

# **In Pursuit of Gravitation**

## **Applied Ingredients: Philosophy, Plausibility, Logic**

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### **Abstract**

In the first part of this paper on pages 2-6, I describe the process of enlightenment that set me free.

In the second part of this paper on pages 7-17, I raise simple questions about field theory, relativity theory and the standard model. Dogma must be replaced with logical explanations.

In the third part of this paper on pages 18-29, I present my new Universe. It starts with my definition of space. Newton and Kant were right: Space and time are absolute and permanent. Space outside our Universe is empty and it extends to infinity in every direction. Space inside our Universe is filled with a super-gas under pressure. The new model of our Universe is very simple, it has only three components: the Proton, the Electron and super-gas Unitron. Atoms and molecules are held together by the pressure of Unitron not by “strong force”. To understand gravitation the real nature of the electric charge has to be understood. I am proposing in this paper that there is nothing electric about the electric charge – it is a mechanical phenomenon. Further work is needed to find the secrets of magnetic interaction. Gravity is explained.

Short summary and simplified diagram are presented on page 30.

This is a unified theory. In this real world, fields, black holes, worm holes and event horizons do not exist. Frames can't overlap; relativity is irrelevant. The presentation is very short on Mathematics. My aim is to provide new direction for our quest to find the truth.

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I reserve the right to amend and modify as needed.

Comments and corrections are appreciated.

# Enlightenment

## I am mad as hell and I won't to take it any more

I have been listening to a never ending stream of nonsense coming from theoretical physicists. Here is a list of the annoying subjects: gravitational fields, strong force fields, electric charges, electric fields, relativity theory, curved space-time, standard model, symmetry, black holes and string theory. The perpetrators disregard philosophy, plausibility and logic. Mindless equations rule their world. They either don't understand physics or they are knowingly misleading us to save face and to keep their gravy train rolling. In any case the situation is not tenable.

The savants keep talking about fields but can't tell you what a field is. The savants keep talking about electric charges but can't tell you what an electric charge is. The savants certainly can't tell you what gravitation is. They are the new alchemists requesting more and more funds for their futile search for the nonexistent God particle, the Higgs boson. Let me clue you in: There is no Higgs boson, there are no quarks and certainly there are no gravitons and gluons.

I am mad as hell and I won't take it any more. By the time you finish reading this paper you will be mad too. We all have been misled for a long time. And the junk science just keeps coming our way. The latest one is string theory. It must be the result of hallucinatory drugs. Please, stop the madness.

## The Process of my Enlightenment

When climbing hills on a bicycle and seeing the pale white face of the Moon up ahead, all I can think of is gravitation. I am talking about long hill climbs to Mount Wilson or to Kaiser Pass in the High Sierra Mountains of California. Hill climbers are experts on gravitation. Long hill climbs in faraway places provide the perfect environment to contemplate my confinement to this Earth by gravitation. Gravitation is on my mind because it is punishing my body. My tired legs urge me to stop, but the anticipated joy of rounding that last ridge is a sweet incentive to keep going. Gravitation is also torturing my mind; it doesn't want to give up its secrets. So I keep on pedaling and thinking. And the Moon is just grinning at me with his pale white face. I can almost see a wink.

I have a stack of books on gravitation. There is on-line access to hundreds of papers on gravitation. In these books and papers there are simple descriptions of gravitation and gravitational experiments, introduction to general relativity, curved space time and black holes. There is information about our Solar system and the Milky Way galaxy. I have learned that gravitation is a universal attractive force; every mass attracts all other masses in the Universe. I have learned that we can't escape gravitation and we can't shield ourselves from gravitation. But I couldn't learn from any of these books and papers what gravitation is or how gravitation really works.

There is an abundance of theories about gravitation. Copernicus, Galileo, Kepler laid the foundation for the laws of planetary motion. Newton formalized the law of universal gravitation with equations. Gravitational field was popularized. Einstein introduced curved space-time. Gravitons are favored by

quantum theory fans. Push gravitation is put forward by amateur scientists. All ideas, old and new lack clear explanations, simplicity and plausibility. The gurus and self-appointed experts aren't able to lead us out of the swamp. They only pretend to know the truth.

Conflicting ideas and opinions created doubts in my mind. Does anybody know what is going on? Does anybody know how gravitation works? While examining gravitational field theory, the doubt in my mind spreads. Gravitational fields, strong force fields, electric fields, magnetic lines, dark energy all become suspects. The common thread in all of them is field theory.

My quest for understanding gravitation became an obsession with field theory. Field theory is involved in every aspect of theoretical physics. Fields are the magical facilitators of strong force, electric force and gravitational force. How did this happen? How did we succumb to the siren call of easy solutions of field theory? Newton's law of universal gravitation soon became gravitational field theory without explanation of working details. Faraday talked about electric fields and magnetic lines. Maxwell combined a set of four equations to describe electric and magnetic fields. These simple and elegant equations describe behavior and provide means to calculate forces. Faraday and Maxwell failed to enlighten us with the actual physical mechanism of electric fields and magnetic fields and the true nature of their interactions with the electric charge. The result is that we don't know what fields are and nobody cares. We have equations to describe fields and experiments 'prove' their existence. Einstein blessed field theory by using it without objections. Curved space-time is just another field; it is just another Holy Ghost. Einstein replaced the magic of Aether with the magic of fields.

Quantum theory and the Standard Model aren't much help either. The Standard Model is defined as Quantum Field Theory. There are vaguely described mediators of field forces: gravitons, gluons, photons. These mediators participate in a momentum exchange with selected partners by using fields. A good computer program is needed to keep track of the associations. There is an admission that gravitation defies unification efforts into the Standard Model. It looks like we have reached the end of a dead end street.

In the course of many hill climbs and many hours of contemplating the plausible, I have realized that field theory is bogus. I have realized that fields of forces don't exist. I have realized that there is nothing in empty space to become a field by the influence of a distant object or charge. Gravitational fields don't exist. We aren't pulled to Earth by a mysterious gravitational field. I have also realized that forces can't exist in empty space, because empty space is empty; space around us must contain some unknown substance and it is not rigid, motionless Aether. I have also realized that strong force theory is pseudo science. How can tiny protons decide on a  $1/r^7$  relationship for strong force fields, when gravitational and electric fields created by the same protons have  $1/r^2$  relationships? I have realized that atoms and molecules are held together by outside pressure and energy, not by some imaginary attracting strong force field. Gluons maybe new flashy explanation for strong force; but they are just not plausible.

The process of enlightenment was long because I had to chop through the fake field theories previously imprinted in my brain by well meaning educators. I bought more books, I read more papers, but they all reek field theory. Slowly I shed all shackles and free myself from the dungeon of deceit. There must be another way. There must be a better explanation. The truth is waiting for us.

## **We are Insignificant Nothings**

We live in a Universe that was built without the consent or approval of man. The Universe operates with a set of instructions and natural laws that came with the building blocks. Man has been prying at the secrets of the building blocks and the secrets of the natural laws, but man can't change the way this Universe functions. Man may declare "laws" and "rules" for natural phenomena but they are ignored by our Universe. Equations created by man may approximate the workings of nature but our Universe will not abide by them. We can argue about the existence of black holes and event horizons but we are ignored. Our Universe already knows that black holes don't exist. Man created field theory, theory of relativity, standard model and string theory but our Universe disregards these feeble attempts; they are just more flat Earth theories. Einstein's theory of relativity is Einstein's theory and not a functional relativity of the Universe. Event horizon is an invention of man; nature has nothing to do with it. We are searching for the truth, but mainly we are just trying to impress each other with our cleverness and original thinking. Arrogant chest beating won't change the fact that we are insignificant nothings in a vast Universe difficult to comprehend. But it would be nice to know the truth.

I am an engineering student and I am inquisitive. I want to know and understand what things are made of and how things work. It isn't enough to know what things do. The joy is to see smoothly working gears, once I remove the faceplate. This engineering student is also interested in the sciences. The main attraction is not the complicated mathematics, but the intricate workings of the world we live in. Mechanical engineers know how to calculate the size of a steel cable for a specific load but some engineers really want to understand the cause of tensile strength. An ascent on the Palms Springs Tram demonstrates the complexities and difficulties of designing steel cables and associated gears. Engineers know how to use gravitation for their gravitation assisted equipment but some of them want to know what gravitation is.

Scientific progress in the last 500 years has been great and accelerating. The Earth isn't flat any more; our astronauts rocketed to the moon and confirmed it. Our marvelous machines are exploring Mars. The Hubble telescope amazed us with pictures of the Universe. Satellites explored our sister planets and the moons of Saturn. It's great to be alive these days.

Then there is theoretical physics. The past century and half was rather active. From luminiferous Aether, Maxwell's equations, field theories and theory of relativity we have progressed to the Standard Model of today. Here this engineering student had difficult choices to make. I could either accept the theories presented by the gurus or I could dig in and try to understand the prevailing theories. For most engineering students the pressing need is to earn a living in their chosen profession, time is precious. Investing ten or twenty years to understand what is going on may also lead to disappointment. Behind the faceplate of semi-unified theories and relativity theories this engineering student found mostly unfinished work, chaos and complexity instead of smoothly working gears. This engineering student soon discovered the true meaning of the word theory. Theory may have nothing to do with reality.

