

TOMORROW'S SCIENCE TODAY –

Proposed Future Discoveries in Science, and How Everyone will see Everything Differently

“If a complete unified theory was discovered, it would only be a matter of time before it was digested and simplified ... and taught in schools, at least in outline. We should then all be able to have some understanding of the laws that govern the universe and are responsible for our existence.”

(“A Brief History of Time” by Stephen Hawking, Introduction by Carl Sagan – Bantam Press 1988, page 168)



Professor Stephen Hawking

Beginning of

Intergalactic And Time Travel, Einstein's Relativity, Bohr's Atomic Model, Dark Matter, Dark And Negative Energy, String Theory / Unification, The Law Of Conservation, And Combining Newtonian And Relativistic Gravity With Standing Waves And Quantum Probability Waves

With Liberated Science's

Implications For Religion And Philosophy As Well As Everyday Life In The Light Of The Concept of an Electronic And Holographic Universe Shaped Like A Mobius Loop

I saw a video (“Hidden Dimensions: Exploring Hyperspace” - <http://www.worldsciencefestival.com/hidden-dimensions>) in which it was stated that mathematicians are free to imagine anything while physicists work in a very different environment constrained by experiment, and that the American physicist Richard Feynman (1918-1988) said scientists work in a straitjacket. Well, Albert Einstein (1879-1955) said “Imagination is more important than knowledge” so let’s see what happens when we throw away everyday tradition and conformity, let our imaginations fly (while trying to stay grounded in science and technology), and thus release science from its straitjacket!

This article has its beginnings in cellular automata (in mathematics and computer science, collections of cells on a grid that evolve through a number of discrete time steps according to a set of rules based on the states of neighbouring cells) and grew into a belief that the universe (electromagnetism, gravitation, space-time and, as we’ll see, 5th dimensional hyperspace) has a digital (electronic) foundation.

It logically leads to assertions of instant intergalactic travel, time travel into the past as well as the future (neither of which can be altered), of unification of the large-scale universe with small-scale quantum particles, that the universe is a computer-generated hologram, that everyone who

ever lived can have eternal life and health, that motion is an illusion caused by the rapid display of digitally generated "frames", that the entire universe is contained in (or unified with) every one of its particles, that the terms "computer-generated" and "computer" do not necessarily refer to an actual machine sending out binary digits or qubits, that we only possess a small degree of free will, that humanity could have created our universe and ourselves through unification physics says a being called God must nevertheless exist and likewise be Creator, and that Einstein's $E=mc^2$ equation could be modified for the 21st century, reflecting the digital nature of reality. Though these things may be unbelievable in 2011, we should not ignore the possibilities of their being true or of their showing that reality is indeed digital because they are the logical product of already demonstrated electrical engineering and trips into space, science is investigating time travel and unification, the notion of motion has been suspect to some ever since the ancient Greek philosopher Zeno of Elea (490?-420? B.C.) argued that motion is absurd, and many religions worldwide speak of God and have some concept of survival of bodily death.



“Little Einstein” writing $E=mc^2$ and poking out tongue like “Big Einstein” did for photographers on his 70th birthday

In July 2009, electrical engineer Hong Tang and his team at Yale University in the USA demonstrated that, on silicon chip-and transistor-

scales, light can attract and repel itself like electric charges/magnets (Discover magazine's "Top 100 Stories of 2009 #83: Like Magnets, Light Can Attract and Repel Itself" by Stephen Ornes, from the January-February 2010 special issue; published online December 21, 2009). This is the "optical force", a phenomenon that theorists first predicted in 2005 (this time delay is rather confusing since James Clerk Maxwell showed that light is an electromagnetic disturbance approx. 140 years ago). In the event of the universe having an underlying electronic foundation (hopefully, my summary will make it clear that this must be so – also ... an electronic universe is a necessary precursor to scientific fulfilment of Star Trek's "magic" which becomes clear as these steps are read), it would be composed of "silicon chip-and transistor-scales" and the Optical Force would not be restricted to microscopic scales but could operate universally. Tang proposes that the optical force could be exploited in telecommunications. For example, switches based on the optical force could be used to speed up the routing of light signals in fibre-optic cables, and optical oscillators could improve cell phone signal processing.

If all forms of EM (electromagnetic) radiation can attract/repel, radio waves will also cause communication revolution e.g. with the Internet and mobile (cell) phones - I anticipate that there may be no more overexposure to ultraviolet or X-rays. In agreement with the wave-particle duality of quantum mechanics, EM waves have particle-like properties (more noticeable at high frequencies) so cosmic rays (actually particles) are sometimes listed on the EM spectrum beyond its highest frequency of gamma rays. If cosmic rays are made to repel, astronauts going to Mars or another star or galaxy would be safe from potentially deadly radiation. And if all particles in the body can be made to attract or repel as necessary, doctors will have new ways of restoring patients to health.

From 1929 til his death in 1955, Einstein worked on his Unified Field Theory with the aim of uniting electromagnetism (light is one form of this) and gravitation. Future achievement of this means warps of space (gravity, according to General Relativity) between spaceships/stars could be attracted together, thereby eliminating distance. And "warp drive" would not only come to life in future science/technology ... it would be improved tremendously, almost beyond imagination. This reminds me of the 1994 proposal by Mexican physicist Miguel Alcubierre of a method of stretching space in a wave which would in theory cause the fabric of space ahead of a spacecraft to contract and the space behind it to expand. Therefore, the ship would be carried along in a warp bubble like a person being transported on an escalator, reaching its destination faster than a light beam restricted to travelling outside the warp bubble. There are no practical known methods to warp space – however, this extension of the Yale demonstration in electrical engineering may provide one.



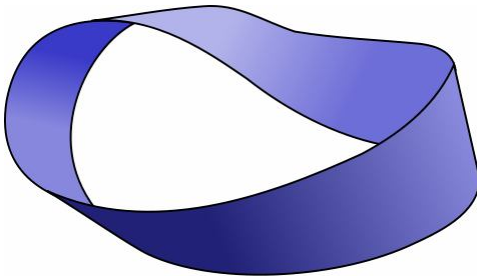
Star Trek's warp-driven Enterprise

Elimination of diseased matter and/or eliminating the distance in time between a patient and recovery from any adverse medical condition – even death – would be a valuable way of restoring health. With time travel in an electronic universe, people who have long since died could have their minds downloaded into clones of their bodies - a modification of ideas published by robotics/artificial intelligence pioneer Hans Moravec, inventor/futurist Ray Kurzweil and others - allowing them to “recover” from death (establishing colonies throughout space and time would prevent overpopulation). If the distance in time between recovery and a patient is reduced to zero; prevention of any adverse medical condition, including that of a second death for those resurrected, can occur and we can enjoy resurrection to eternal life.

Since Relativity says space and time can never exist separately, warps in space are actually warps in space-time. Eliminating distances in space also means “distances” between both future and past times are eliminated - and time travel becomes reality. This is foreseen by the Enterprise time-travelling back to 20th-century Earth in the 1986 movie "Star Trek IV: The Voyage Home" and by Star Trek's "subspace communications". Doing away with distances in space and time also opens the door to Star Trek-like teleportation. Teleportation wouldn't involve reproducing the original and there would be no need to destroy the original body – we would “simply” be here one moment, and there the next (wherever and whenever our destination is).

Can anything more specific about the mechanics of time travel be stated here? If we get into a spaceship and eliminate the distance between us and a planet 700 light-years away, it'll not only be possible to arrive at the planet instantly but we'll instantly be transported 700 years into the future. On page 247 of "Physics of the Impossible" by physicist Michio Kaku (Penguin Books 2009), it's stated "astronomers today believe that the total spin of the universe is zero". This is bad news for mathematician Kurt Godel, who in 1949 found from Einstein's equations that a spinning universe would be a time machine (p. 223 of "Physics of the Impossible"). Professor Hawking informs us that "all particles in the universe have a property called spin which is related to, but not identical with, the everyday concept of spin" (science is mystified by quantum spin which has mathematical similarities to familiar spin but it does not mean that particles actually rotate like little tops). Everyday spin might be identical to Godel's hoped-for spinning universe. If the universe is a Mobius loop (a Mobius loop can be visualised as a strip of paper which is given a half-twist of 180 degrees before its ends are joined), the twisted nature of a Mobius strip or loop plus the fact that you

have to travel around it twice to arrive at your starting point might substitute for the lack of overall spin. Then the cosmos could still function as a time machine. We've seen how it permits travel into the future. We can journey further and further into the future by going farther and farther around the Mobius Universe. We might travel many billions of years ahead - but when we've travelled around M.U. exactly twice, we'll find ourselves back at our start i.e. we were billions of years in the future ... relative to that, we're now billions of years in the past.



Mobius strip

Maybe any limits on trips to the future or past (e.g. travelling backwards beyond our starting point and into the past) are overcome by travelling to other universes and linking their "eliminated distances" to those in this universe. This linkage requires all laws of physics etc. to be identical everywhere. In a so-called multiverse consisting of parallel universes where things have the potential to be slightly different in each universe, the link could be broken because we might find ourselves trying to force a square peg into a round hole. How could subatomic particles communicate instantaneously across the universe (phrased another way - how could they experience the whole universe in their existence)? The last two phenomena could be understood by stating that any particle has the same properties as the universe as a whole. Unconventional US cosmologist Max Tegmark says "You are made up of quantum particles, so if they can be in two places at once, so can you." We can say "The universe is made up of quantum particles, so if they can be in two places at once, so can the universe." There need not be any such thing as parallel universes, however (the parallel-universes, also called the many-universes or many-worlds, interpretation of quantum mechanics was developed by American physicist Hugh Everett III in 1957). The universe's being in two places simultaneously could mean it's in the same space-place as any or all of its particles. It could also be in the same time-place as any or all of its earlier or later selves because there can be no space without time.

It seems appropriate now to address a question I've heard posed by Stephen Hawking, Michio Kaku and other scientists: Where are the tourists from our future who've journeyed into their past to check out our present? I can think of 3 possibilities - maybe they've used synthetic biology to develop ghostly, non-physical bodies ... if they're still physical, maybe they're "dark tourists" who resemble dark matter by remaining invisible yet are capable of exerting gravitational, or other, influence. Or an even more bizarre possibility ... it's possible that every person we see is ultimately from the future, though they'd be totally unaware of it. They'd be unconscious of their true place in this eternal universe since their job is to contribute, in whatever way they can, to development of the fantastic future awaiting everyone. They'd be less inclined to build the future if they had awareness of it already existing.

