents an attractive force, but a negative dot product represents a repulsive force. Those objects that have the same direction of absolute motion are attracted to each other, but those objects that have absolute motions in the opposite direction exert a repulsive force on each other. Assuming the Big Bang model is correct then the dot product of the unit vectors for all local regions of the Universe is +1. This means that gravity in the local region is attractive. The dot product for a distant region, say beyond the radius of the observable Universe, is -1. Therefore, gravity for all those distant regions is repulsive. This is the reason why the far reached regions of the Universe are in a state of accelerated expansion.

The Electromagnetic Force

This is the force observed between charged particles. It was determined that like-charged particles exert a repulsive force on each other while unlike charged particles exert an attractive force on each other. The reader will recall that a charged particle is the result of a clockwise or counterclockwise orbiting motion of its S-Particle around a specific E-String. A clockwise orbiting motion of the S-Particle gives rise to a positively charged particle. A counterclockwise orbiting motion of the S-Particle gives rise to a negatively charged particle. The charges between the interacting particles determine whether the force between them is attractive or repulsive. The following diagrams describe the electromagnetic force in Model Mechanical terms:

Interaction between Negatively Charged Particles

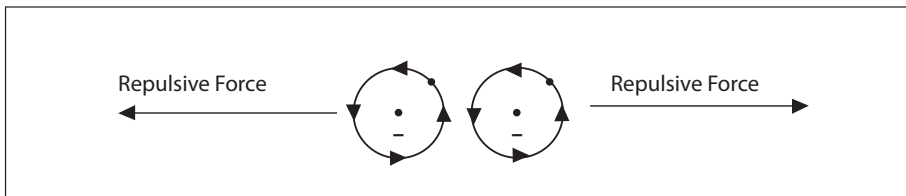


Fig. 3.4: The force exerted on each other by two negatively charged particles. In this case, the S-Particles are traveling in the opposite directions at the closest approach and therefore the force between them is repulsive.

Interaction between Positively Charged Particles

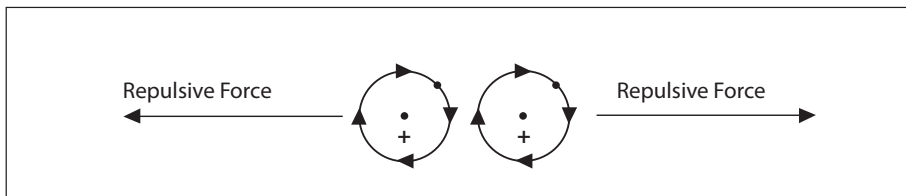


Fig. 3.5: The force exerted on each other by two positively charged particles. In this case, the S-Particles are traveling in the opposite directions and therefore the force between the resulting particles is repulsive.

Interaction between Negatively-Positively Charged Particles

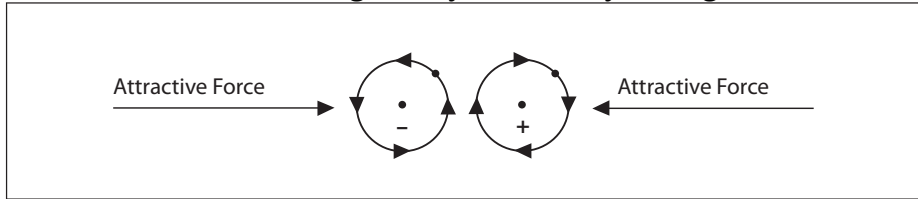


Fig. 3.6: The force exerted on each other by a negatively and a positively charged particle. At the nearest point of approach, the S-Particles are traveling in the same direction and therefore the force between them is attractive.

The Nuclear Strong Force

The Model Mechanical description of the nuclear strong force is very simple. It is caused by the absolute motion of the S-Particles of the quarks in the protons and neutrons. This description of the nuclear strong force raises the question: Since the quarks in the protons and neutrons are negatively and positively charged particles, how do they manage to stick to each other? The answer is stacked-interaction. When two particles of the same charge are stacked on top of each other, their S-Particles are traveling in the same direction. Therefore, they exert an attractive force on each other. The following diagrams illustrate the stack interaction concept.

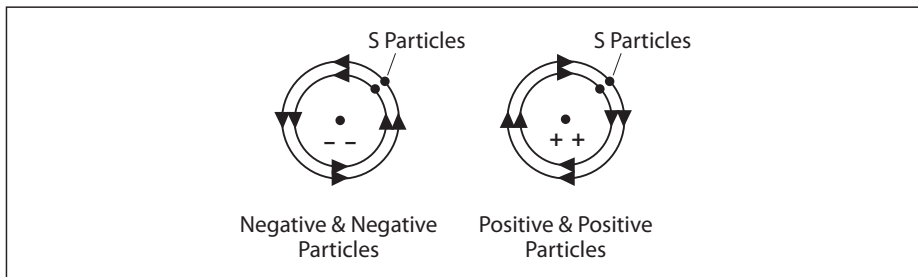


Fig. 3.7: The stacked interactions of two similarly charged particles. The negative particles would be the down-quarks and the positive particles would be the up-quarks.