I strongly believe that theoretical science is philosophy. We can't see it, we can't touch it. We can only contemplate the plausible. Newton introduced equations for planetary motions and for gravitation and then the mathematicians took over. To the mathematicians nothing matters but 'elegant' equations. They have built their own world of wonder.

Engineering systems are constructed from subsystems with clearly defined interface specifications. Subsystems are further divided into smaller and smaller blocks. A block may also be called a black box. We may not care what is inside the box as long as the interface specifications are fully satisfied. A transistor is considered a three terminal device. For the engineer it is not relevant if the transistor is built from silicon or plywood as long as it satisfies the transfer characteristics specified for the device. In our physical world there are similar levels: Universe, galaxies, planetary systems, suns and planets, molecules, atoms, protons, neutrons, electrons and the ubiquitous electric charge. There are forces tying them all together: nuclear forces, electric forces and gravitational forces. Unfortunately not much time and effort was invested in understanding the basic blocks. We don't have a clue what an electric charge is. Fields are not explained; still they are used without constraints. Gravitation and warped space-time are as mysterious as ever. They are all black boxes, made from pixie dust and wishful thinking. We must investigate and determine what is inside these black boxes.

Scientists have proposed multitude of theories about the world we are made of but can't see. Some theories are good, others are wanting. The standard measuring rod for the correctness of any theory is the general acceptance of it by members of the scientific community. And often that doesn't work. The pressure to get into the boat without rocking it is unrelenting. Non-conformance to the prevailing views espoused by the powers that are maybe rewarded with banishment. This engineering student doesn't have restrictions. This engineering student doesn't depend on faculty appointments and grant monies. This engineering student makes his living by designing working, functioning devices. This engineering student spends his own meager resources in search of the truth.

So it happens that this engineering student spent fifty years of his life trying to solve the puzzle of gravitation. Anybody traveling on a similar mission soon finds the road very treacherous. False promises and dead-end streets await at every turn. Sorting through an unending stream of theories is time consuming but helps to avoid pitfalls. Obsession is driven by dissatisfaction with prevailing theories. Lack of simplicity and plausibility of the accepted theories are strong driving forces. The journey was difficult but I am satisfied with the result. You have to judge for yourself. If you are an incorrigible fan of field theory, theory of relativity or the Standard Model, this paper won't be much help to you.

## **Gods Protect Us from Evil and Misfortune**

An easy alternative approach to scientific investigation is to rely on the goodwill of Gods. The Gods can protect us from evil and misfortune. The Gods may grant us eternal salvation. All we have to do is believe in and make sacrifices to the Gods. This practice has been going on for thousands of years.

The Egyptians had many Gods; later converted to a single Sun God - RA at the time of Tutankhamen. The sun was a major force in daily life. The Sumerians also had a Sun God: Ur or Nap Ur. The Greeks had a God for every purpose and cause imaginable. Gods protected cities, governed all aspect of life and influenced love and war. Offending a God was a foolish deed with fatal consequences. Socrates, the teacher of Plato was tried, convicted and forced to kill himself because his teachings may have offended Goddess Athena, the protector of the city of Athens.

Another way to explain the unknown is to label it a miracle. If we don't know what to do, we invoke the name of a God. If we are facing the unknown we ask for God's blessing. If we had some good fortune, we praise the Lord. If we had some misfortune we think the Gods were punishing us. We pray to the Gods for rain, and we curse when we feel powerless and abandoned.

Theoretical physicists also rely on the services of many Gods. Anything that can't be seen, felt or reasoned is assigned its own God. Please allow me to list a few of them. Gravitation has three Gods: the Gravitational Field God, the Curved Space-Time God and the Graviton God. For electric charges we have the Electric Field God and the Photon God. The atom is protected by a multitude of gods: the Strong Force God, the Gluon God, and the Glueball God. They all have their variations also. The Higgs Boson God has a name, but we can't find him. The Dark Force God is a fairly new God; it manifests itself in negative gravitation we are told. I have to mention the Symmetry God and the Super-Symmetry God. They are admired feverously. None of these Gods have ever been seen or detected, but they are doing a good job protecting us from falling apart. The string theory God has ten or eleven faces, maybe more and it is the most elusive God of them all.

Most of these Gods leave faint traces of their presence in the apparatus built for the purpose of their detection. The traces are interpreted by the gurus of science for our benefit. We are building larger and larger machinery to discover more Gods. For some reason the story of the alchemist comes to mind.

# Simple Questions

In this section I examine some of the accepted theories and raise questions about them. These theories are ingrained and accepted because of mindless repetition. Nobody asks what a gravitational field is because we know what a gravitational field is, don't we. Nobody asks what an electric field is because we know what an electric field is, don't we? Nobody asks what an electric charge is because we know what an electric charge is, don't we? And the list goes on. Please allow me to ask some very basic, simple questions.

## Field Theory

Field theory proposes that masses interact with other masses and electric charges interact with other electric charges at a distance with the help of field forces. A mass creates a gravitational field and is influenced by gravitational fields created by other masses. An electric charge creates an electro-magnetic field and is influenced by electro-magnetic fields created by other charges. All this happens in empty space at a distance without physical contact. Miracle it must be.

Field theory may have originated with Newton's law of Universal Gravitation. The inverse square law is the main feature of field equations for point source fields. It is logical. The surface of a sphere increases with the square of its radius. Early man must have been aware of this feature while using his torch to light up the cave. Faraday used electric fields to describe the seemingly magical forces between electric charges. The equation for electric forces is similar to the equation for gravitational forces. Field equations are very useful to calculate forces, orbits, tides. My objections to field theory are the mysterious nature and the unlimited strength of fields.

What is a field? One could declare that a field is a transparent, massless, tasteless, odorless something that is created in empty space by a distant mass or charge. You can't see it, you can't touch it, but this field has magical powers. Obviously this is not a correct answer, and I suspect there aren't any correct answers because fields don't exist.

Scientists quietly distanced themselves from field theory and moved onto quantum theory and the new Standard Model. But the Standard Model is defined as a quantum field theory; fields are not disavowed just played down. Mediators of quantum field theory interact with the help of fields.

At this time the pressing problem is to discover what substance is used to make a field, and how this field substance is informed by a mass or a charge to cause the formation of a field. What attributes of this field substance change to make it into a gravitational field or into an electric field? What means are used by this field substance to exert force on another mass or on another electric charge? These are very basic questions and without answers to them I consider fields as real as Casper the ghost.

The dogma of field theory has permeated the world of physics for over a century. The unsubstantiated concept of fields is hammered into the head of every student like a religion. Fields are now considered real physical entities with magical properties. Fields can push and pull objects. Fields can change the speed of your clock. Fields can bend and warp. Fields can distort your appearance like a concave

mirror in an amusement park. We are told about the gravitational field that pulls us to earth. But how does this magic happen? We are told about the electric fields that control current flow in vacuum tubes and field effect transistors. How does it happen?

Gravitational fields can materialize in empty space by the magical intervention of a distant mass. It is implied that gravitational fields have no mass or inertia but can possess nearly infinite amounts of gravitational energy. This is the limitless nature of field equations. The strength of gravitational fields can vary from negative infinity to zero. There are no limits, no saturation points and no disruptions. I have not encountered a single field equation with limits imposed on it. The limitless field equations of Einstein made possible the ideas of event horizons and black holes. The calculated negative energy density at an event horizon is  $10^{35} \text{ joules}/m^3$ . Thirty five zeros. I would consider this a rather large number. It is not mentioned what carries this tremendous amount of negative energy. Is it empty space or Aether or some other magical substance? Energy doesn't exist alone in empty space.

Then there is the energy density of the Big Bang. We are told that the singularity was the size of an atom at  $10^{94} \text{ gr}/cm^3$  density and at  $10^{99} K^\circ$  temperature. It must be all magic. We are brainwashed and sucked into the black hole of field theory and into the field theory of black holes. This is the stuff of bad dreams.

Einstein claimed that gravitation is curved space-time. This statement is usually accompanied by a diagram of a rubber sheet with a mass in the center being pulled down by gravitation or some other magical means. Is this supposed to be curved space-time? Curved space-time has not been described in any detail; it must be some sort of a field. What constitutes space-time? What attributes of this space-time become curved? What means or messengers are used by mass M to bend, curve or warp this space-time? How this curved space-time tells another mass m how to move? What does the pushing or pulling? I am looking for descriptions of real cause-effect relationships. Curved space-time is an example of official pseudo-science presented with an air of authority by pretentious people. I don't think Einstein or any of his blind followers understood space or time or gravitation. They should study the work of Newton.

Electrical field equations are very similar to gravitational field equations. We are told that an electric charge will create an electric field around it, and this field will exert a force on another electric charge. The problem is compounded by charge polarity. Two charges of the same polarity will repulse each other, while two charges of opposite polarity will attract each other. The questions for electric fields are the same as questions listed for gravitational fields. What constitutes an electric field? What messengers are used to establish an electric field? If mass causes curved space-time, electric charge must cause massive curved electric-space-time?

We are told that orbiting electrons also bind atoms into molecules and crystal structures. This binding force must be another field force. This binding force is so strong and precise that a block of wood will withstand heavy loads of compression and tension without noticeable change in length. In fact silicon crystal can be subjected to 9 Gigapascal pressure without deforming it. Carbon nanotubes are able to withstand 63 Gigapascal pressure without damage. Whatever happened to the inverse square law of electrical forces? This is really troubling if you consider that under tension the electrical forces diminish as the distance between atoms grows. Is there some sort of preloading involved? This subject is brushed aside with the statement that electrical forces are  $10^{40}$  times larger than gravitational forces.