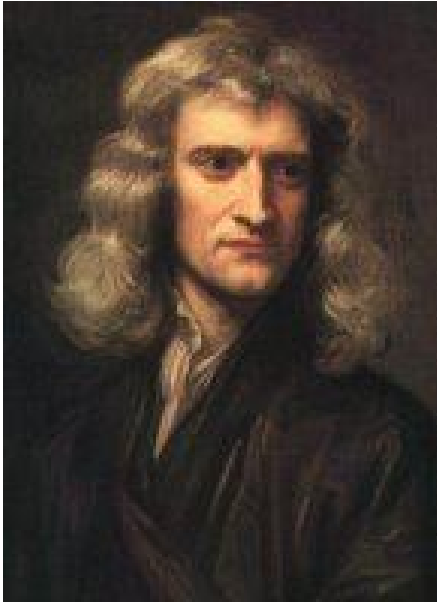


Tourists from the future want to see Hawaiian
Hula girls

The famous scientist Stephen Hawking says time can be thought of as another dimension. Perhaps he should have said "time can be thought of as another space dimension". If we journey in these other dimensions, they must have spatial coordinates for us to navigate in (length, width and depth in 4-D time and 5-D hyperspace as well as familiar 3-D: if we choose, we can therefore say the universe has 9 dimensions: and the zero separation unifying these 9 can be regarded as a 10th dimension). Then getting into a spaceship and eliminating the distance between us and a planet 700 light-years away would be the same as traversing the 1st of time's 3 axes (for convenience, let's call it the back-forth dimension). We continue with the interdependence of space and time by using the spaceship to travel many billions of light-years ahead. This causes travel around the Mobius loop and in the up-down dimension (time's 2nd axis). As travel proceeds, the spacecraft's nose can be pointed, say, one degree further to the left (or right) each revolution. This takes us into time's 3rd axis (the side-to-side dimension) which is equivalent to Godel's hoped-for spinning universe.

It's equivalent because, though the universe itself isn't rotating, the spaceship simulates (models) universal rotation as a result of a) its being in the 3 axes of time simultaneously and b) its unbelievable velocity (each revolution around the visible universe – at a minimum, 40 to 45 billion light years – is almost instant). Together, a + b cause the ship and the rest of the cosmos to undergo quantum mechanics' entanglement and the ship experiences the whole universe in its existence (communicates instantly with the entire cosmos). The ship's rotation (through the axes of time) is therefore equal to universal rotation. Remember ... Godel mathematically found from Einstein's equations that a spinning universe would be a time machine. So if you agree that all subuniverses in this megauniverse are in physical contact, we can say there is only one Universe and remove the need to travel to other universes and link their "eliminated distances" to those in this universe. Eliminating spacetime distances in this - the only - universe is perfectly adequate for time travel into the past. Since we live in a cosmos with an electronic foundation, we could simulate the spaceship's endeavours and teleport into the future or past (and anywhere in space, or the 5-D hyperspace which produces space and time) using a stationary machine like Doctor Who.

It can't be denied that these paragraphs imply the possibility of humans from the distant future time-travelling to the distant past and using electronics to create this particular subuniverse's computer-generated Big Bang (the feedback of the past and future universes into the unified cosmos's electronic foundation would ensure that both past and future could not be altered). An accomplishment such as this (humans creating the universe) would be the supreme example of "backward causality" (effects influencing causes) promoted by Yakir Aharonov, John Cramer and others. However, recalling Isaac Newton's inverse-square law and what it says about the force between two particles being infinite if the distance of separation goes to zero means there's still room for God because God would be a pantheistic union of the megauniverse's material and mental parts, forming a union with humans in a cosmic unification.



Isaac Newton (1642-1727),
discoverer of Law of Gravity

Even further in the future, we'll be able to use “telekinetic independence from technology” and teleport without any machine at all (eat my dust, Doctor Who). Paradoxically, this independence from technology would seem to be dependent on technology. What kind of technology could manipulate the unification and zero separation of all space-time? Band-gap structures ...

Morpho butterflies create colour by selectively adding and deleting certain wavelengths of light. Physicists have only recently devised comparable materials, called photonic band-gap crystals; and are now exploring their use in phone switches, solar cells and antennas. No surprise, then, that some engineers are looking to the living world for the next generation of optic inspirations. I believe advances in engineering and biology will enable humans, like the morpho butterfly, to selectively add and delete certain wavelengths of light. But the word "light" need not only refer to visible wavelengths. It can be extended and refer to any wavelength of the electromagnetic spectrum. Science accepts that radio, infrared, ultraviolet waves and X-rays as well as gamma radiation are all forms of light.

For decades scientists have theorised the existence of a particle, called the Higgs boson, that explains how other particles acquire mass. The Higgs boson is believed to produce a field that interacts with particles and gives them a property we interpret as mass, explains Dr Kevin Varvell, of the University of Sydney in Australia. Dr Aldo Saavedra, a particle physicist also at the University of Sydney, made this comment as colleagues at the European Organization for Nuclear Research (CERN), near Geneva, switched on the Large Hadron Collider - "It would be really nice if nature actually provided some very puzzling thing that theories haven't actually thought of." In September 2008, renowned British astrophysicist Professor Stephen Hawking bet US\$100 that the LHC experiment would not find the

Higgs boson. "I think it will be much more exciting if we don't find the Higgs." Suppose matter acquires all its properties (including mass) by the superimposing of electromagnetic and gravitational waves* (computer-generated in a 5th dimension and projected into the hologram of 3+1 dimensions which we call space-time). We can then further extend the above reasoning and regard matter as a hybrid of electromagnetic and gravitational waves. So the day will come when we can add or delete wavelengths anywhere we choose!

* Einstein predicted the existence of gravitational waves but they haven't been discovered yet. The measurements on the Hulse -Taylor system (a pulsar & a star in orbit around a common centre of mass – in 300,000,000 years they will merge to form a black hole and cease to radiate gravitational waves) have been carried out over more than 30 years. The orbit has decayed since the binary system was initially discovered, in precise agreement with the loss of energy due to gravity waves predicted by Einstein's General Theory of Relativity (there's a 0.2% disparity between the data and the predicted results which is due to poorly known galactic constants). In 1993, Russell Hulse and Joe Taylor were awarded the Nobel Prize in Physics for this work, which was the first indirect evidence for gravitational waves. A precursor to the superimposing of electromagnetic and gravitational waves is the Touchable Hologram method, demonstrated on 6 Aug 2009 by researchers from The University of Tokyo led by Hiroyuki Shinoda, of using an ultrasound phenomenon called acoustic radiation

pressure to create a pressure sensation on a user's hands, which are tracked with two Nintendo Wiimotes.



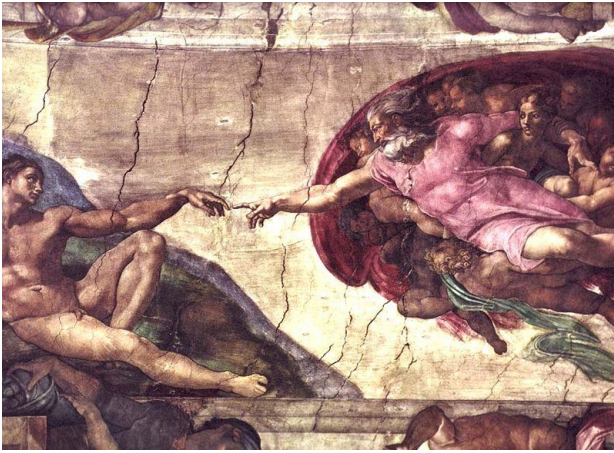
Albert Einstein, about 1920

I anticipate people will oneday have band-gap structures in their brains that are no bigger than a computer chip (these won't require surgical implantation, but simply downloading, because of the computer-generated hologram's creation of the pre-existing digital nature of all parts of the universe). Photonic band-gap crystals would, of course, only deal with light

in its photonic forms (energy forms such as visible light or radio waves). The band-gap structures I have in mind would need to deal with forms like genes, so they could add or delete anything and everything we choose. They might accomplish this by acting similarly to a modem that acts on a scale trillions of times smaller than a modem manufactured by nanotechnology, and would be capable of manipulating digitised matter. Then they could emulate computers' copy/paste function to add things; as well as their delete function, to remove things (now that's what I call genetic engineering!). This ability must only come to fruition in a future, ideal society: it would only be wasted and abused in the present warring and selfish world!

Though humans have a very special potential which will, I believe, see us use our inbuilt creativity to oneday produce universes and ourselves and perform other so-called miracles; this is, in the end, just another article proclaiming that God created us and the universe. This apparent contradictory statement is resolved easily by noting that this article makes 4 points - a) it attempts to use science to demonstrate how people could create the universe and ourselves, b) it tries to show scientifically that there truly is a God – who is the total of everything in the universes, from consciousness and personality to a cluster of galaxies to a person ... to a grain of sand ... to an atom ...to a ray of light or a magnetic or gravitational field (with the One's consciousness capable of "downloading" into any component physical form, type of energy or force), c) finite humans are

united with God via the universe's Unified Field (which embraces zero-separation). The inverse-square law (see next paragraph) of famous English scientist Isaac Newton (1642-1727) says the force between two particles is infinite if the distance of separation goes to zero which surely means the force between 2 zero-separated particles in the zero-separated universes is the infinity we term God, and if God is everything++, must be particles themselves (of brains, light, computers, gravity, etc.), and d) therefore, saying "we created the universe and ourselves" is another way of saying "God created the universe and us" – the religious writer and broadcaster Herbert W. Armstrong (1892-1986) would have phrased this apparent contradiction as "God is reproducing himself through mankind" since he taught that the true message Jesus brought to the world was that mankind's destiny is to become God. And, on another religious/philosophical viewpoint, Hindu Tantrism would correctly state that unity of the worshipper with the worshipped is ultimately achieved.



Michelangelo's The Creation of Adam.

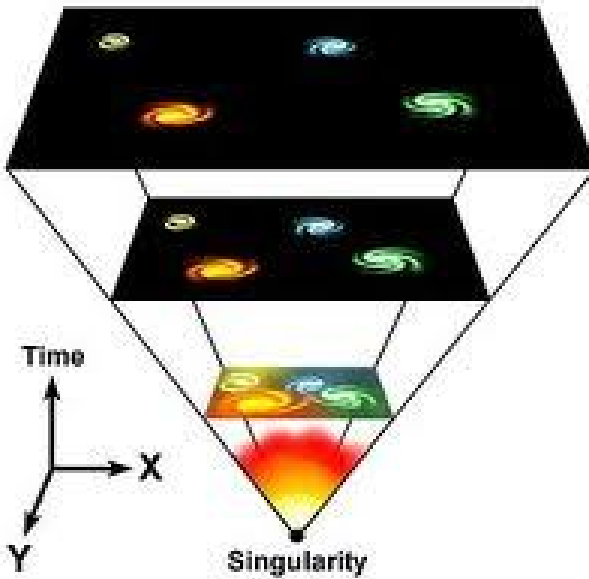
The inverse-square law says that if stars A and B emit light of equal intensity but star B is twice as distant, it will appear one quarter as bright as star A ie not the square of 2 (4) but the inverse square of 2 ($1/4$ or one divided by four). Newton was just as dedicated to the quest for God as he was to the quest for scientific enlightenment. I don't know if he was familiar with the teachings of ancient Greek philosopher and politician Parmenides (c.515 BC - c.445 BC) Parmenides taught that the only true being is "the One" which is infinite, indivisible and the whole of it is present everywhere (if accepted, these beliefs would surely have assisted Newton's thoughts regarding zero-separation and an infinite God). This last point seems to anticipate invention of the hologram (each piece of a hologram stores information about the whole image). The philosopher and mathematician

Pythagoras (580?-500 BC) believed that numbers constitute the true nature of the universe.