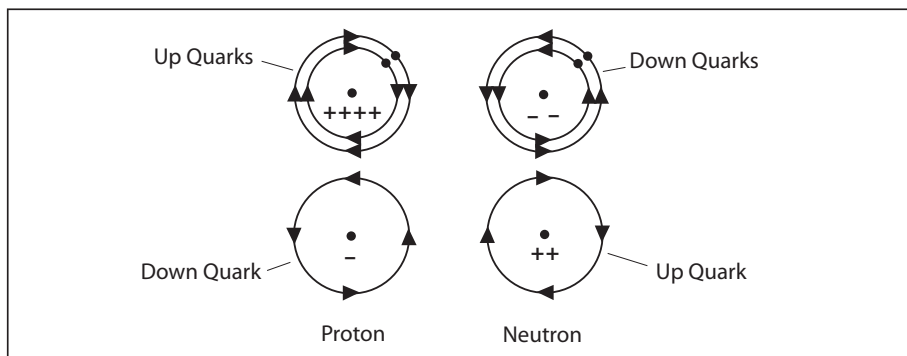


Fig. 3.8: The stacked and the electromagnetic interactions in a proton and a neutron.

The Nuclear Weak Force

The Nuclear Weak Force is responsible for initiating the decaying processes of unstable subatomic particles. The best-known subatomic particle decaying process is the neutron decay, also known as the beta decay. Quantum Mechanics does not specify when a free neutron will decay or why it will decay in about sixteen minutes. On the other hand, Model Mechanics is capable of describing the neutron decay process in detail. The following diagrams will help the reader to visualize the processes involved.

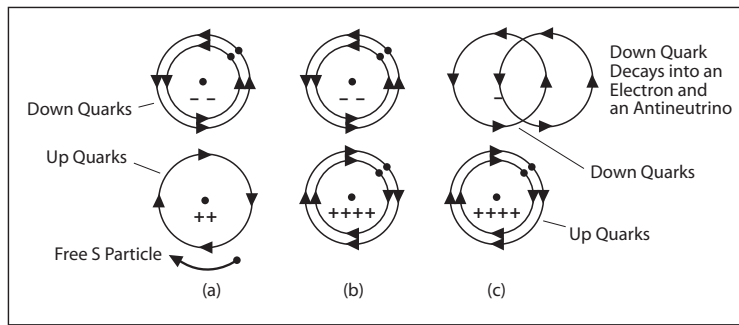


Fig. 3.9: Schematic diagrams for the neutron decay process.

- The up-quark in an unbounded neutron exerts an attractive force on any free S-Particles that are traveling in the same direction as its S-Particle. When a free S-Particle follows the orbit of the orbiting S-Particle of the up quark, it becomes an up-quark. This new up-quark immediately forms a stacked interaction with the original up quark.
- The down-quark between the two-stacked up-quarks is pulled closer to them because it feels the force from both of them.
- This has the effect of moving the stacked down quarks laterally relative to each other. When the lateral movement is greater than the radius of the down quark, the force between the stacked down-quarks becomes repulsive. This causes the down-quark that feels less attractive force from the two stacked up-quarks to peel away. The peeled away down-quark will then interact with a free S-Particle to give an electron and an antineutrino.

The Processes of Life from Model Mechanics

In 1859, Charles Darwin published the book *On the Origin of Species* by Means of Natural Selection. In his book he detailed his theory that all species are evolved from more primitive species through the process of natural selection. With this process, he theorized that all life, as we know it today originated from a few primitive forms. In his words "From so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved." What was the process that gave rise to the few primitive forms? Privately, he suggested that life could have arisen from chemistry. It was this suggestion that initiated much of the research efforts in the 20th century.

Model Mechanics describes that all the particles, all the forces and all the processes of nature are the results of absolute motion of S-Particles or S-Particle systems in the space filling E-Matrix. Interacting S-Particles or S-Particle systems moving in the same direction in the E-Matrix are attracted to each other and they are repelled to each other when they are moving in the opposite. The stacked interaction of two up-quarks in combination with the electromagnetic interaction with a down-quark forms a proton. The stack interaction of two down quarks in combination with the electromagnetic interaction with an up-quark form a neutron. The protons and neutrons, in turn, form the various nuclei of atoms via further stacked and electromagnetic interactions.