That is an unsatisfactory dogmatic explanation. The question is what makes carbon nano-tubes strong? What makes silicon crystals strong? What makes your bones strong? What hold us together?

The most bizarre field force of them all is the Nuclear Force or Strong Force. This force or interaction was invented by friends of the atom to hold the atom together. The reasoning was that the electric repulsive forces of protons in the nucleus of an atom would blow the atom apart. Since this destruction is not happening there must be something to hold the nucleus together. Protons or quarks must generate a super strong gravitational field of some sort that can over-power the electric field they also generate. This strong force field must not extend beyond the nucleus of the atom because it would suck in all the orbiting electrons. Therefore strong force fields must have unorthodox  $1/r^7$  behavior. As you can see protons or quarks are very special particles. They generate gravitational fields, they generate electric fields and they generate this strange strong force field.

In summary, let me repeat my questions. What are fields made of? What messengers are used by a mass or an electric charge to inform this substance to form a field? How does a field exert force on another mass or charge? How does a strong force field act on another proton? I am looking for scientific descriptions of fields and their interactions. I hope you have the answers I am looking for?

## Relativity Theory

Aether or Aether not, was the question since the time of the Greek Giants. Aristotle believed in the four elements of Fire, Earth, Air and Water. Aristotle also believed that space not occupied by the four elements was filled with Aether, because nature doesn't like empty space. Aristotle came very close to the truth; his Aether was not solid; though the movement of solid objects through this Aether wasn't fully explained.

2000 years later the polarization of light was discovered and Aether was assigned a rigid, static state except for the small vibrations necessary to carry electromagnetic waves. Aether was well suited for Maxwell's electromagnetic wave equations. Electric and magnetic waves could propagate in this rigid Aether with ease. The movement of solid object through this solid Aether was more difficult than through non-solid Aether but the process was never explained.

Michelson and Morley set out to prove the existence of this rigid Aether with their famous experiment, first in Philadelphia then on Mount Wilson in California. You can read transcripts of the numerous meetings in the Journal of Chemistry. I can only admire their efforts and persistence. The negative results of the experiments were unexpected and disappointing. No rigid motionless Aether could be detected or proven. But if you really think about it, the idea of a rigid motionless Aether is absurd.

Lorentz came to the rescue. Lorentz was a brilliant mathematician. He discovered that if light travels in a rigid stationary Aether and he manipulates both time and distance in moving frames, he can preserve the apparent speed of light in all frames moving or not. His transform equations would explain the null result of the Michelson-Morley experiment. Light travels in stationary Aether at the speed of  $c$  and if you observe this light from a moving frame (Earth) the speed of light is still  $c$ ; all you have to do is adjust the length of your measuring rod and adjust the speed of your clock. It is all done with smoke and mirrors.

The Lorenz transform equations require a static rigid Aether. Light propagates in this static rigid stationary Aether no matter what generates it in what frame. I believe Lorenz developed his transform equations for this rigid static Aether as a practical joke. After hundred years of polishing the self-serving and meaningless transform equations, they are now bullet-proof.

Enter Einstein. The ideas of Poincare relativity and Lorenz transform were assembled into a paper and submitted for publication in 1905. To be original Einstein declared that the speed of light is a universal constant and Aether is not needed to propagate light. He claimed that his Special Theory of Relativity explains everything. Electromagnetic waves, including light will travel through space or vacuum or continuum with the speed of light with or without Aether no matter what is the speed of your frame of reference. Why? Because he says so, and the Michelson-Morley experiment proves him correct. Many members of the scientific community jumped on the bandwagon of this absurd theory. Non-believers were ridiculed. The Earth became flat again.

I find it rather obnoxious to declare that electromagnetic energy travels with the constant speed of  $c$  in empty space. It is puzzling that this arbitrary declaration is accepted by the scientific community without scientific proof. Nature will not follow arbitrary rules of man. Electromagnetic energy is either wave energy where the speed of propagation is regulated by the characteristic impedance of the transporting medium or electromagnetic energy is carried by particles in empty space where the speed of propagation is determined by the speed of emission. This concept is rather elementary and can't be altered with mathematical wizardry and ecumenical declarations. Wave energy doesn't propagate in empty space. If you say that space isn't empty, then please explain.

The Special Theory of Relativity is based on the Lorenz transform equations, and the Lorenz transform equations were developed for a rigid motionless Aether. Lorenz and his contemporaries didn't need to improve the idea of a rigid motionless Aether; they believed in a static Universe. A rigid motionless Aether can't be justified or accepted for an expanding Universe. It simply doesn't make sense. Would Aether stretch with the expansion of the Universe? Would the solar system stretch with it?

There are other problems. It is believed that the Universe is about 14 billion years old and about 93 billion light years across. That would violate Einsteins relativity equations. But there is a loophole. We are told that space can expand without speed limit. But "space" isn't defined. Two galaxies located in distant spaces of the Universe can move away from each other faster than the speed of light if the space between them grows faster than the speed of light. I am very happy that this is clarified. So what is this magical expanding space that can carry whole galaxies with it faster than the speed of light? Is it expanding Aether, vacuum, or emptiness? This is just more stardust into our eyes by double talking experts.

The General Theory of Relativity is more of the same mad science. The only "proof" of GTR is the explanation for the advance of the perihelion of Mercury. Please be aware that the advance of the perihelion of Mercury was calculated correctly and justified by other methods prior to Einstein's work. German scientist Paul Gerber has derived the correct formula in 1898 using classical methods. Einstein's "proof" to verify GTR used an identical equation with identical letters twenty years later. There is nothing relativistic about the advance of the perihelion of Mercury. In fact there is nothing

relativistic about anything. Einstein also predicted gravitational lensing as another “proof” of GTR, but gravitational lensing was known to Newton.

Let me go back and examine the Michelson-Morley experiment. The experiment was to determine the speed of Earth moving through solid stationary Aether. This idea boggles the mind: a solid object moving through a solid Aether. I do not see logic or plausibility. If we fix a not so solid Aether to the surface of Earth, moving and rotating with Earth, the problem becomes mute and the experiment is meaningless. There could be a secondary Sagnac effect due to rotation of Earth that could not be detected with crude instruments. I always had a feeling of sorrow for the folks at Mount Wilson for tirelessly conducting the experiments. They have expanded hundreds of hours of hard work for nothing because of the fuzzy thinking by scientists.

## **The Standard Model**

I was looking for solutions and theories with simplicity, elegance and plausibility. Instead, I found the Standard Model. The Standard Model must be the most complicated and inelegant theory of all time. How did it happen? Maybe field theory was getting old and stale and couldn't explain the strange results coming out of particle accelerators and colliders. Instead of investigating the cause of strange results, a new set of particles and interactions were invented. Quantum mechanics combined with field theory blossomed into the new Standard Model. The evolving complexities justified larger amounts of research monies that provided more opportunities to increase the complexities. By the early 1970's the Standard Model was refined and polished to be acceptable as the new standard of theoretical physics by the powers that are. The Standard Model is defined as quantum field theory consistent with quantum mechanics and special relativity. Protons and neutrons are broken up into inseparable “confined” sub-particles called quarks. Mediators are introduced to provide for force and energy transfer with the help of fields. One major feature is symmetry. Each particle has its anti-particle. Each electric charge has its electric anti-charge.

Only Rube Goldberg could have come up with a system as complex and complicated as the Standard Model. The search is on for new particles and new explanations to resolve remaining problems. Did anybody inform the Universe that it must have quarks and leptons and gluons and gravitons and that these particles must behave according to the rules prescribed in this complex Standard Model? Nature ignores the laws and rules of man.

According to the Standard Model there are six quarks and six leptons. Gluons hold together three quarks at a time to form a proton or a neutron; always three, never less, never more. The strong nuclear force mediated by gluons is stranger than the strong force of field theory; the force increases with distances resulting in confinement. You can't separate the three quarks making up a proton or a neutron. The forces behave like a rubber band or string. The more you stretch the harder it is to pull. To make things work properly, there are eight flavors of gluons, as the occasion calls for. I wonder what would happen if the wrong gluon was used? But this is not all. Some of these particles have “color”, an additional attribute that can change with each momentum exchange. Yes, we do have momentum exchange sometimes with massless particles.

There is momentum exchange in the world of phantom gluons. Gluons with no mass pushing quarks, like feathers pushing elephants. Momentum exchange conjures up images of dancers performing a lively folk dance by hooking each others arms. But the ideas are getting more bizarre than ever. Picasso must be smiling. I can't keep a straight face either.

And soon the missing link, the God particle, the Higgs Boson should be found, we are told. The giant apparatus is being built right now. If they don't find the Higgs Boson this time, a larger particle accelerator will be built. And after that we will still need bigger machines. Gravitation still has to be integrated into the Standard Model. It has resisted all attempts so far.