Combine Parmenides' belief in the One with the Pythagorean belief in number being the essence of the universe and you have the foundation of my conviction that the building blocks making up the universe are a combination of electromagnetic pulses plus a cosmic hologram.

++ Dutch philosopher Baruch (or Benedict) Spinoza (1632 to 1677) said everything that exists, including individual men and women, is a part of God and is a tiny part of an all-inclusive pantheism. Scientists today and of the recent past, including Albert Einstein, tend to believe in "Spinoza's God" and an impersonal pantheism. While Spinoza said there can be no such thing as personal immortality but only the impersonal sort that consists in becoming more and more one with God i.e. one with the material universe, he also said thought and mind were attributes of God. This sounds like agreement that "(God) is the total of everything in the universes, from consciousness and personality to a cluster of galaxies to a person ... to a grain of sand ... to an atom ...to a ray of light or a magnetic or gravitational field" (I think we need a time machine so we can go to the 17th century and ask him for his thoughts about this). In any case, I believe advances in technology will prove him wrong about there being no personal immortality because "people who have long since died could have their minds downloaded into reproductions of their bodies" (welcome back, Spinoza).

On the subject of everything - would the entire universe instantly feel the loss of the sun's gravity if our star disappeared suddenly? The answer to this is a matter of relativity. If we're viewing this occurrence from the 3+1 dimensions of spacetime, the answer must be "no" (and agree with Einstein's Relativity) because we'd be dealing with the finite speed of gravitational (and electromagnetic) waves - 299,792,458 metres per second (approximately 186,282 miles per second). If we're viewing from the 5th dimension (where this article theorises electromagnetic and gravitational waves are computer-generated and "projected" into the hologram of 3+1 dimensions which we call space-time), or from those 3+1 dimensions after spacetime and matter have been subjected to the "eliminated distances" mentioned in the middle of this article, the answer must be "yes" (and agree with Newtonian physics) because we'd be dealing with unification and zero separation.



The universe evolving from the ideas of Newton and Einstein

I was seriously tempted to rethink everything in the above article when I read online that in "The Atlantic Monthly" for April 1988, journalist Robert Wright says U.S. computer scientist and physicist "Ed Fredkin thinks that the universe is a computer. According to his theory of digital physics, information is more fundamental than matter and energy. He believes that atoms, electrons, and quarks consist ultimately of bits — binary units of

information, like those that are the currency of computation in a personal computer or a pocket calculator.” After all, it’s easier to contemplate the universe being a computer than thinking of the universe as the product of a quantum computer hiding in hyperspace. However, I find 3 faults with his theory of digital physics and I’ll discuss these now –

First, the theory has no need for a 5th dimension. Albert Einstein saw the value of a 5th dimension after receiving a letter in 1919 written by Theodor Kaluza. He proposed that Einstein’s dream of finding a unified theory of gravitation and electromagnetism might be realized if he worked his equations in five-dimensional space-time. Einstein scoffed at the idea at first but later reconsidered and helped Kaluza get his paper published. A few years after that, physicist Oskar Klein published a quantum version of Kaluza’s work. In the 1970s, the resulting Kaluza-Klein theory turned out to be beneficial in working on supersymmetry (a postulated unifying relationship between elementary particles).

Professor Fredkin’s digital physics leaves no room for the universe to be considered a hologram. It can, of course, digitally generate holographic interference patterns – but it says nothing about using lasers in creation of universes.

The article “Holographic Principle” in the Internet’s free encyclopedia Wikipedia states: “The holographic principle is a property of quantum gravity and string theories which states that the description of a volume of space can be thought of as encoded on a boundary to the region —

preferably a light-like boundary like a gravitational horizon. First proposed by Gerardus 't Hooft, it was given a precise string-theory interpretation by Leonard Susskind. In a larger and more speculative sense, the theory suggests that the entire universe can be seen as a two-dimensional information structure "painted" on the cosmological horizon, such that the three dimensions we observe are only an effective description at macroscopic scales and at low energies. Cosmological holography has not been made mathematically precise, partly because the cosmological horizon has a finite area and grows with time." (Regarding the holographic principle, read about Craig Hogan (Affiliate Professor, Department of Physics, University of Washington, USA) and the GEO600 gravitational-wave detector in "New Evidence of a Holographic Universe?" at <http://www.khouse.org/articles/2009/839/> (excerpted from New Scientist, January 15, 2009)

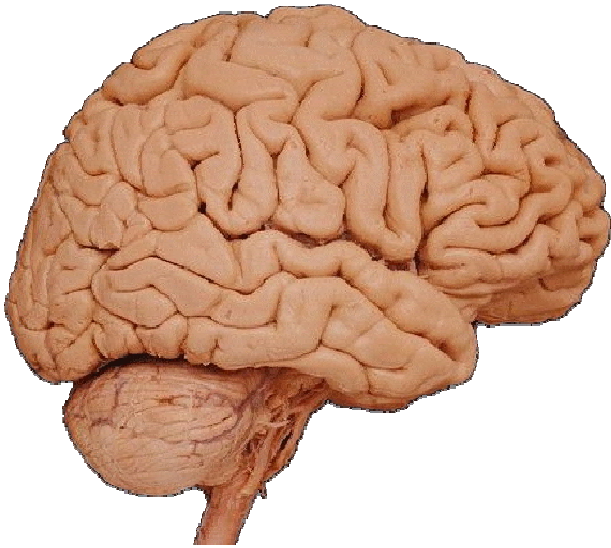


Is the world a Touchable Hologram generated by Digital Physics in a 5th dimension?

And it is stated by <http://www.spaceandmotion.com/Physics-David-Bohm-Holographic-Universe.htm> (part of one of the top philosophy sites on the Internet) that the British quantum physicist David Bohm (1917-1992) asserted that the tangible reality of our everyday lives is really a kind of illusion, like a holographic image. Underlying it is a deeper order of existence, a vast and more primary level of reality that gives birth to all the objects and appearances of our physical world in much the same way that a piece of holographic film gives birth to a hologram. Bohm calls this deeper level of reality the implicate (which means enfolded or hidden) order, and he

refers to our own level of existence as the explicate, or unfolded order. Bohm is not the only researcher who has found evidence that the universe is a hologram. Working independently in the field of brain research, Stanford neurophysiologist Karl Pribram has also become persuaded by the holographic nature of reality. He says that the human brain can be modeled as a hologram. Capitalizing on Pribram's findings, Bohm states that our brains are smaller pieces of the larger hologram. That our brains contain the whole knowledge of the universe. So, you can see how each mind has a limited perspective of the universal hologram. Our brains are our windows of perception. Each mind always contains the whole picture, but with a limited and unclear perspective. We each have different experience in our lives, but each perspective is valid. Our brains mathematically construct objective reality by interpreting frequencies that are ultimately projections from another dimension, a deeper order of existence that is beyond both space and time.

Fredkin's digital physics allows the "eliminated distances" in space-time which I spoke of earlier but, as far as I understand, it supposes that reality is something objective and "out there" - therefore I don't see how it could unify the entire universe and, for example, allow extrasensory perception. Since processing in the hyperspatial quantum computer doesn't happen at infinite speed but is always restricted to the speed of light, this unification must be only virtual or partial even if processing takes an infinitesimal 10^{-43} of a second (that's a second divided into 10 million trillion trillion trillion parts). Things like ESP and telekinesis (psychokinesis) would be everyday phenomena if unification was total. But because our universe's unification is the tiniest degree removed from total, they aren't. Why are true telekinesis and ESP possible at all? It must be because the universe's underlying electronic foundation enables our cosmos to be a total and complete unification by elimination of all distances in space and time and between the different sides of objects and particles, too. In other words, the brain can sometimes transcend the barriers of space, time and matter to connect with other brains, living structures or nonliving structures.



Does the brain contain the whole knowledge of the universe – and can it transcend space, time and matter?

Tomorrow's Science Today:
Part 2 of 3

Continuing

Intergalactic And Time Travel, Einstein's Relativity, Bohr's Atomic Model, Dark Matter, Dark And Negative Energy, String Theory / Unification, The Law Of Conservation, And Combining Newtonian And Relativistic Gravity With Standing Waves And Quantum Probability Waves

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Implications For Religion And Philosophy As Well As Everyday Life In The Light Of The Concept of an Electronic And Holographic Universe Shaped Like A Mobius Loop

"The Moon Is New" (a book by John Dobson – Berbeo Publishing, 2008) has the potential to completely change our understanding of the universe. On page 14, it's stated that "Einstein's equation ($E=mc^2$) says that mass and energy are the same thing ..." and "The c^2 is just how many ergs are equal to one gram" (making the equation $E=m$). In pages 38-40, the book asks "... how many centimeters (are) equal to a second. That ratio, what is known in the trade as the speed of light, is about 30 billion centimeters to a second." This question, and these pages, could lead to us saying "space and time are the same thing." But as the book tells us on p. 38, "... time is the opposite of space in the geometry of this world ..." and "... the space and time separations between (any) two events are equal and the total space-time separation is, therefore, zero."

Suppose a star we are viewing is at a distance of 100 light years (this can be represented as +100). Since we see nothing as it presently is but as it was when the light left it, we are seeing the star as it was 100 years ago (represented as the opposite of space i.e. as -100). Repeated experimental verification of Einstein's Relativity theory confirms its statement that space and time can never exist separately but form what is known as space-time. The space-time distance between us and the star is therefore $100 + (-100)$ i.e. $100 - 100$ i.e. 0 and there is actually zero separation between us and the star's gravity, heat etc.

So saying space and time are equivalent ("equal" or "the same thing") is incomplete and, to be accurate, we need to say space-time separation is equal (and zero). This possibly explains cosmic unification and because the inverse-square law of famous English scientist Isaac Newton (1642-1727) says the force between two particles is infinite if the distance of separation goes to zero; also possibly explains the existence of an all-powerful, and super-intelligent (since those particles could be brain particles), God.

Is it also incomplete to say mass and energy are the same thing? Yes. We can add c^2 to $E=m$. But we can think differently and think of $E=m$ as $10=10$ exponent 1. To make the equation totally complete, we must add something without altering the meaning e.g. by writing $10=10$ exponent $1+0$. Now we have $E=m$ exponent $1+0$ (in the BASIC programming language, $E=m ^ 1+0$). Where do we find 1's and 0's? In the binary language used by computers. Does this mean the Underlying Existence spoken of in the book is energy as the book suggests – but to be more specific, the energy of a computer (perhaps a quantum supercomputer) processing?