The divergent geometries of the E-Strings of the E-Matrix leads to the discovery of a new repulsive force called the CRE force. The CRE force between two objects moving in the same direction in the E-Matrix is repulsive. The reason is that both objects are confined to the divergent geometries of the E-Strings. It turns out that the CRE force is directly responsible for two of the most important processes of life: The cell division process and the ability of a replicated RNA strand to rip away from the DNA template. These interpretations lead to a new theory on the origin of life on earth. The relevant provisions of Model Mechanics as related to the origin of life on earth are summarized in the following table.

Item	Description	Properties	Functions in Life Processes
E-Matrix	It is a light-conducting medium occupying all of space.	It is a stationary and structured elastic medium. It is composed of E-Strings.	The structure of the E-Matrix is divergent and thus it gives rise to the repulsive CRE force which is necessary for the cell division processes of life.
E-Strings	The E-Strings are very thin elastic strings. They are compacted together to form the E-Matrix.	The E-Strings are repulsive to each other. Orbiting S-Particles round an E-String will follow the geometry of the E-String.	The properties of the E-Strings allow the S-Particles to orbit around them to give rise to the various Elementary and Basic Particles that are the building blocks of life.
S-Particle	The S-Particle is the only fundamental mass-bearing particle exists.	The S-Particle is a spherical- object. It is repulsive to the E-Strings surrounding it. Therefore its motion in the E-Matrix is maintained.	The orbiting motions of the S-Particles around the E-Strings give rise to the various Elementary and Basic Particles that are the building blocks of life.
Electromagnetic Force (the EM force)	This force is the result of interacting particles follows the geometry of the E-Strings to which they are confined by orbiting motion around these E-Strings.	The EM force can be attractive or repulsive between interacting particles or particle systems.	The EM force in combination with the Nuclear strong force forms the protons and neutrons from the Basic Particles. The EM force also responsible for the forming of all atoms, DNA RNA and all the proteins of life.
Nuclear Strong force	This force is the result of stacked interaction oop quarks and down quarks.	The Nuclear strong force is attractive between interacting particles.	The Nuclear strong force is responsible for the forming of all the nuclei of all atoms from the Basic Particles.
Elementary Particles: Electrons, Up-Quarks and Down-Quarks	These particles are the results of different orbiting motions of the S-Particles around the E-String(s).	Elementary Particles are the building blocks of all the atoms in the universe.	The atoms formed by the Basic Particles are the building blocks of all life forms.

In the past few decades, many of the molecular processes of life at the cellular level were discovered. Perhaps the most important of these discoveries was the deciphering of the double helix structure of the DNA strand by James Watson and Francis Crick in 1953. However, many mysteries remain. Perhaps the biggest mystery is the process of cell division--the ability of a cell to sub-divide to form two new cells. Also, there is the related question of how a cell knows when to sub-divide. Another big mystery is the ability of a replicated RNA strand to rip away from the DNA template when the replicating process is completed. A template is referred to the de-coupled end of a double helix DNA strand. I consider these processes are mysteries because the force that carries out the replicating processes is surely attractive. As it turns out, there exist logical explanations for these mysterious processes under the framework of Model Mechanics. To understand how Model Mechanics explains these mysteries, the reader will need to recall the following provisions of Model Mechanics:

1. At the most fundamental level, the S-Particle is the only truly fundamental particle in the universe. The orbiting motions of the S-Particles around the E-Strings give rise to the stable Basic Particles (the electron and the quarks). The Strong Force and the EM Force acting on these Basic Particles give rise to the various atoms that are the basic building blocks of life.
2. Each Basic Particle is confined to a specific E-String by orbiting motion of its S-Particle. The geometry of all neighboring E-Strings obeys the inverse square law. With these specifics, all

neighboring Basic Particle or Basic Particle Systems will exhibit a repulsive effect on each other. This is identified as the CRE force. The magnitude of the CRE force between organized Basic Particle systems (DNA, RNA and Proteins) is proportional to the number of Basic Particles in each Basic Particle system.

The above provisions of Model Mechanics enable us to come up with the processes that control the cell division phenomenon. Further, these processes control the timing for when a living cell is to be divided. The Model Mechanical processes of cell division can be visualized as follows: A living cell is composed of a central region known as the nucleus that consists of a DNA strand and is surrounded by the various nucleic acids that make up the DNA strand. As noted previously, a DNA strand is composed of a repeated sequence of specific constituents. On this basis, these sequences could continually be added to both ends of the strand and could cause it to grow in length unchecked. If this was the only process, there would be no cell sub-division and thus no life. Fortunately, as the DNA strand grows in length, the CRE force acting on it also grows proportionately. This causes a continuing increase in tension on the DNA strand. The highest tension point would be in the middle of the DNA strand. When the CRE force grows to a point that it is stronger than the coupling EM Force in the middle of the DNA strand, it will split the DNA strand into two equal parts. The two DNA strands will each become the nucleus of a new cell. These processes will continue as long as there are constituents available to repeat them.