## Particles (fermions)

	<b>First Generation</b>	<b>Second Generation</b>	<b>Third Generation</b>
Quarks			
	Up Quark	Charm Quark	Top Quark
	Down Quark	Strange Quark	Bottom Quark
Leptons			
	Electron	Muon	Tau
	Electron neutrino	Muon neutrino	Tau neutrino

For each particle there is an antiparticle as required by symmetry. Here is a list:

## Antiparticles

	<b>First Generation</b>	<b>Second Generation</b>	<b>Third Generation</b>
Antiquarks			
	Up antiquark	Charm antiquark	Top antiquark
	Down antiquark	Strange antiquark	Bottom antiquark
Antileptons			
	Positron	Positive muon	Positive Tau
	Electron antineutrino	Muon antineutrino	Tau antineutrino

## In the Beginning

Let me see if I have got this Astronomical Standard Model right. It all started 13.5 billion years ago. There was no time and there was no space. Then vacuum fluctuated and a singularity appeared. It was the size of an atom at  $10^{94} \text{ gr/cm}^3$  density and at  $10^{99} \text{ K}^\circ$  temperature. The tiny ball expanded and cooled and expanded some more. Protons or quarks acquired the four major field forces: gravitation, strong force, weak force and electric force. The ball cooled some more, expanded some more. Matter prevailed over anti-matter and forces have prevailed over anti-forces. Protons captured electrons to form atoms. Atoms formed clouds. Clouds formed stars. Stars formed galaxies and black holes. Here we are 13.5 billion years later trying to figure out what happened and how it happened.

If you fully understand and believe this big-bang model, you are qualified to be an astrophysicist. If you can present it with a straight face or you can write a book about it, you are a scientist or a professor or a guru. You are also a creationist and a believer of magic and miracle.

# The Electric Charge

According to the Standard Model “The electric charge is a fundamental conserved property of certain subatomic particles that determines their electromagnetic interactions. Electrically charged particles are influenced by and create electromagnetic fields. The elementary unit of charge is carried by a single proton and the equivalent negative charge is carried by a single electron”.

This statement tells the student that the electric charge is defined once and for all by its behavior and by its interactions with an electromagnetic field and the student does not need to worry about it any more. The electromagnetic field is also defined by its interaction with electric charges. There isn't an independent definition of neither the electric charge nor the electromagnetic field. The definition of the electric charge by the Standard Model is a description of behavior; it doesn't tell us what an electric charge is. This is not science.

The Standard Model declares: “The elementary unit of charge is carried by a single proton ( $e^+$ ) and the equivalent negative charge is carried by a single electron ( $e^-$ )”. In the Standard Model we also find that there are up quarks with  $2/3e$  charge and there are down quarks with  $1/3e^-$  charge. Two up quarks and a down quark add up to a charge of  $1e$  for a proton. One up quark and two down quarks add up to a charge of zero for a neutron. If the elementary unit of charge is  $e^+$  and  $e^-$ , how do we get  $2/3e^-$ ,  $1/3e^-$ ,  $1/3e^+$  and  $2/3e^+$ ? Maybe  $1/3e$  is the elementary charge?

NAME	Symbol	Charge	Mass
Electron	$e^-$	$-e$	511 keV
positron	$e^+$	$+e$	511 keV
up quark	$u$	$+2/3e$	$\sim 3000$ keV
up antiquark	$/u$	$-2/3e$	$\sim 3000$ keV
down quark	$d$	$-1/3e$	$\sim 6000$ keV
down antiquark	$/d$	$+1/3e$	$\sim 6000$ keV

Let us examine the charge to mass ratio of the various elementary particles. The ratios are very dissimilar. If we could take a sharp knife and cut an electron into three pieces, we could use two of the pieces for an up antiquark and use one piece for a down quark. But the newly created up antiquark and down quark wouldn't have nearly enough mass to be a real up antiquark and down quark. That may mean that the charge is not an inherent property of the matter of the electron or the quark. Is the charge somehow painted on or mixed in like colored plaster or confined inside like a cherry seed? Would any of these solutions work?

I have to reject the painted on charge scenario. We would need two varieties of paint: negative charge paint and positive charge paint. Both varieties would have to come in different densities because of the different sizes of the particles to be painted. The same problem exists with the mixed-in charge. A very large number of mixtures would be required to build the various particles defined by the Standard Model. The only alternative left is placing  $1/3e$ ,  $2/3e$  or  $3/3e$  charges or their negative counterparts into the center of the balls created from neutral matter. Any one of these scenarios boggles the mind. Let's move on.

The electric charge is very mystical. The mentioning of electric charge conjures up images of lightning bolts and thunder. Lightning strikes can scorch trees and start fires. Dozens of people are killed every year by charges accumulated in the sky. In science fiction movies giant Van de Graf generators are used to create monsters. You can build your own static electric generator to make your hair stand up. I remember doing such experiment in high school. In more mundane tasks the electric charge is used as power source by a wide variety of devices. Electric charge in motion is electric current.

The standard definition of charge mentioned at the beginning of this chapter requires that you accept the existence of electric fields and magnetic fields. Let me inject here that an electric charge doesn't exist in empty space; it is always attached to an electron, a proton, or some other particle of mass. According to the Standard Model definition of the charge, an electron uses electric fields to convey to the world that it is a charged particle. My hope is that by now you are questioning these items: What is electric? What makes the electron an electrically charged particle? What is an electric field? How the electron creates an electric field? What is the cause of repulsion between two electric fields created by two electrons?

What is an electric charge at the level of the electron? What makes the electron a charged particle? What means are used by the electron to inform the world that it is a charged particle? The answer depends on your acceptance of the Holy Ghost. According to field theory the electron informs the world by establishing an electric field around itself. This electric field will repulse an electric field created by another electron and attract an electric field created by a positron or proton. This happens in empty space or not so empty space. The magnitude of attractive and repulsive forces is proportional to the magnitude of the charges and follows the inverse square rule for distance between them. We have heard this answer since our high-school days, and now we just nod our heads without hesitation. It is in our blood.

You are reading this paper; you must be an inquisitive person. You want to know what constitutes an electric charge. You also want to know what constitutes an electric field. You really want to know what is there in vacuum or empty space that turns into an electric field by the presence of an electron. What is used by the electron to create this electric field to inform the world around it that it has an electric charge? We are told that this electric field extends to infinity. We are all familiar with equations that describe this electric field, but we're in dire need of working details. If photons are involved what happens to these photons as they move out from the electron? Do these photons return to the electron? Or is there an infinite supply of photons? And what is "electric" about these photons? If electrons emit photons, what is the mechanism for protons? Do they swallow photons?

To believe in an "electric" charge is akin to believe in the Holy Ghost. The acceptance of mysterious electric fields created by distant electric charges is not sound science. There must be energy or pressure information passed by physical contact from the electron to surrounding space. The electron informs the world with physical means that it is a "charged" particle without expanding any energy. I have already discussed the problem of polarity, positive – negative "charges". We need a new model and I am here to provide it.

## So what is the Problem?

The purpose of my journey was to find solution to the gravitation riddle. Along the way I found many other mysterious problems in need of answers:

What is space, empty space and free space?

Can attractive and repulsive forces at a distance be explained with fields and mediators?

What is strong force and confinement?

What is the nature of the electric charge?

What is gravitation?

What is the cause of dark force?

Is the Universe open or closed?

What is the nature of time and how we measure time?

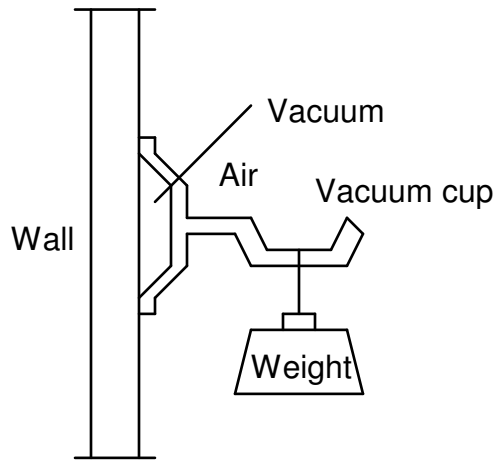
An optimist will tell you that problems represent opportunities to provide solutions. In some cases solutions may come easy. In some other cases one needs tenacity to provide answers. My stubborn pursuit of the truth was fueled by dissatisfaction with the prevailing cumbersome theories.

The further I get into theoretical physics the more I discover that theoretical physics is not science, it is philosophy. Newton applied philosophical thinking to deduce that space and time are absolute without relation to anything. Immanuel Kant deduced with philosophical thinking that the Solar System and the Milky Way Galaxy were created from spinning clouds of gas. He had no prior experience or knowledge of such behavior. The Bohr atom was not observed but was the brain child of philosophical thinking. Disciplined logic and the acceptance of the plausible can lead to proper solutions. Dogma and un-disciplined logic leads to Flat Earth theories. We have learned to understand the vastness of intergalactic space but we are still struggling with the concept of the great nothingness outside our Universe. What makes the great nothingness into intergalactic space? We don't have the knowledge to answer this question and we may never have it. We can answer this question only with philosophy.