Maybe this quantum supercomputer resides in the same place as the purported Big Bang. Science says the Big Bang created all the matter and energy in the universe – if a quantum supercomputer exists in that place, we could indeed say that all matter and energy is computer-generated. Carl Sagan (who was an American astronomer, astrophysicist, cosmologist and author) said there is no centre to the universe where the Big Bang could have taken place and initiated expansion. Therefore, the Big Bang (and for our purposes, the quantum supercomputer) would exist outside space and time in what we might call 5th dimensional hyperspace. Page 34 suggests “... the rest mass of the proton (is) just the energy represented by its separation ... from all the rest of the matter in the ... universe.” Since that separation is zero, the universe must be unified with each of its constituent subatomic particles and those particles must follow the rules of fractal geometry being similarly composed of space and time and hyperspace. This is another challenge to our senses – like their being zero separation between us and a star’s gravity, heat etc. – that is possible if we live in a holographic universe (combining gravitational with electromagnetic waves) controlled by the magic of computers.



Carl Sagan

$E = m^{1+0}$ is $E = mc^2$ for the 21st century

Does the simple modification of $E = mc^2$ ($E = mc^2$) to $E = m$ exponent $1+0$ ($E = m^{1+0}$) extend Albert Einstein's genius, which he claimed was not genius but intense curiosity and imagination, infinitely beyond the 20th century?

Removing $E = m$ from both equations means c^2 (to be precise, $c^2 = 1+0$)

Multiplying each side by base n (any number) gives us

$$nc^2 = n^{1+0} \text{ i.e. } nc^2 = n$$

Dividing both sides by n gives $c^2 = 1$, therefore c also equals 1

Tradition says c is the speed of light. If c has the same value as c^2 then the velocity of light in a vacuum must be a universal constant and since it cannot change, space-time has to warp: producing things like gravity, gravitational lenses, black holes and time travel.

Solving $E=mc^2$ for mass (m) results in $m=E/c^2$

$$\text{Since } c^2 = 1+0$$

$$m = E/1+0$$

Multiplying each part of each element by base n :

$$nm = nE/n^{1+0}$$

$$nm = nE/n$$

$$m = E/1 = E$$

Therefore, the mass of the expanding universe can be thought of as pure energy.

If we interpret $m=E$ ($1m=1E$) as meaning all the mass and energy in the universe forms a unit, we won't be able to think of any of the masses and energies composing the universe as separate. Every planet, star, magnet, beam of light, etc. would be part of a unification* comparable to a hologram (but a very special hologram, including all forms of electromagnetism as well as gravitational waves which give objects mass. In September 2008, renowned British astrophysicist Professor Stephen Hawking bet US\$100 that the Large Hadron Collider would not find the Higgs boson, a theoretical particle supposed to explain how other particles acquire mass. Einstein predicted the existence of gravitational waves, and measurements on the

Hulse-Taylor binary-star system resulted in Russell Hulse and Joe Taylor being awarded the Nobel Prize in Physics in 1993 for their work, which was the first indirect evidence for gravitational waves).

* (Our brains and minds are part of this unification too, which must mean extrasensory perception and telekinetic independence from technology are possible, despite modern science's objections which appear to be based on non-unification.)



Medal awarded in Nobel Prize

The seeming fact that particles can communicate instantly over billions of light years (are entangled - a process that appears to have operated in the entire universe forever) also seems to support the holographic principle and makes these lines relevant - another effect of the universe being a unification having zero separation is that experiments in quantum mechanics would show that subatomic particles instantly share information even if physically separated by many light years (experiments conducted since the 1980s repeatedly confirm this strange finding). This is explicable as 2 objects or particles only appearing to be 2 things in an objective, "out there" universe (Austrian physicist Wolfgang Pauli's exclusion principle – which was discovered in 1925 and says 2 matter particles cannot have both the same position and the same velocity – only applies in an objective universe and therefore allows past and future versions of the universe [which is not what we see and therefore not objective] to exist simultaneously with the present one ... though programming in the "cosmic computer" does include it as applicable to the reality we perceive since that appears objective). They'd actually be 1 thing in a unified, "everything is everywhere and everywhen" universe. If the universe is a hologram with each part containing information about the whole, the instant

sharing of information over many light-years loses its mystery. And we'll see that time travellers from our future could return to the time of our Big Bang and make this a computer-generated hologram* in which things appear distant from each other on a huge "screen" but are also unified by the strings of ones and zeros making up the computer code which is all in one small place. And objects in the universal hologram would not only include the screens of our computers, TVs and mobile phones but every physical and nonphysical part of the universal hologram would be a receptor for the downloading of data from the Quantum Supercomputer (in other words, a "screen" for displaying data)."

* According to Wikipedia, "Computer Generated Holography (CGH) is the method of digitally generating holographic interference patterns. A holographic image can be generated e.g. by digitally computing a holographic interference pattern and printing it onto a mask or film for subsequent illumination by suitable coherent light source. On the other hand, if holographic data of existing objects is generated optically, but digitally recorded and processed, and brought to display subsequently, this is termed CGH as well."



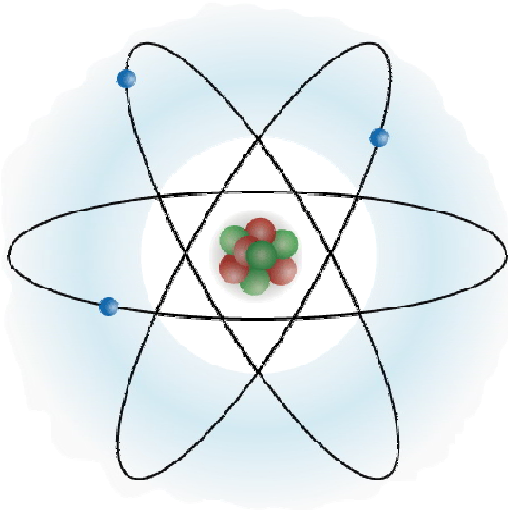
The attractive screens of
computers and mobiles

Page 179 of "The Grand Design" by Stephen Hawking and Leonard Mlodinow – Bantam Press 2010, says "(the positive energy of a body) means that one has to do work to assemble the body." Does this mean the positive component of the Cosmic-Quantum Union refers to an actual computer performing work by sending out the binary digits of 1 and 0 (in hyperspace) while its negative component refers to the universe being like a dream, and to binary digits that are transmitted by "telekinetic independence from technology". In 1928 English physicist Paul Dirac (1902-84) proposed that all negative energy states are already occupied by (then) hypothetical antiparticles (particles of antimatter) – "Workings of the Universe", a book in the series "Voyage Through The Universe", by Time-Life Books 1992. Recalling the proposal of English scientist Professor Roger Penrose of quantum functioning of the brain, this has ramifications for the subatomic particles called mesons which bind protons and neutrons together to form the atomic nucleus, in much the same way that gluons are said to bind together quarks which are said to be the constituents of protons and neutrons. Mesons are always composed of a quark-antiquark pair i.e. of a positive energy-negative energy pair. So when we're dreaming and our brains are using negative energy, they're not merely using a much lower degree of positive energy to do work but the antiparticles in them are free of the inhibitions that accompany our waking activities and are receiving greater expression, allowing us to do work literally effortlessly and to accomplish feats, like appearing "anywhere and everywhere", that would be thought of as miracles while we're awake.

Page 180 of "The Grand Design" says "Because gravity is attractive, gravitational energy is negative." Since there was no gravitation in our universe prior to the Big Bang (we didn't even have a universe), this sentence can be combined with the "backward causality" (effects influencing causes) promoted by Yakir Aharonov, John Cramer and others to explain that gravity's negative energy gives us no reason to think that bodies could not appear anywhere and everywhere – as Professors Hawking and Mlodinow put it "Bodies such as stars or black holes* cannot just appear out of nothing. But a whole universe can." Maybe it's only playing with words, but I'd regard gravity as repulsive instead of attractive (its energy would then be positive like matter's, matter and gravitational waves would be unified, and the universe could be more than a vast collection of the countless photons, electrons and other quantum particles within it; it could be a unified whole that has particles and waves built into its union - plausibly, of digital 1's and 0's like the reality simulating games SIMS and SECOND LIFE (or its union of qubits – quantum binary digits). And the article "Gravitation" by Robert F. Paton in World Book Encyclopedia 1967 agrees that gravity is repulsive:

"Einstein says that bodies do not attract each other at a distance. Objects that fall to the earth, for example, are not 'pulled' by the earth. The curvature of space time around the earth forces the objects to take the direction on toward the earth. The objects are pushed toward the earth by the gravitational field rather than pulled by the earth."

Repelling gravity would cause the universe to expand – astronomer Edwin Hubble (1889-1953) confirmed this expansion in 1929 – and adding repelling gravity by continual "creation" (actually, recycling) of matter via the small amount from a preceding local area of the universe which is used to initiate expansion of its successor (or by dreaming and our brains using negative energy and antiparticles in them to do work effortlessly and to accomplish feats that would be thought of as miracles while we're awake) would cause it to expand at an accelerated rate – this acceleration was discovered in 1998 by observations carried out by the High-z Supernova Search Team and the Supernova Cosmology Project, has been confirmed several times and is claimed to be caused by mysterious "dark energy".

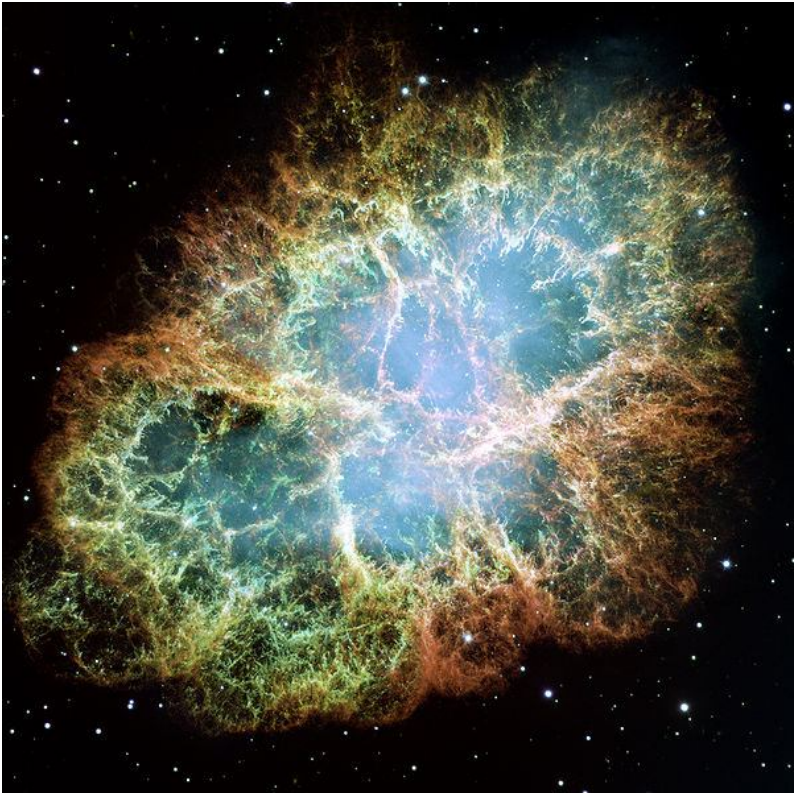


Protons and neutrons inhabit the nucleus of an atom while electrons orbit around them