Similarly, the CRE force is responsible for the de-coupling of a replicated RNA strand from the DNA template. The process is as follows: The DNA template attracts constituents from the surrounding fluid to form the RNA strand. As the RNA strand grows in size, the CRE force is also growing. When the CRE force becomes stronger than the coupling EM Force the newly formed RNA strand will rip away from the DNA template.

Model Mechanics tells us that all the Basic Particles, and all the forces of nature are the results of motions of the S-Particles and/or S-Particle systems in the E-Matrix. The subsequent organization of the Basic Particles, mainly by the attractive EM and Nuclear Strong forces, gave rise to all the atoms of the universe. Further organization of the atoms gave rise to the molecules and then the constituents of life. This sequence of organizational events implies that life is a natural outcome of the Model Mechanical theory. However, an organized system of particles by itself is lifeless -- a crystal is a good example of a lifeless organized system of particles. On the other hand, an organized system of constituents could have life properties. The main requirement is that it is capable of self-generating and self-reacting to its own dynamic¹ properties with time. How does a constituent system generate and react to its own dynamic properties? Interactions between the dynamic CRE Force with the EM Force are capable of doing just that. Those constituent systems that can maintain an organization and, at the same time, react to the dynamic CRE force generated within themselves are considered collectively to have life properties. Of course, there is no such thing as a constituent system with an organizational force weaker than the CRE force. Such a system does not exist. On the other hand, an organized constituent system (such as a crystal) will remain lifeless if the CRE force of the system cannot overcome the attractive EM force that forms them. In other words, life is a continuous process of balancing the organizational attractive EM Force and the dynamic repulsive CRE force within a collection of organized systems of life constituents.

Model Mechanics Interpretation of Consciousness

With all the research devoted to understanding the human brain, there have been limited successes on the question of consciousness. What are the processes that enable us to become aware, to think, to intuit, to interpret, to appreciate, to fear, to enjoy and finally, to form an opinion? Essentially these questions have been left unanswered. The proposed Model Mechanical processes for consciousness is as follows: Each input of a signal from the sensory organs, such as seeing a table visually, will result in a specific geometric pattern on the E-Strings in the brain. These geometric patterns serve as memory cards for future recognition of the same signal (seeing a table). When the same signal (seeing a table) arrives in the brain at a later time the specific geometric pattern (seeing a table) on the E-

Strings in the brain will show up automatically. The neurons in the brain will react to that specific geometric pattern in the E-Strings and conclude that it represents seeing a table.

The above Model Mechanical interpretation of the processes of life will need to be confirmed experimentally. However, as they stand, they do not conflict with any known observations or experiments. Furthermore, they will give scientists a new way of dealing with the ever-increasing complex problems of life processes.

Conclusions

The Model Mechanical processes of life described above are capable of self-generating and self-reacting. Did God just simply leave us alone to evolve after He started the universe? Or is He in His mysterious ways controlling the way we are evolving? The true answers to these philosophical questions will probably be forever be unknown to us. However, we can still speculate. Personally, I support the view that God is involved in our evolution to this day. I can offer very little supporting evidence for this view. Perhaps the most compelling evidence is that life appears to have evolved from a grand design. The following provisions of Model Mechanics support the idea of a grand design:

1. The elastic property and the repulsive force between the E-Strings appear to be designed properties.
2. The compacting force that compacts the E-Strings together is also a designed property.
3. The incompatibility between the S-Particles and the E-Strings allows the S-Particles to move unimpeded in the E-Matrix is a grand designed property.
4. The forces of nature appear to be the result of a grand design. Specifically, the dynamic CRE force acting on a DNA strand in the cell division process of life.
5. The E-Strings and their distorted geometry that connect all the neurons enable the brain to recognize patterns that it had experienced previously represent the consciousness processes of life. This is another example of a grand design.
6. The continuous competition between the electromagnetic force and the CRE force gives rise to the dynamic processes of life. This also is an example of a grand design.

All these designed properties of Model Mechanics are the necessary ingredients of an automatic mechanism that could produce life. The possibility that these ingredients come together by chance is very remote. The only other choice would be that it is a grand design of God. If God is involved in our evolution, how would He do it? One of the ways would be to adjust the geometry of the E-Matrix locally or globally. Such an adjustment could affect all the processes in the universe, including the processes of life.

Reference:

Seto, Ken H. "Model Mechanics: The Final Theory". KHS Publishing, 2016---Available at Amazon.