## Simple Physics

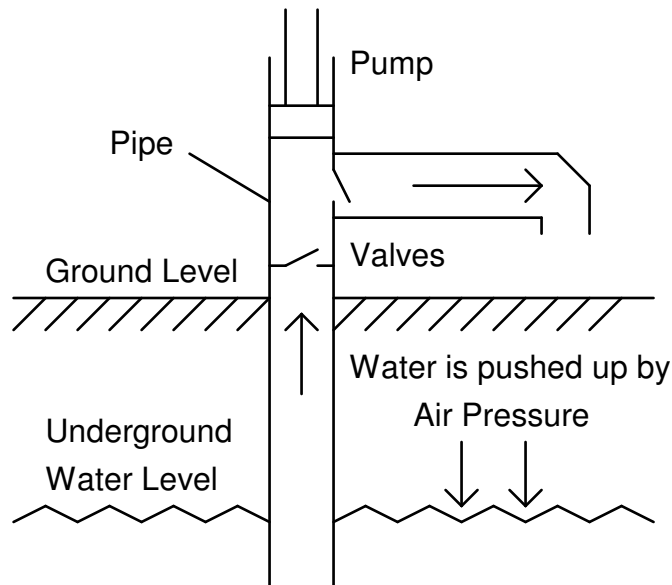
The engineering student realizes early in life that nothing happens without a cause. There is a cause-effect relationship for everything. Sometimes the cause is not readily apparent. The cause can be hidden from us. Our senses may mislead us. Still there aren't any miracles or supernatural events.

**Vacuum cups** are small cups made of rubber or pliable plastic that have a concave surface on one side and a hook to carry a load on the opposing side. Pressing the concave surface against a flat wall, air is expelled from the cup. Now we have a hook capable to support a load because vacuum holds the cup to the wall. This may be obvious to the observer, but it is not true. The cup is held against the wall by air pressure from the hook side of the cup. Vacuum can't pull, pressure can push. Vacuum cups are useless in vacuum chambers. Vacuum cups should be called pressure cups.



Air pressure holds "Vacuum Cup" to wall

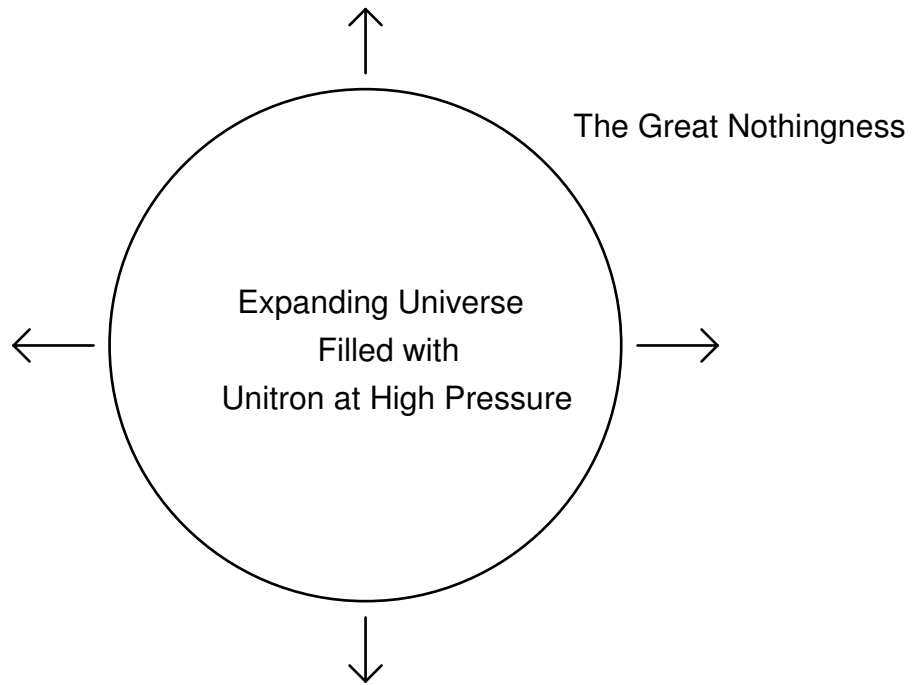
Similar situation exists with an old fashioned **water well pump**. The pump is located at ground level for easy access by humans. Water is at a few feet below the surface. Working the pump handle we create "vacuum" in the pipe and water is sucked to the surface. But vacuum can't pull water. It is air pressure at the surface of ground water that is pushing water up the pipe. Atmospheric pressure is good only for 10 meters of water level difference. If the water table is more than 10 meters below ground level, the pump has to be located under ground with mechanical linkage to ground level.



Water is pushed up by atmospheric pressure

A major subject of discussion in the scientific community: Is the **Universe closed**? Will gravity pull us back into the **Big Crunch**? Argument about this question has been going on for quite some time. I have a gut feeling that most scientists consider the idea of gravitational pull untenable, but they don't have an alternative mechanism. For a closed Universe the speeding masses of the Universe must

decelerate and reverse their direction of motion. Gravitational pull was assigned to accomplish this task. This must be similar to some sort of Hollywood cartoon trick where you lift yourself out of a mud-hole by pulling on your own boots. The only way the masses of the Universe can reverse their outward motion, if pressure or energy outside this Universe is larger than the pressure inside. This is elementary physics. We must stop the wishful thinking of gravitational pull collapsing this Universe into the big crunch. It will never happen.



The Universe will expand until inside pressure equals outside pressure

# Brave New World

The ideas presented in this section are intertwined and interdependent. Please bear in mind that this is work in progress and contribution from everybody is solicited.

Here is a summary of the concepts followed by some details.

## New Concepts that are Simple and Self Evident

- Space is a boundless, three-dimensional extent
- Space outside our Universe is empty, absolutely empty
- Empty space can't bend, stretch, fluctuate or transport energy of any kind
- Space inside our Universe is filled with super-gas Unitron at high pressure or energy density
- Our Universe is made from three components: Unitron, Electrons and Protons
- Energy stored in super-gas Unitron is the source of all energies
- Force is applied by physical contact: pressure and collision. Force at a distance doesn't exist
- There is no negative energy, negative matter or negative charge in our Universe
- Super-gas Unitron serves as shells of atoms. Strong force doesn't exist
- Our Universe is open. Gravitation can't pull it back into a big crunch
- Dark force is the manifestation of high energy Unitron expanding for ever
- Electron is the only "charged" particle
- Electric charge is a mechanical phenomenon caused by polarization of Unitron by the electron
- Gravitation is caused by an energy density gradient in Unitron around a mass
- Black Holes and Event Horizons don't exist
- Super-gas Uni encapsulating an object is the local frame. Frames can't overlap
- Information traveling from one frame to another is translated at the boundary
- Speed of light is a function of the pressure of Unitron
- Time is absolute and Universal; observation of events may be delayed

## **All about Space**

Humans have struggled for centuries with the definition of space. For Aristotle space not occupied by Fire, Earth, Air or Water was filled with Aether because he believed that nature didn't like empty spaces. The implication is that there is no empty space; empty space would be filled with Aether. As we will see this is good for space inside our Universe but not for outside. For Leibniz space was a collection of spatial relations between objects. For Newton space was absolute, without relation to anything external, always remaining the same. Kant concluded that space and time were not discovered by humans to be objective features of the world. According to Kant space is not a substance or relations between objects.

From Encyclopedia Britannica I read: Space is the boundless, three-dimensional extent in which objects and events occur and have relative position and direction. Please note the definition: three-dimensional extent. Three-dimensional means Euclidian geometry, extent means: not substance and not relation.

Let me approach the concept of space from a different angle. Nothing existed in my brain before I was conceived because my brain did not exist. My brain was not only empty, there was no brain. Once I have experienced existence, once I have experienced consciousness, I had to realize that there is an infinite space around us. I had to realize that local spaces exist everywhere from here to infinity in every direction with or without objects in them. These local spaces have coordinates and properties. These local spaces existed before I have gained consciousness and they will exist long after I will resume non-existence. We can also assume that empty space existed before the Big-Bang and empty space will exist after our Universe will dissipate into oblivion. Space is not a thing. Space is a total lack of things. Space is an absolute boundless three-dimensional extent where there is nothing. Space occupied by air is air. Space occupied by a brick is a brick. Space occupied by the Sun is the Sun. Space occupied by Unitrons, Electrons and Protons is our Universe. Space occupied by nothing is empty space outside our Universe.

For similarity let me talk about the colors of light in the visible spectrum. Colors represent various wavelengths of electromagnetic energy. There is a rainbow of colors between deep blue and deep red for us to see. Our brain reconstructs colors from information collected by receptors in our eyes. We may think that black is also a color because we are able to purchase black paint at the local paint store. But black is not a color. Black is a total lack of all colors and energy in the visible spectrum. Similarly space is a three-dimensional extent where there is nothing.

## **Space outside of our Universe**

Space outside this Universe is empty, absolutely empty. Empty space extends to infinity in every direction. No matter how far we would travel, the local empty spaces have coordinates and these local spaces contain nothing. They are empty. It is possible that in some other part of the great emptiness there is another Universe of sorts that we will never know about unless we collide with it. The great emptiness provides total isolation.

Empty space can't bend, stretch, grow, fluctuate or support fields of any kind, it is absolutely empty. Empty space has no energy and can't transport any form of energy. There are fancy diagrams showing

the Universe curving back on itself or being a donut or some other shape. The simple fact is that outside these exotic Universes space extends to infinity and that space is empty; we could call it the great emptiness.