* On the subject of black holes, I'd like to write a couple of paragraphs showing how zero separation can physically link sunspots and black holes (regions of space that can be formed by collapse of massive stars and have such a powerful gravitational field that nothing inside the event horizon or boundary, including light and other radiation, can escape), making comparison of the two by no means a superficial one. Why do young stars form around a black hole when they should be torn apart? Compare the black hole to a sunspot. Sunspots form because the sun's equator rotates more quickly than its poles (25 days at the equator, 34 days at the poles). Being "frozen" into its gases, the magnetic field lines of the sun stretch, twist, are drawn out into loops and erupt through the sun's surface, forming sunspots. Since the intense magnetism of the spots prevents heat from rising to the surface and radiating into space, the Maunder Minimum of observations of extremely low sunspot activity from 1645 to 1715 (named

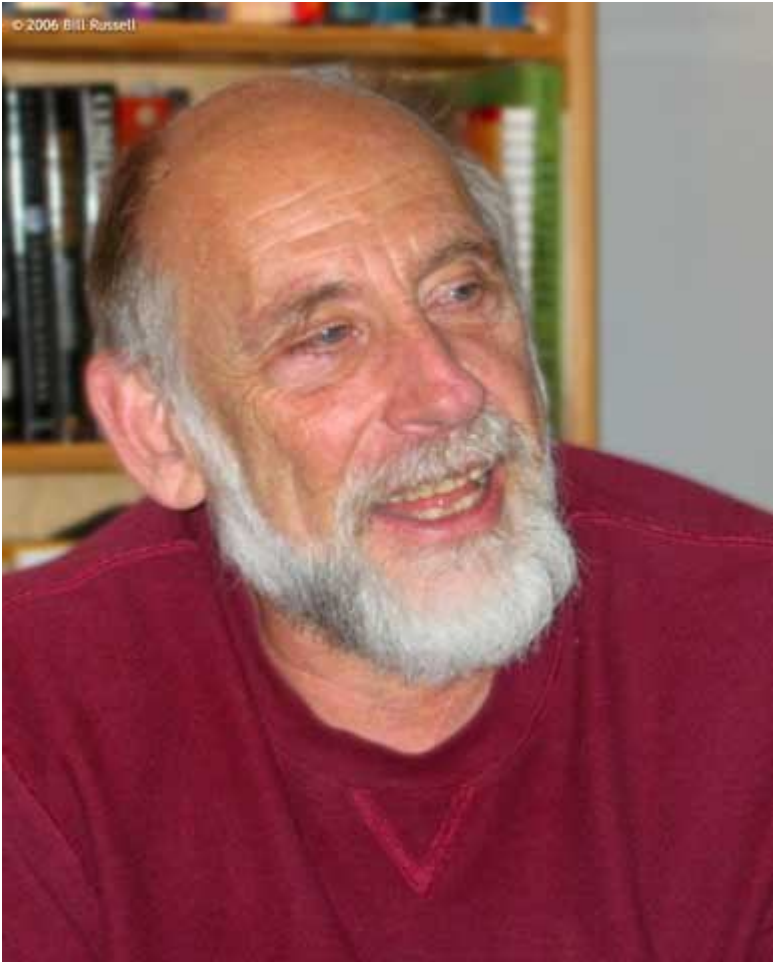
after the solar astronomer Edward W. Maunder [1851-1928]) could actually be attributed to a period of intense sunspot activity. Why? Because a great number of sunspots would stop the Earth receiving as much warmth from the Sun, and the Maunder Minimum coincided with the middle – and coldest part – of the Little Ice Age during which Europe and North America and perhaps much of the rest of the world saw glaciers advance and rivers freeze – even the Baltic Sea froze over, allowing sledge rides from Poland to Sweden with inns built along the way. It would be termed a period of minimum activity coz the sunspots would not have been visible. The distorted magnetic loops don't have to break through the sun's surface or photosphere but can remain within, forming a rotating vortex that concentrates field lines and can create intense, heat trapping magnetism (info from recent observations by the satellite SOHO, the Solar and Heliospheric Observatory.) How does magnetism trap heat? Magnetic waves converge from opposite directions and constructively interfere to produce a wave packet (a wave packet is a short "burst" or "envelope" of wave action that travels as a unit, and is interpreted by quantum mechanics as a probability wave describing the probability that a particle will have a given position and momentum). When they converge, they act like 2 hands coming together and catching a ball. Actually, photons are absorbed and emitted just as in laser cooling but instead of a laser beam slowing down atoms, the envelope slows (and traps) infrared photons.

When a black hole is rotating; it might also stretch, twist and loop its magnetic field lines. The lines may penetrate into the hole and be lost, but in the case of star formation they'd be drawn out beyond the hole's event horizon (boundary) and compress clouds of dust and gas into new suns (a supermassive black hole's magnetic field is so strong that it can focus particles into jets ejected far out into space so, provided the star is a safe distance from the black hole, it should be able to stop the hole's gravity from shredding a star and making its gases spiral inwards). To condense the paragraphs on zero separation into a few words, the 2 objects which appear distant from each other could be a sunspot and a black hole. On the subject of sunspots and the sun, the famous 17th-century scientist Sir Isaac Newton once said the entire universe would instantly feel the loss of the sun's gravity if our star disappeared suddenly – I think modern science doubts this but zero separation forces me to agree with him. And on the subject of black holes, a massive star truly can collapse and explode as a supernova while a gravitational singularity (the place all matter falling into the black hole gathers) would be produced from the collapsing core. What if that singularity is disintegrated by the fantastic pressure? It would become "BITS of space-time" (this book's proposed building blocks of all matter and spacetime that are the Binary digiT_S – strings of ones and zeros – from which space and time emerge). In this way, nature would protect us from black holes (as Einstein believed it would) and eliminate their assumed and perplexing properties of infinite density, infinite gravity and infinite spacetime curvature.



Crab Nebula, remains of a supernova that exploded in 1054

This also means information is not lost in a black hole and would be another way to resolve the “black hole information paradox” in which scientists Leonard Susskind, John Preskill and Gerard 't Hooft were convinced information is not lost while Stephen Hawking and Kip Thorne maintained that it is. The battle was resolved by the 't Hooft/Susskind holographic principle (this principle, along with Juan Maldacena's related AdS/CFT correspondence (anti de Sitter/conformal field theory correspondence) says it might be possible for all the information in a black hole to also be encoded on the hole's surface area), as well as by Hawking's change of mind and announcement in 2005 that quantum perturbations could cause information to escape from a black hole and the idea of the multiverse in which it's possible that information entering a black hole is passed from this universe to a parallel universe. My section about time travel – and later parts of “ $E=mc^2$ is $E=mc^2$ for the 21st century” - explain why I don't like the concept of a multiverse with parallel universes, and that I speak of a megauniverse with subuniverses.



Leonard Susskind, a founder of String Theory and the Holographic Principle

Hawking radiation is Stephen Hawking's 1974 prediction that of pairs of particles produced in space near a black hole, one member of a pair is absorbed by the black hole while the other is radiated. The theory predicts that black holes slowly evaporate into photons and other particles, and it may be explained by the final pages in this book. Gravitons (the predicted, though undiscovered, bosons or force-carrying particles that transmit gravitational force) and negative, refracted gravitational waves from deep space – actually, gravity is unified with space (it *is* space) since Einstein tells us that gravity is the warping of space – are diverted to the interior of a black hole by its mass. The more mass, the more gravity is diverted – so stellar black holes (black holes are believed to exist on all mass scales but stellar ones result from the collapse of stars which may be 10, 20 or more times as massive as the Sun; and which collapse because they run out of fuel at the end of their lives) would have such powerful gravity that photons (the particles transmitting light and other forms of electromagnetism) are trapped by it. So the black hole cannot be seen and produces a dark “hole” in space.

When gravity is diverted to the centre of each photon, the light particle is so tiny and light that it recoils using Isaac Newton's 3rd Law of Motion (to every action, there is an equal and opposite reaction). The negative, refracted gravitational waves are repulsive in nature and are pushing photons into the black hole's centre (again, see the final pages of this book). Their recoil means the black hole is illuminated within its event horizon or boundary, and is a "white hole". Naturally, the amount of recoil experienced by particles varies since they aren't all exposed equally to the push of gravitons - some photons (or antiphotons, their antimatter counterpart which is identical) are absorbed into the black hole while other photons (and antiphotons) are emitted, joining gravitons – the other particles – and producing Hawking radiation. The 3rd Law of Motion can be described in terms of electrical attraction or repulsion which are the same things as mathematical positive and negative quantities being produced by a Cosmic Computer and either reinforcing or cancelling one another i.e. producing the constructive and destructive interference of waves.

Gravitational waves reinforce, or add to each other, when they produce wave packets (also known as probability waves or matter waves) which trap photons to produce particles or antiparticles i.e. matter and antimatter are produced by the superimposing of gravitational and electromagnetic waves. Therefore, energy is matter and $E=mc^2$ – since both are the product of binary digits, $E=mc^2+0$. Gravity waves are able to travel through space and thus possess electromagnetic properties - and when they cancel or subtract, this is the same thing as electromagnetic (electrical and magnetic) repulsion. So the partial cancellation of predominantly positive matter (such as LIGO, the Laser Interferometer Gravitational-wave Observatory) and gravity waves (which are negative in the vicinity of Earth) is, in other terms, electric repulsion that largely prevents the two from interacting but is capable of displacing photons or causing contraction of a billionth of a billionth of a metre (complete cancellation would cause the explosion that results when matter and antimatter meet). Positive matter meeting the positive gravity between galaxy clusters produces the repelling that is called dark energy or antigravity, and is responsible for expansion of the universe (big bangs are nevertheless necessary to create additional subuniverses whose extra positive matter meeting positive gravity accelerates cosmic expansion).



The inventor and engineer Nikola Tesla (1856-1943) was known to be working on antigravity

Every photon and graviton has both positive and negative qualities (in other words, is composed of strings and anti-strings). As an example - when a graviton strikes a photon, the negativity in the graviton can either interact with the photon's negative anti-strings and repel it into or away from the black hole or the graviton's negativeness can interact with a photon's positive strings and attract it (either racing past the hole and continuing in space together, or diving into the hole together). If they attract and go into the hole, the negative anti-strings of the new GP boson (graviton-photon composite) may contact the positive strings of a GP particle that entered the other side of the black hole. No doubt many GPs continue experiencing the resulting electrical repulsion with other particles until they reach, or even travel beyond, the event horizon. Being a photon joined to a graviton and travelling out from the black hole's centre to its boundary, not only would the brightness of a white hole be produced but so would anti-gravity. So-called "dark energy" is referred to as antigravity – what better place to find dark (black) energy than in a black (dark) hole?