My definition of the empty space outside our Universe is:

Empty space is limitless in every direction

Empty space is empty, absolutely empty

Empty space can't bend, warp or fluctuate

Empty space has no energy

Empty space can't propagate light or any other form of energy

Empty space provides this Universe total isolation

It may be possible for certain undividable particles to float around in empty space. This may happen when the density of a dying Universe becomes so low that the basic parts will drift away like space junk.

## Space inside of our Universe

Some sort of singularity – or Big Bang – has created conditions for us to exist because we can't exist in empty space. The singularity has changed empty space into intergalactic space that can support atoms, molecules, energy, light and gravitation. Our Universe is not empty; the space is filled with a substance to provide infrastructure for matter and energy.

I propose that the space inside this Universe is filled by a super-gas substance at considerable pressure, driving the expansion of this Universe into empty space around it. Our Universe is a giant ball filled with super-gas Unitron at high pressure. This high energy super-gas distinguishes intergalactic space in our Universe from the surrounding emptiness. This super-gas is the main component of our Universe and I shall call it Unitron. This super-gas Unitron we can't see or feel or detect because it is part of every atom and every molecule in our bodies. The pressure in Unitron holds together atoms, molecules and crystal structures. Unitron also provides the mechanism to propagate visible light and all other radiated energy.

The physical size of Unitron must be 3, 4 or 5 orders of magnitude smaller than electrons and we know how small electrons are. The thermal velocity of Unitron must be about the speed of light. Unitron has very small mass, still the total mass of super-gas Unitron contained in this Universe must be orders of magnitude greater than the total mass of all other matter. Super-gas Unitron may be the dark matter everybody is talking about and looking for. How did super-gas Unitron get here? What has compressed it? What has energized it? I don't know the answer and I shall not speculate.

Based on the strength of crystal structures, I estimate the pressure in Unitron to be in the range of 100 to 1000 gigapascals. In the beginning this pressure was much higher, and with the expansion of the Universe the pressure will further diminish. In our lifetime the expansion is very small compared to the radius of the Universe. The pressure in Unitron is decreasing accordingly. I can also envision how our Universe is falling apart at the edges. The outer layers are falling away at several times the speed of light.

## Consequences

In the previous paragraph I proposed that our Universe is filled with super-gas Unitron at very high pressure and this Universe is surrounded by the great emptiness. This new model of the Universe also implies a host of other conditions that must be discussed.

**There is no negative energy, negative matter or negative anything in our Universe.** Matter and antimatter pairs are product of fuzzy thinking. Antimatter may be a hole in a sea of matter. If you remove a single mass  $m$  from a layer of masses  $m$ , there seems to be a mass - anti-mass pair. But the anti-mass is only a hole in the sea of masses. Symmetry is an invention of man and nature is not obliged to satisfy it. The situation is the same for the electric charge. There is a charge and there is no anti-charge but a hole in a sea of charges.

**Force is applied by physical contact. Field forces don't exist.**

Force is exerted by physical contact: pressure and collision. Magical gravitational fields, strong force fields and electric fields don't exist. The concept of black holes and event horizons is the result of unjustified limitless field equations. They don't exist.

**Super-gas Unitron encapsulating an object is the local frame.**

Unitrons are part of atoms and molecules. Unitron is part of every object. Every object is immersed in a sea of Unitrons. This encapsulating sea of Unitrons is the local frame. Light and all other forms of energy travel in this Unitron with the speed of light that is determined by the pressure or energy density of Unitron. Objects moving with the same speed in the same direction are part of the same frame. Objects moving with different speeds or in different directions have their own moving frames. An observer can make direct measurements only in his own frame. Information arriving from other moving frames is converted, translated at the boundary of the two frames. This boundary isn't well defined.

Let us examine the famous **train vs. embankment mind experiment** described by Einstein. Lightning strikes both ends of a speeding train at the same time. On the embankment light travels in Unitron tied to the embankment. The man standing halfway on the tracks will see the two lightning strikes at the same time. Inside the train light travels in Unitron moving with the train. The man standing in the middle of the train will also see the two lightning strikes at the same time. The two observations happen simultaneously, but both observers see that the other observer's observation was tardy. The process is same for sound traveling in air inside the train and in air outside the train on the embankment.

It is senseless to talk about light traveling in a frame tied to the train and observing it from a frame tied to the railroad embankment. Frames can't overlap and frames don't overlap. You can observe light traveling in the train only if you are in the train.

The Michelson-Morley experiments were conducted in closed rooms, laboratories and basements. The Michelson-Morley experiment proved that Unitron encapsulating the experiment was the local frame of the experiment. How can you measure a differential speed in Unitron if this Unitron is moving with your measuring apparatus? The Michelson-Morley experiment was a wasted effort due to incorrect definition of Aether. Fizeau has modified the Michelson-Morley apparatus by inserting a water pipe

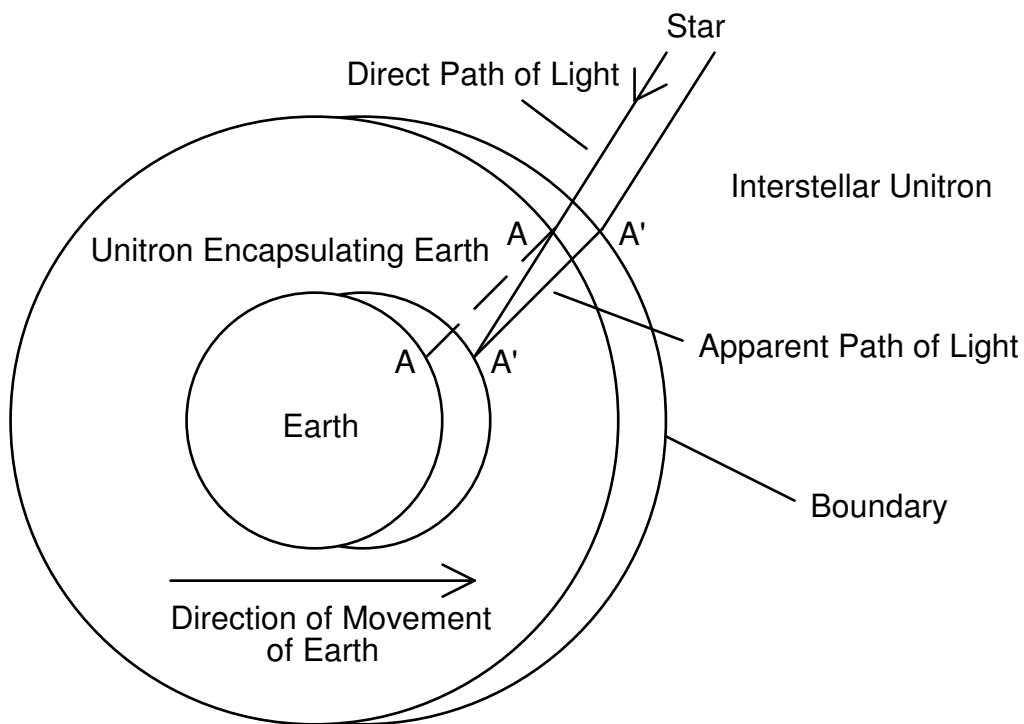
into the light path. Changing the speed and direction of water flow in the pipe achieved the expected interference shift. Fizeau proved that the speed of light is relative to the transporting medium.

**Frames don't overlap.**

Unitron encapsulates every object. There is a single frame tied to objects traveling at the same speed in the same direction. Frames don't overlap. Unitron is either encapsulating the moving object being observed or it is encapsulating the observer. An observer in one frame isn't able to measure speed or distance in another frame. An observer is not able to determine that the trajectory of light arriving from other frames is straight or linear. The observer will only see the light in his own frame arriving at his measuring apparatus. Information from an object located in another frame is translated at the boundary of the frames. The boundary of the two frames may not be well defined but they can't overlap. The boundary may depend on the physical size and shape of the objects in the frames.

**Stellar Aberration**

We are able to calculate the speed of Earth around the sun because the direction of movement of Earth changes with the seasons. The apparent positions of distant stars change with the seasons and this phenomenon lets us calculate the speed of Earth around the Sun



Direct and Apparent Paths of Light from Distant Star

Carel van der Togt has a paper: “Stellar Aberration and the Unjustified Denial of Ether”. Carel van der Togt uses vacuum and dragged ether in his paper. His vacuum and dragged aether can be substituted with Interstellar Unitron and Unitron encapsulating Earth. The math is the same and it will not be repeated here. Carel van der Togt is correct, there is no relativity of any kind involved.

We can't measure the speed of the Solar system and the speed of our Galaxy with the help of stellar aberration because one revolution of the Solar system takes several hundred thousand years. We are not able to measure the speed of the sun relative to our galaxy or the speed of our galaxy relative to the Universe because there is no reference and we can't observe the original information from our frame. We can't make direct measurements of objects and velocities in other frames. By the time information arrives into our frame, the information has been converted and referenced to our frame.

### **Speed of light is a function of pressure of Unitron.**

Random thermal oscillation of Unitron is a function of energy density or pressure. At higher energy density Unitron may be able to transmit information at higher speed.

### **Gravitational Lensing**

Unitron has mass. It is subjected to the laws of gravitation. In reality because of the energy gradient each Unitron carrying a photon's energy is bombarded just a little more from the outer side than from the planet side.

### **Duality of light**

Duality of light can be explained. Unitron, real particle with mass carry energy – photons – at the given frequency.

### **Inertial Mass is Larger than Gravitational Mass**

A portion of Unitron column in front and behind the accelerating mass must also be accelerated.

## **Gravitation Equations**

Gravitation is the mother of all natural phenomena. Gravitation rules the Universe. Gravitation is always there. You can always count on gravitation. When you get up in the morning you don't have to plug in and turn on your gravitation machine. You don't have to provide energy to have gravitation. Just the opposite, you can't escape gravitation. You could travel to a point between Earth and Moon where the gravitational pull of these two bodies cancel each other out and you could feel free. This is an unstable situation and you are still a captive of Earth, Moon and Sun.

Without knowing what gravitation is we have equations to describe its behavior. We can calculate the forces caused by gravitational attraction. We can calculate potential and binding energies. We are able to calculate the energy needed to launch a satellite into orbit or make it escape the solar system.

Gravitational force is described by Newton's equation:  $F = \frac{G \times M \times m}{d^2}$  (Newtons)

Gravitational potential energy of mass  $m$  is the integral of the gravitational force equation from  $r$  to infinity and is a negative number. This equation is correct if  $M \gg m$ . It represents the energy required to move mass  $m$  from distance  $r$  to infinity.

Gravitational potential energy:  $U = -\frac{G \times M \times m}{r}$  (Joules)

Gravitational binding energy is the energy required to dismantle and pull apart mass M of radius R and uniform density, and transport all the material to infinity:

Gravitational binding energy: 
$$U = \frac{3}{5} \times \frac{G \times M^2}{R} \text{ (Joules)}$$

What is the energy required to levitate a 1kg mass at the surface of the Earth? To levitate a mass above Earth we have to put it into a circular orbit around Earth.

Here are some numbers:

Gravitational potential energy of mass m sitting on the surface of the Earth is:

$$U_p = -\frac{G \times M \times m}{R}$$

A non-orbiting mass is never in a state of equilibrium. If you lift up a rock and let it go, it falls to the ground. The rock stops only at a hard surface. To achieve equilibrium the rock has to be in circular orbit around Earth.

The energy required to put mass m into orbit at the surface of the Earth is:

$$U_k = \frac{m \times v^2}{2} = \frac{G \times M \times m}{2 \times R}$$

Derived from this equation:

$$Force = \frac{m \times v^2}{R} = \frac{G \times M \times m}{R^2}$$

To push an orbiting mass m into a higher orbit requires half of the energy of lifting the same but non-orbiting mass to the higher orbit.

If the sum of forces acting on a mass is zero, the mass will not accelerate. To reverse this statement if a mass is not accelerating, the sum of forces acting on this mass must be zero.

If we lift a mass m to a height of one meter from the surface of earth and release it, the mass m will accelerate towards earth and crash. One would say that there is an attractive gravitational force of Earth acting on mass m. One could also say that mass m did not have enough energy to stay afloat. If we place this mass m into a gun and shoot it straight up towards the sky, this mass m will give up all of its kinetic energy by gaining potential energy, stop, reverse direction and crash into the gun. One could conclude that mass m never gained enough potential energy to stay afloat.

None of the foregoing explains gravitation. Gravitation was never explained satisfactorily by anybody. Universal attraction is not an explanation of gravitation.

Curved space-time is double-talk by pretentious people – it is not an explanation of gravitation.

I have discovered that to grasp the nature of gravitation I must understand the electric charge first. In the next chapter I will investigate the electric charge.

## The Electric Charge

In my journey through the darkness I have realized that I must understand the nature of the electric charge before I can understand gravitation. I must understand the true nature of attraction and repulsion by the electric charge without the use of electric fields. I know fields do not exist. The need for a new model was apparent, but finding it was not easy. The old concept of the electric charge is repeated time and again; it is hammered into my brain and the brain of every student. The equations work. There are no apparent reasons or courage to challenge the concept of the electric charge and the electric field.

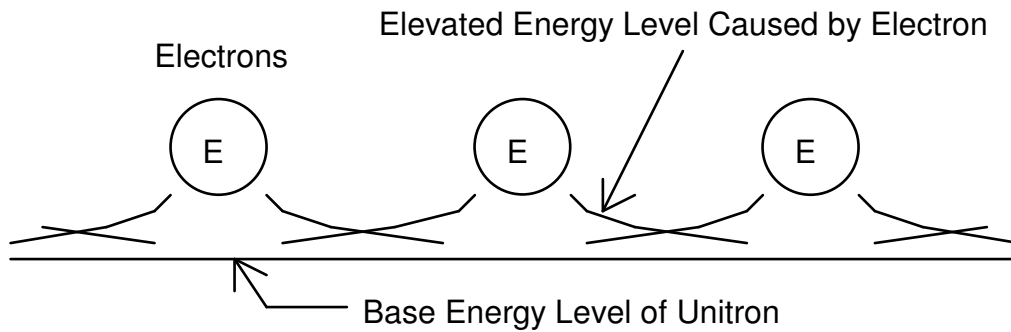
To develop an alternative view of the electric charge required major changes in my thinking. It is not sufficient to massage equations. I had to abandon the cul-de-sac where I found myself and strike out in a new direction. Old concepts of the electric charge and electric fields had to be purged from my brain. There is nothing electric about the electric charge. This is a difficult un-learning process.

As I have stated earlier I don't believe in the Holy Ghost and I don't believe in mysterious electric fields created by distant electric charges. There must be energy or pressure information passed by physical contact from the electron to surrounding space. The electron informs the world with physical means that it is a "charged" particle without expanding any energy. I have already discussed polarity, the problem of positive – negative charges.

Let's locate a copper sphere into a vacuum chamber. The copper will insure electron mobility. After injecting a large number of electrons onto the copper sphere, the electrons will distribute themselves evenly over the surface of the sphere because electrons repulse each other. How does this happen? Each electron must inform his electron neighbors that he is an electron and that his neighbor electrons must keep their distance. They behave just like elephant seal beach masters; they keep away from each other. I can tell you electric fields aren't the answer.

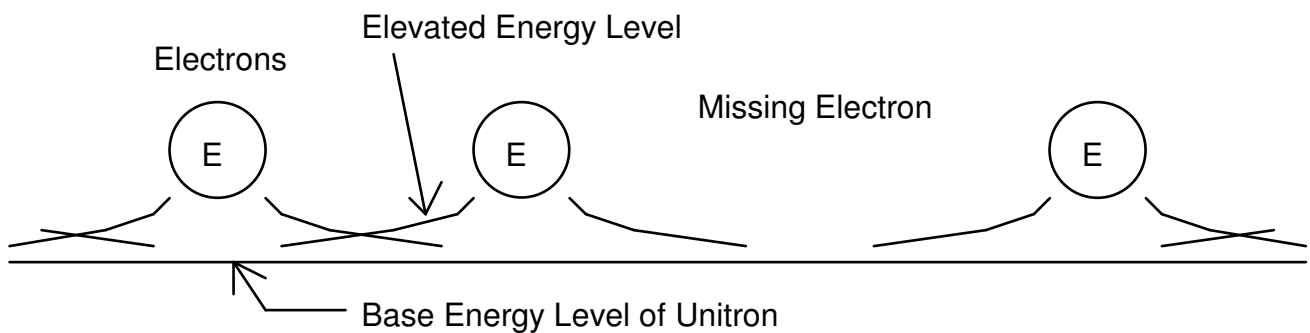
In an earlier chapter I have proposed that this Universe is filled with super-gas Unitron at high energy or pressure. It was proposed that this high pressure holds atoms, molecules and crystal structures together. At this point I propose that the electron has a particular surface property that polarizes the random thermal movements of Unitron around the electron. This polarization of thermal movement has the effect of increasing the energy level of Unitron around the electron in the radial direction. The so-called electric charge is a physical property of the electron's surface and not an "electrical" property.

Let's get back to the copper sphere mentioned above. An electron informs the Universe that it is an electron with its surface property by modifying the random thermal movements of the surrounding Unitron. The result of this polarization is a minor elevation of energy level around each electron in the radial direction. This polarization propagates with the speed of light and diminishes with the square of distance. Each electron tries to occupy an area of the lowest energy level; they keep away from the elevated energy levels of each other. Please note that there isn't any expenditure of energy by the electron. Electrons are passive particles, they can't and they don't generate fields.



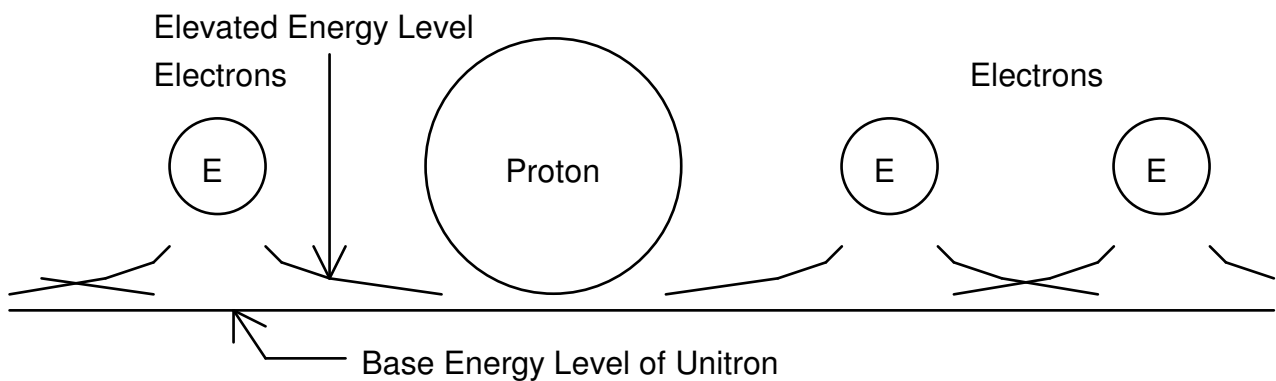
Electrons keep away from elevated energy levels created by other Electrons

Now we have to deal with the subject of polarity. I propose that the only so-called “charged” particle is the electron. Proton has no “charge” at all and a neutron may have half of an electron’s “charge”, but it is neutral to the surrounding space. A neutron maybe a proton with an electron stuck to it. The world can only see half of the electron’s surface resulting in half of the electron’s “charge”. This model doesn’t rely on imaginary fields, action at a distance or Casper.