(Demonstrating zero separation to be relevant to the universe astronomers study requires a bit of research to get the astronomical facts right, so thanks go to the May 2009 interview in "Discover" science magazine with professor of astronomy and physics Andrea Ghez; the 2006? TV documentary "The Sun"; Wikipedia, the free Internet encyclopedia; "The Sun", a 1989 volume

in Time-Life's series "Voyage Through The Universe", Stephen Hawking's 1988 book "A Brief History of Time" and Patrick Moore's 1986 book "A-Z of Astronomy")

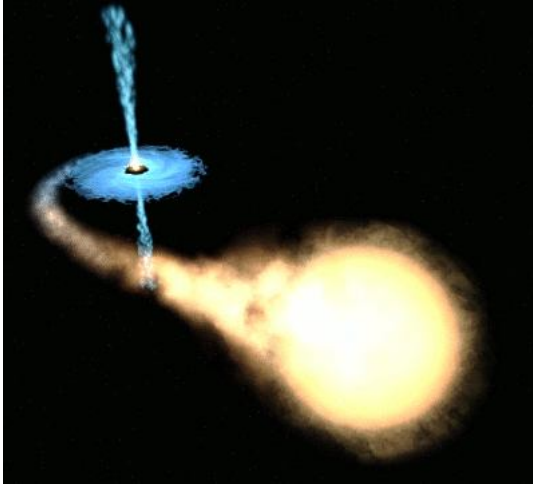
Light can attract and repel itself like electric charges and magnets (according to Discover magazine's "Top 100 Stories of 2009 #83: Like Magnets, Light Can Attract and Repel Itself" by Stephen Ornes, from the January-February 2010 special issue; published online December 21, 2009 - in July 2009, electrical engineer Hong Tang and his team at Yale University in the USA demonstrated that, on silicon chip-and transistor-scales, light can attract and repel itself like electric charges/magnets). Therefore, it must be true to say electrically charged particles and magnets can attract and repel like light (electric/magnetic attraction/repulsion would, similarly to light, occur only on microscopic scales if the universe did not have an electronic foundation in which it was composed of silicon chip- and transistor-scales: more will be said about this later). We have known for ages they attract/repel – but now we know they do it "like light", can we extend this phenomenon from quantum mechanics' wave-particle duality (in the case of electric charges and light) to universe-wide wave-particle duality (in the case of magnets and light)? If the magnets we can see and touch

behave like light, is it not possible that every object in the universe (from a small magnet to an enormous planet or star) behaves like light – making the universe a hologram.

Since $m=E$, we can think of c as not merely representing the speed of light (energy) but as symbolic of mass and the speed of universal expansion (c =Hubble Constant or 299,792.458 kilometres per second = approx. 70 km/sec/megaparsec). What can it mean if c and c^2 both equal 1 in the context of cosmic holographic expansion? Answering this is impossible unless we look back at the work of Albert Einstein. That work leads to the conclusion - if c has the same value as c^2 then the velocity of light in a vacuum must be a universal constant and since it cannot change, space-time has to warp: producing things like gravity, gravitational lenses, black holes and time travel. Applied to cosmic holographic expansion, the conclusion is – if c has the same value as c^2 then expansion (whether positive, zero or negative) obviously always exists and space-time's warping produces the weird phenomena modern science proposes, like higher dimensions and hyperspace and time travel and parallel universes.

Let's see where things lead if we assume c and c^2 both equalling 1 means that the future universe, whose rate of expansion is the square of today's, is existing at the same time as today's – and if we think of present expansion as c^2 , that the present universe whose rate of expansion is the square of

one in the past is unified with the past one. For a start, such an assumption would be consistent with "dark energy" causing expansion to accelerate.



Black hole eating a star

We can, of course, write that c^2 equals a number, any number ($c^2 = n$)

Then $c = \text{square root } n$ ($n^{1/2}$)

But $c = 1$

Therefore $n^{1/2} = 1$

$n = 1^2$

$n = 1$

$n = c$

and $1 = c^2$

$n = c^2$

Since c and c^2 both equal n , any past or future universe (whatever the rate of expansion, even if zero or negative) exists at the same time as ours. So a simple modification of Einstein's $E = mc^2$ to $E = m^{1+0}$ implies that our holographic universe is generated and supported by binary digits (1's and 0's). The universe's underlying electronic foundation (which makes our cosmos into a partially-complete unification, similar to 2 objects which appear billions of years or billions of light-years apart on a huge computer screen actually being unified by the strings of ones and zeros making up the computer code which is all in one small place) would make our cosmos into physics' holy grail of a complete unification if it enabled not only elimination of all distances in space and time, but also elimination of distance between (and including) the different sides of objects and particles. This last point requires the universe to not merely be a vast collection of the countless photons, electrons and other quantum particles within it; but to be a unified whole that has "particles" and "waves" built into its union of digital 1's and 0's (or its union of qubits – quantum binary digits). The feedback of the past and future universes into the unified cosmos's electronic foundation would ensure that both past and future could not be altered.

Carl Sagan (who was an American astronomer, astrophysicist, cosmologist and author) said there is "... no centre to the expansion, no point of origin of the Big Bang, at least not in ordinary three-dimensional space." (p. 27 of "Pale Blue Dot" - Headline Book Publishing, 1995). Does this mean the Big Bang (or for our purposes, the binary 1's and 0's) would exist outside space-time in what we might call 5th dimensional hyperspace? The revised equation also says this universe is a unification, permitting time travel into both past and future (because any past or future universe exists at the same time as ours – a twist on the concept of parallel universes). Repeated experimental verification of Einstein's Relativity theory confirms its statement that space and time can never exist separately but form what is known as space-time. So space, like time, must also be a unification whose separation can be reduced to zero. This suggests that intergalactic travel might oneday be completed extremely rapidly.



Our planet Earth is just a pale blue dot in this photo taken from nearly 4 billion miles away by the spacecraft Voyager 1

And according to Michio Kaku on p. 316 of "Physics of the Impossible" Penguin Books, 2009 - "... the inverse-square law (of famous English scientist Isaac Newton [1642-1727]) says that the force between two particles is infinite* if the distance of separation goes to zero". Space-time's

being a unification whose separation can be reduced to zero also suggests the existence of an infinitely powerful, and infinitely intelligent (since those particles could be brain particles), God. Since the distance of separation is zero, the universe must be unified with each of its constituent subatomic particles and those particles must follow the rules of fractal geometry being similarly composed of space and time and hyperspace. Unification of the cosmos with its particles is an insurmountable challenge to our bodily senses and their extensions, scientific instruments – as is existence of zero separation between us and a star's gravity, heat etc. If we could see the universe exclusively with our minds, we'd see that these insurmountable challenges are indeed possible if we live in a non-materialistic holographic universe (combining gravitational with electromagnetic waves) controlled by the magic of computers.

* Page 118 of Stephen Hawking's/Leonard Mlodinow's "The Grand Design" says "M-theory (that theory which string theorists now consider fundamental) has solutions that allow for many different internal spaces (the curling up of extra dimensions into tiny, invisible spaces), perhaps as many as 10^{500} , which means it allows for 10^{500} different universes, each with its own laws." My article suggests there is only one universe (I call it a megauniverse), with one set of physical laws. 10^{500} would therefore not refer to space and the number of universes but to time (space's "other half") and the number of "frames" existing in the cosmos at present. Could this unbelievably enormous number also be known, when applied to practical purposes, as infinity (infinity will increase in the future when hyperspace transmissions produce more space and time)?

Subuniverse? Megauniverse? What am I talking about?

A megauniverse is hinted at by Einstein's equations as well as cosmology's Steady State theory, which say the universe has always existed and will continue forever. Einstein spoke of a "static" universe (which accurately describes a megauniverse that has no limits in space and has always existed/will continue forever), but he thought of this local branch as static, and rightly called it his greatest mistake since the local universe (our subuniverse) is now known to have had a beginning and to be expanding. Each subuniverse and its region of space-time is created from a big bang, but the megauniverse they belong to has no beginning and no end. And it maintains its average density through continuous "creation" of matter (actually, conversion of the energetic hyperspace transmissions to matter - in agreement with the Law of Conservation which says neither matter nor energy can be created or destroyed, only converted *) via the small amount from a preceding subuniverse which is used to initiate expansion of its successor. This steady-state, or static, megauniverse would have its tendency to collapse (from, according to the viewpoint that only one time exists at any instant, ever-increasing gravitational attraction)

always exactly balanced by, again from the viewpoint that all times cannot exist at once, the ever-increasing expansion of the universes it contains. The notion that contained universes that are forever expanding would somehow "burst" a static, steady-state megauniverse mistakenly assumes the megauniverse possesses a finite size; and it also reverts to our everyday experience that only one time exists at any instant (forgetting that all times exist and the megauniverse therefore accommodates not just some, but all, extents of expansion). Expanding subuniverses reminds me of the claim by cosmologists Paul J. Steinhardt and Neil Turok that the Big Bang which created our universe was triggered by a collision between our cosmic brane (or membrane) and a neighbouring one. The only essential difference between our hypotheses is that I believe collisions between neighbouring universes are the result, not the cause, of big bangs. We can regard the cosmic hologram and the megauniverse as examples of invariance (the quality of not changing) and the hologram's relativistic property of appearing different from differing vantage points as represented by the expanding universes with their big bangs.

* So is it not possible that the newly fertilised egg which grows into a baby is not exclusively a product of its past ancestors and the time it's born in (this is impossible in a unified universe) but also a conversion of matter and energy from the future, and the supreme example of "backward causality"

(effects influencing causes). It would not be unreasonable to say "every person we see is ultimately from the future". I imagine the beginning of languages and civilisation is not totally dependent on historical origins but also on effects influencing causes, therefore partly depending on the future. Dr. Michio Kaku writes on p. 283 of the book "Physics of the Impossible" (Penguin Books, 2009) that "It would set off a major shake-up in the very foundations of modern physics if precognition was ever proved in reproducible experiments". I believe a baby born into a cosmic/quantum unification (and, in the greatest series of reproducible experiments ever, every person on the planet is or was or will be that baby) is born into a literal unification of the mind with all space-time, making the non-existence of precognition impossible.



Galaxies make up subuniverses which make up the megauniverse – but since the universe is everything that exists, it's accurate to simply say “Galaxies make up the universe”

Just as $E=mc^2$ means energy must contain particles e.g. electromagnetic energy is composed of photons, $E=m^1+0$ means a computer in the universe's hyperspace which is projected onto space-time must, thanks to fractal geometry repeating phenomena from the smallest scale to the largest, also be contained in each particle's hyperspace and projected onto the immaterial particle's space-time i.e. the entire universe is contained in (or unified with) every one of its particles.

This reminds me of something: The realisation that every person is contained in, or unified with, every other person – all the others are part of the universe unified with any quantum particle in any individual - would not only usher in worldwide peace but also paradise on Earth (via the global financial "crisis"). The worldwide economic crisis has the potential for many political benefits, since cooperation will be the only way to maintain and improve our living standard if monetary systems fail. The crisis would encourage domestic and international peace and sharing - perhaps even paradise on earth ...

The present global financial crisis may indicate that the world we live in today has lost stability and is on the brink of changing. Therefore, this "crisis" might be necessary to awaken us to the potential of tomorrow. Just because money has been making the world go round for thousands of years doesn't mean money will be the way of the world forever. We should start looking for an alternative system to preserve, and increase, standards

of living now in case we need it tomorrow (I imagine politicians are the ones with the resources and organizational ability needed to implement such a system). This scheme should not use any form of monetary organisation nor be based on gold, silver etc. It should, idealistic and naive as it appears at first, be based on mutual cooperation and the goal of ushering in a paradise on earth. We can say there can never be paradise on earth; but the human instinct to survive is much stronger than our tendency for other types of self-interest, and greed, and to not cooperate with each other. If money ceases to be an option; most people will gladly cooperate with those we would have previously regarded as competition, or even as an enemy, if it's the only way to maintain and improve our living standard.

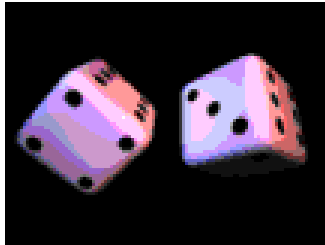


Global financial crisis? Or world-changing political opportunity?

And the entire universe being contained in (or unified with) every one of its particles reminds me of something else: American astronomer Carl Sagan (1934-1996) wrote these lines for his award-winning television series and accompanying book, "Cosmos": "There is an idea – strange, haunting, evocative – one of the most exquisite conjectures in science or religion. It is entirely undemonstrated; it may never be proved. But it stirs the blood. There is, we are told, an infinite hierarchy of universes, so that an elementary particle, such as an electron, in our universe would, if penetrated, reveal itself to be an entire closed universe." Well, this article doesn't support the idea of a hierarchy of universes. I believe there is one static megauniverse (one Cosmos) existing forever and made up of an infinite number of expanding subuniverses. But I do believe – it stirs my blood! – in the "exquisite conjectures" of the universe (and the infinite Cosmos) behaving like an elementary particle, and of these two combining to form one unified field.

$E=mc^2$ also means, since energy equals mass, that the terms "computer generated" and "computer" do not necessarily refer to an actual machine sending out the binary digits of 1 and 0 but could refer to binary digits that are sent forth by "telekinetic independence from technology" (see Part 1 where it's explained that this independence from technology would seem to be dependent on technological band-gap implants in the brain). You and I would not merely possess a rigidly preprogrammed life in the universal hologram, but would be capable of a degree of free will because

the universe possesses a “randomness factor” – also called a “mutation factor”. (In computer art, randomness is introduced into the chain of repetitive calculations producing a mountain range so a convincingly rugged image will result.) I’d like to suggest that Charles Darwin’s evolution has far greater consequences than either he or any scientist has realized. I believe the theory is not limited to biology, but is absolutely fundamental to the very existence of our universe and everything in it i.e. to cosmology, space-time, physics, mathematics, etc. In a vital way, Darwin’s ideas even go beyond Albert Einstein’s ideas since these paragraphs conclude that a "mutation factor" (a "randomness factor") is fundamental to the universe (regarding randomness, Einstein declared “God does not play dice with the universe”).



“God does not play dice with the universe” – until He / She realizes how vital quantum mechanics is

Tomorrow's Science Today:

Part 3 of 3

End (temporarily) of

Intergalactic And Time Travel, Einstein's Relativity, Bohr's Atomic Model, Dark Matter, Dark And Negative Energy, String Theory / Unification, The Law Of Conservation, And Combining Newtonian And Relativistic Gravity With Standing Waves And Quantum Probability Waves

With Liberated Science's

Implications For Religion And Philosophy As Well As Everyday Life In The Light Of The Concept of an Electronic And Holographic Universe Shaped Like A Mobius Loop

Space and time only exist in our experience. They are emergent properties, like wetness and mind. We experience wetness because it emerges from the building blocks of the hydrogen and oxygen atoms which make up water. We experience mind because it emerges from the building blocks of neurons composing the brain. And we experience space-time since it emerges from the building blocks making up the universe. These units are a combination of electromagnetic pulses (forming a cosmic computer which includes randomness and thus the potential to escape rigid preprogramming, and have a small degree of free will) as well as a cosmic hologram (this is produced by the interaction of electromagnetic plus gravitational waves and combination of the holographic aspect with the electronic aspect unifies general relativity with quantum physics). Every physical and nonphysical part of the universal hologram would be a receptor for the downloading of data from the cosmic computer which not only exists in the hyperspace of the large-scale universe but also in the hyperspace of each subatomic particle. (In other words, the holographic universe or spacetime we know is a screen for displaying data from the 5th-dimensional computer.)

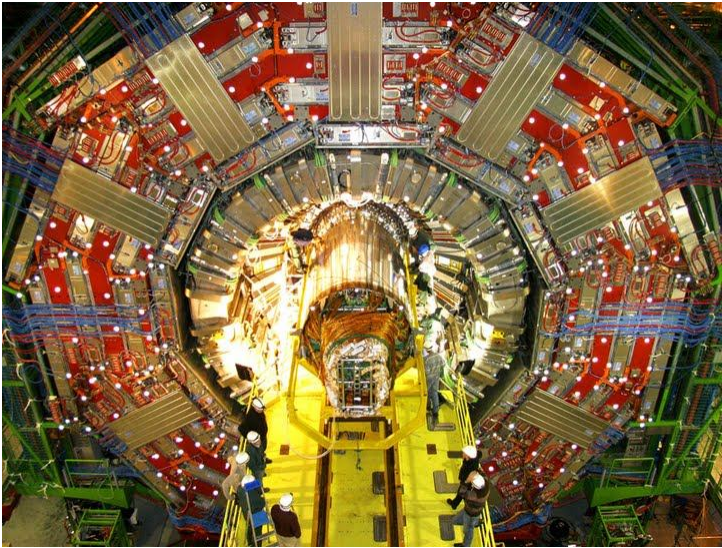
It might be helpful to visualise time as the playing of a CD or video tape. The entire disc or tape obviously exists all the time. But our physical senses can only perceive a tiny part of the sound and the sights at any fraction of a second. I believe space and time are infinite, so it might be more accurate to visualise time as that HUGE number - in this case, of CDs or tapes - which some versions of string theory propose (10 exponent 500). My essay tells you exactly how to travel to the future, how to return home, and how to travel into our past. Neither future nor past can be altered (a blow to our belief that we have the free will to shape the future) and my explanation of travel to the past requires re-interpretation of the concepts of "multiverse" and "parallel universes". It also requires the ability to travel billions of light years INSTANTLY - no doubt many readers will instantly dismiss the essay because their preconceptions "know" this simply isn't possible. It indeed sounds like pure fantasy, but I outline an approach based on electrical engineering, General Relativity, and Miguel Alcubierre's 1994 proposal of "warp drive" that makes it logically possible.



10^{500} videotapes = infinite time

Why can particles and the universe be considered as Mobius loops? The 1st reason this seems possible is - all particles in the universe have a property called spin which is related to, but not identical with, the everyday concept of spin. In the case of particles of matter, according to the book "A Brief History of Time" by mathematician and physicist Stephen Hawking, this spin is said to have a fractional value of $1/2$ which means they "do not look the same if one turns them through just one (complete) revolution: you have to turn them through two complete revolutions!" Similarly, you have to travel around a Mobius strip or loop twice to arrive at your starting point. The 2nd reason it seems possible is - the concept of "dark matter" would be used today to explain the increased gravitational effects caused by undetectable matter. But that undetectable matter would not be a new, unknown form of matter - it would be known particles traveling EXCLUSIVELY through the 4th and 5th dimensions (and therefore nonexistent in the 3 dimensions of ordinary space). While in these other dimensions, the particles known as dark matter are invisible ... but would of course still exert gravitational influence. (Physics' string theory states this by saying "Gravity may not be confined to 3 dimensions.")

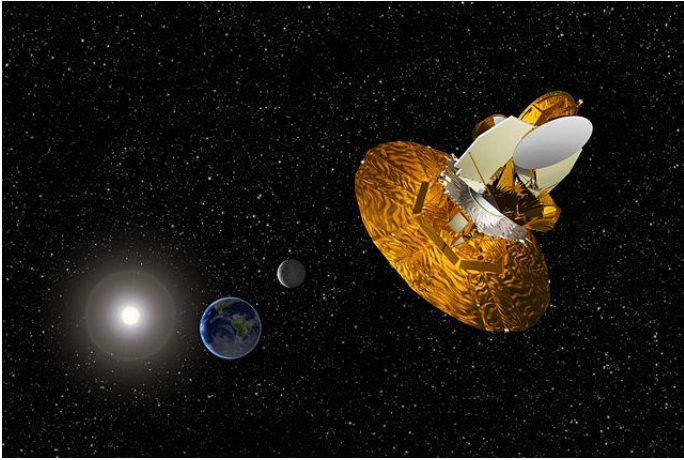
My essay explains why the universe is a Mobius loop and how it is unified with each of its particles (using fractals, and the principle that the largest scale is repeated on the smallest scale - the word "fractal" was coined in 1975 by French mathematician Benoit Mandelbrot). Then each fermion and boson would also be composed of the 3 spatial dimensions, the 4th dimension of time, and the 5th dimension of hyperspace. Detectors like the Large Hadron Collider would be unable to "see" the time and hyperspace components of particles but could only see the small (maybe 5% of the whole) 3 spatial dimensions (the time component would be what we call dark matter), erroneously assuming particles are those small fractions of a Mobius loop that physics calls strings. "Dark matter" would exert a gravitational influence because time, being part of a curved Mobius loop (whether of quantum or cosmic scale), would push objects together in the same way Einstein's curved space-time pushes objects together. We can speak of the HST now - no, not the Hubble Space Telescope but Hyperspatial SpaceTime. We can visualise the Mobius loop as composed of a hyperspace computer which generates information on how things change from one presently undetectably tiny fraction of a second to the next (we call this time, and it's comparable to the frames in a movie) and transmits the data (transmits dark energy) to the insignificant portion of length, width and depth that makes up subatomic particles ... and the universe.