Missing Electron or “Electron hole” doesn’t “repulse”, it seems to “attract” nearby Electrons

We can create an electron hole by removing a single electron from an evenly distributed group of electrons. This happens in semiconductors. At the site of the electron hole the energy level is not elevated. The electron hole is not repulsing the neighboring electrons, but the neighboring electrons are still repulsed from the opposite sides creating the illusion that the “hole” is pulling the electrons.



A Proton also behaves like a missing Electron, it “attracts” Electrons

A proton also represents an electron hole; it occupies space excluding electrons from that space.

Electrons elevate the pressure of Unitron around themselves, therefore electrons repulse each other. The repulsive nature of electrons keeps the Universe in an “electrically neutral” state. The repulsive nature of these forces makes it difficult to concentrate large numbers of electrons at any single point. It is impossible to create electric forces to rival gravitational forces. It is impossible to suck all the free electrons out of the solar system and pump them into the Sun. If you could achieve this, the electrons wouldn't stay long enough.

To demonstrate the problem, consider the capacitance of a sphere. A sphere of 20 cm radius has a capacitance of 20 picofarads versus the surrounding Universe. The capacitance of Earth is about 710 microfarads. Then we have the equation:  $q = I \cdot dt = C \cdot dV$ . It is a linear equation. To double the number of electrons on a sphere, the potential to force the electrons onto the sphere must be doubled. The electrons are closer to each other on the sphere, resulting in larger repulsive forces that the outside source must overcome. To store one Coulomb charge on Earth we need to apply 1400 Volts to Earth compared to the surrounding Universe. To store one Coulomb charge on a sphere of 20 cm radius we need to apply  $50 \cdot 10^9$  Volts to the sphere compared to the surrounding Universe and Earth. That is 50 billion Volts. And how do you create 50 billion volts? By concentrating one Coulomb charge onto a sphere of 20 cm radius.

My conclusion is that there is nothing “electrical” about an electric charge. The electric charge is the manifestation of a physical property of the electron. It is all about surface property, polarization and the energy contained in Unitron. How can we use tiny electrons to transmit large amounts of power, you ask? How can we do it with polarization of Unitron? Remember the numbers involved. The pressure or energy in Unitron is hundreds of Gigapascals; small polarization can create large forces. The number of electrons in a Coulomb (Ampere-second) is also very large; about  $6.2415 \times 10^{18}$ . While it is difficult to assemble a charge of 1 coulomb on a small sphere, current flow isn't a concentration of electrons; it's a flow of evenly distributed electrons. You can find the number of excess electrons in a section of wire by multiplying the capacitance of the wire section with the potential applied. It is very small

What are electric sparks and lightning? Electrical spark is the violent equalization of electron density between two objects. Violent collisions create photons that we see as lightning or spark.

We come to the question: what is neutral? Neutral is the average energy density of local space and it may vary with the location. In metals there are large number of electrons, the “potential” is higher. Some metals are more “neutral” than others due to the variation in electron density. This difference allows us to make batteries; it also causes corrosion.

I extend an invitation to the reader. Creative thinking and sophisticated modeling by hundreds of people are needed to work out the details of this new model. It is much beyond the means of this author. It is expected that new and better models will emerge. We must march toward the truth.

# Gravitation

The key to understand gravitation is to understand the nature of the “electrical charge”, repulsion and attraction. A new concept of the electrical charge was presented in the previous chapter. To recapture the essence: Electrons with their surface property polarize the random thermal movements of Unitron to cause a small increase in the local energy level in Unitron around the electron in the radial direction. The increased energy level causes repulsion between electrons; every electron wants to occupy a space with the lowest energy level possible. Electrons want to move away from each other as far as possible, they want to disperse evenly. There is no attraction. Attraction is repulsion from the other side by other electrons. The average electron density in any locality represents the “neutral” state.

Let us turn to gravitation. Gravitation is very similar to electron repulsion but opposite. Every proton causes a tiny decrease in the local energy level of Unitron surrounding the proton. This small decrease in energy level could be caused by the mass of the proton or the exclusion of electrons from the space occupied by the proton or both. Protons are giant dumb masses compared to electrons. If there are no electrons to cause elevation of energy level, then the proton will “attract” electrons and other protons from nearby space with higher energy levels. This force is weak, but the “attractive” nature of these forces allows the accumulation of protons. The accumulation of protons creates larger forces to attract more protons.

If matter in the early Universe was evenly distributed, it was an inherently unstable situation. The smallest disturbance in the energy level in Unitron would start the process of clumping two protons. Protons have no charge, they don’t repulse each other. As more protons and hydrogen atoms join the crowd, the local energy level sinks lower. If the Universe did not expand, all protons in the Universe could end up in one big pile. Some call this process the gravitational attraction towards a big crunch, but it is driven by the pressure or energy in the surrounding Unitron with the help of electrons. The big crunch will never happen because the Universe is expanding at much higher rate than the clumping process occurs. As the Universe expands, the pressure in Unitron diminishes and at one point all will fall apart and dissipate into the great nothingness.

The pressure or energy contained in Unitron is limited. How far can a large mass reduce this pressure? The center of the galaxy may contain very large piles of matter, but the energy level of Unitron can’t fall below zero. Therefore the energy level difference is limited to the energy level of Unitron in intergalactic space. The strength of gravitation will never be large enough to prevent light or matter from escaping from a large mass. Spiral galaxies with their center bars are proof that matter is ejected from the grey hole to form the spiral arms of these galaxies. This must be the way old stars are recycled into new hydrogen atoms. Event horizons and black holes may make good material for science fiction books and suspense movies but they don’t exist.

# Time

Newton defined the essence of time in his Principia: Absolute, true and mathematical time, of itself and from its own nature flows equably without relation to anything external...

The concept of Time is more elusive than the concept of gravitation or the concept of the electric charge. All we know in our world that Time marches on relentlessly. Philosophy plays a great role in our perception of time. We measure the passage of time with our crude clocks. A pendulum clock in earth orbit will come to a complete halt and could not keep track of time. A clock depending on the strength of a spring can't keep accurate time if the ambient temperature changes. A cesium clock in all probability ran faster a billion years ago and will run slower a billion years from now.

We have to distinguish between Time and our ability to measure the passage of time with clocks. Suppose a big-bang event occurred some time ago marking the beginning of time for this Universe. This time should be absolute and Universal for every part of this Universe. Chances are that this Universe will whimper out some  $10^{100}$  years from now. Will this Universal time clock slow down with the diminishing density of Unitron? What about the passage of Time in the great emptiness? Maybe the passage of Time doesn't need a clock?

If your time piece depends on the pressure of Unitron, like a cesium clock, it will run slower in lower energy density Unitron closer to a large mass like Earth or some other planet. It is possible that some molecular functions also slow down. Does this mean that time has slowed down? To stop your cesium clock you have to reduce the energy density of Unitron to a point where cesium atoms fall apart. If your clock is accelerated to very high speed, Bernoulli Effect may reduce the pressure or energy density of Unitron tied to the clock. This effect will have to be determined and calculated. We have already stated that your clock may run slower in reduced energy density. But Time keeps marching on.

In an expanding Universe energy density is getting smaller. If we look back in time, your cesium clock may have run a lot faster than now due to the higher pressure in Unitron. A second may have lasted only half as long as now. If you go back far enough, your cesium clock didn't run at all. There was no cesium. Does that mean there was no passage of time? But due to the higher pressure the speed of light would have been higher also by today's clocks. We also have to take into consideration the size of your measuring rod. Did the size of the measuring rod increase with the expanding Universe? So what is the standard? What do you compare to? Is anything constant? Maybe the only constant is Time. Not your clock but Time. Time marches on.

# Summary

This is a simplified diagram of our simple Universe.

An expanding ball filled with Unitron super-gas at high pressure, surrounded by the great emptiness. The pressure of Unitron holds together protons and electrons to form atoms, molecules and other structures.

The surface property of electrons polarizes the thermal movements of Unitron, increasing pressure around the electron. Electrons “repulse” each other; they want to avoid the higher energy levels of other electrons. Electrons want to disperse; making the Universe “neutral”.

Protons exclude electrons from the space they occupy, behaving like electron holes. Protons “attract” each other; they want to move to the lower energy level around other protons. Protons want to clump; they form celestial bodies with large accumulated mass.