Part of Large Hadron Collider (world's largest particle accelerator – hadrons are the subatomic particles called protons, neutrons and mesons)

Preceding the Big Bang (which created this local section of the infinite, eternal universe ... or if you prefer, this subuniverse of the megauniverse) there would have been no space, matter or time in this subuniverse. No transmissions of dark energy (creating time and space/matter) would have occurred - therefore the dark-energy content of the universe would have been zero, increasing to the present 72% as more and more matter was created. How is matter created? Perhaps as cosmologist Alan Guth once suggested – "You might even be able to start a new universe using energy equivalent to just a few pounds of matter. Provided you could find some way to compress it to a density of about 10^{75} (10 exponent 75) grams per cubic centimeter, and provided you could trigger the thing ..." At the time the Cosmic Microwave Background was emitted (less than a million years after the big bang), results from the Wilkinson Microwave Anisotropy Probe say the dark-energy content of the universe was negligible. Space/matter has been increasing since the big bang so transmissions from the hyperspace computer (dark energy) which create them are increasing. Time is also created by hyperspace and is thus also increasing but (see the next 3 paragraphs) the amount of time being transmitted to our material 5% of the universe is decreasing - according to the WMAP satellite, dark matter has reduced from 63% when the CMB was emitted to 23% today. Why isn't dark energy increasing at the same rate dark matter is decreasing? It must be because, as stated earlier, both time and hyperspace exert a gravitational influence, thereby mimicking space and matter to a degree. This mimicry causes the dark matter between the start of the CMB and the present to

decrease by only about 40% while dark energy increases in the same period by about 70%. If we were dealing with a simple and ordinary loop, this similarity would cause dark matter and dark energy to be more or less equal and if there was any difference in their amount of decrease/increase, it would be in the same direction. But we're talking about Mobius loops which are like strips of paper that have been twisted 180 degrees before the ends are joined. This causes their variation to go in different directions (one increases, the other decreases) and the amount of variation is quite significant (+72%, -40%). My guess is that the real-life twist occurs in the temporal segment of the loop, enabling a traveller in time to go in different directions i.e. into the future or into the past. To replenish dark matter in billions of years, we merely have to extend Guth's proposal by using the knowledge of that future time to create more hyperspace (with its associated extra space, extra matter and extra time).



artist depiction of Wilkinson Microwave Anisotropy Probe (WMAP satellite)

A real-life Mobius is by no means a featureless loop, however. If, contrary to our impressions, the universe is unified with each particle it's composed of; the WMAP satellite's findings must apply to the quantum world. The figures 72%, 23% and 5% would not only describe the present universe's content of dark energy, dark matter and ordinary matter but also any particle's content of space or ordinary matter (5%), time or dark matter (23% - time is considered to be dark matter here because dark matter is regarded as ordinary matter invisible to us since it's present in another region of the dimension we call time, just as most of a sphere is in another dimension and consequently appears as a dot when first entering Edwin Abbott's 1884 exploration of other dimensions called "Flatland"), and hyperspace (72%: the transmissions from the hyperspace computer create space and matter, cause expansion of space on cosmic scales where there are no forces to overcome the expansion as there is in matter, and are known as dark energy – creating more matter causes that matter's repelling gravity to bring about accelerating expansion).

On p. 179 of "The Grand Design" by Stephen Hawking and Leonard Mlodinow (Bantam Press, 2010) it's stated "One requirement any law of nature must satisfy is that it dictates that the energy of an isolated body surrounded by empty space is positive ...". Page 179 also says "... if the energy of an isolated body were negative ... there would be no reason that bodies could not appear anywhere and everywhere."

Let's assume for the moment that everything is a union of positive and negative energy – the conclusions in the rest of this article will support the assumption and make it clear that this is how reality must operate. Every matter particle (fermion) and force-carrying particle (boson) would be a positive-negative union. So when matter and antimatter meet, the positive and negative quantities form zero and neutralise (destroy) each other. The positive/negative components of everything must therefore avoid direct contact – this separation can either be in space or in time because all things are able to display both separateness/solidity (isolation in space) as well as the potential to appear anywhere and everywhere (in time as well as space). Also, as we'll see later, the universe – here I refer to the infinite, eternal megauniverse; but I also use the term to refer to our local, visible subuniverse which originated from one of many Big Bangs - is a Mobius loop and is contained in, or unified with, each of its particles (relying on physical senses or 21st-century scientific instruments would make this statement ridiculous). Then each fermion and boson would also be composed of the 3 spatial dimensions, the 4th dimension of time, and the 5th dimension of hyperspace. Detectors like the Large Hadron Collider would be unable to "see" the time and hyperspace components of particles but could only see the small (maybe 5% of the whole) 3 spatial dimensions (the time component would be what we call dark matter), erroneously assuming particles are those small fractions of a Mobius loop that physics calls strings.

If everything is a union of positive and negative energy, gravitation would be too, and could thus either repel or attract like magnetism (causing either the accelerating expansion that occurs on a cosmic scale or the attraction within the solar system - we don't want the planets to be blasted away from the sun and escape into intergalactic space).



Our solar system's planets

Here's a way to visualise gravity causing cosmic expansion while, at the same time, pushing together planets in a star system (combined with this push, their orbiting speeds stabilise the system and produce the solar system we know). Imagine the universe to be an ocean and each star system to be an island. As ocean waves approach an island, part of the wave feels friction with the increasingly shallow sea-bed resulting in wave refraction or bending. This causes part of the wave to travel in the direction of the shore while part continues on parallel to the shoreline. In the same way, as gravitational waves approach a star system, part of the current in the cosmic ocean feels friction with the increasing mass experienced as planets orbit closer to their star. This causes gravitational refraction or bending in which part of the gravity travels in the direction of the star (this is called the negative component and pushes planets together) while the other part continues on (this is called gravitation's positive component and produces universal expansion when it eventually leaves the relevant group of galaxies)*. As the refracted gravitational wave heading for the sun passes a planet, part of it is once again diverted by the increased mass (the more mass, the more gravity is diverted - see PS; though the International Space Station weighs around 400 tons, it has tiny mass compared to any planet and produces so-called weightlessness while black holes – ranging from about 3 solar masses for the smallest stellar variety to billions of solar masses for supermassive black holes in galaxy centres – have so much mass and diverted gravity that light pushed into them may be unable to escape). This time gravity is diverted towards the centre of the planet, giving the impression that

objects on that planet are being attracted to the planetary centre. Space would be nothing if it was merely the distances between matter in the universe but can be something, and curved, if it's a product of binary digits from a 5th-dimensional hyperspace (more about this in the next paragraph). Being curved space, the portion of gravitation that's called dark energy (the portion responsible for universal expansion) would have an amplitude – displacement of a wave equal to half the distance from the top of the wave to the bottom – corresponding to the moving layers of the atmosphere which make the stars seem to twinkle.

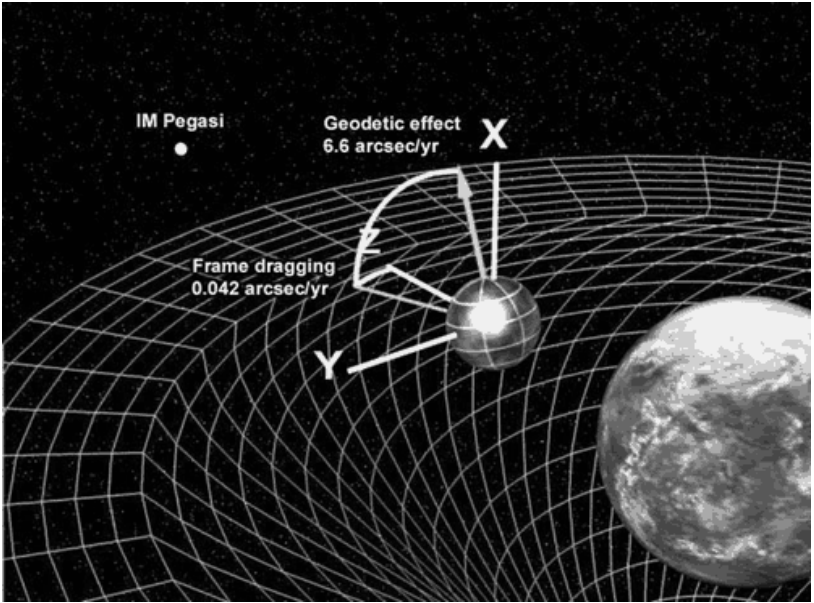
Page 180 of “The Grand Design” says “Because gravity is attractive, gravitational energy is negative.” Since there was no gravitation in our universe prior to the Big Bang (we didn't even have this subuniverse), this sentence can be combined with the “backward causality” (effects influencing causes) promoted by Yakir Aharonov, John Cramer and others to explain that gravity's negative energy gives us no reason to think that bodies could not appear anywhere and everywhere – as Professors Hawking and Mlodinow put it “Bodies such as stars or black holes cannot just appear out of nothing. But a whole universe can.” Maybe it's only

playing with words, but I'd regard gravity as repulsive instead of attractive (its energy would then be positive like matter's, matter and gravitational waves would be unified, and the universe could be more than a vast collection of the countless photons, electrons and other quantum particles within it; it could be a unified whole that has particles and waves built into its union of digital 1's and 0's (generated in a 5th-dimensional hyperspace). And the article "Gravitation" by Robert F. Paton in World Book Encyclopedia 1967 agrees that gravity is repulsive:

"Einstein says that bodies do not attract each other at a distance. Objects that fall to the earth, for example, are not 'pulled' by the earth. The curvature of space time around the earth forces the objects to take the direction on toward the earth. The objects are pushed toward the earth by the gravitational field rather than pulled by the earth."

Repelling gravity would cause the universe to expand – astronomer Edwin Hubble (1889-1953) confirmed this expansion in 1929 – and adding repelling gravity by continual "creation" of matter and hyperspace would cause the subuniverses[^] to expand at an accelerated rate – this acceleration was discovered in 1998 by observations carried out by the High-z Supernova Search Team and the Supernova Cosmology Project, has been confirmed several times and is claimed to be caused by mysterious "dark energy".

^ Page 118 of Stephen Hawking's/Leonard Mlodinow's "The Grand Design" says "M-theory (that theory which string theorists now consider fundamental) has solutions that allow for many different internal spaces (the curling up of extra dimensions into tiny, invisible spaces), perhaps as many as 10^{500} , which means it allows for 10^{500} different universes, each with its own laws." My article suggests there is only one universe (I call it a megauniverse), with one set of physical laws. 10^{500} would therefore not refer to space and the number of universes but to time (space's "other half") and the number of "frames" existing in the cosmos at present. Every bit of space/instant of time exists forever like an individual frame of a movie (when these are displayed in rapid succession, what we call motion comes into being). Could this unbelievably enormous number also be known as infinity when applied practically (infinity will increase in the future when hyperspace transmissions produce more space and time)?



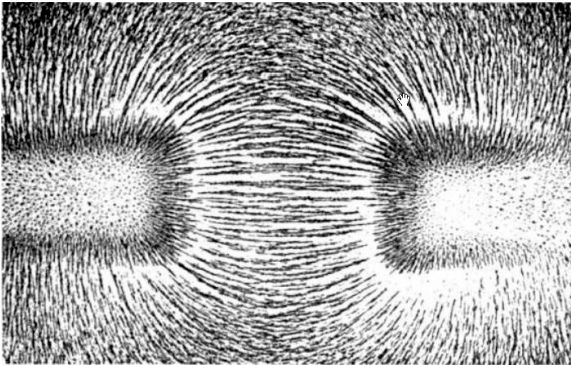
Gravity Probe B: the satellite that measures spacetime curvature near Earth

I must confess to being a bit lazy in one of that paragraph's sentences – I should have pointed out that gravitation's energy is *mostly* positive (consider the vast amount of positive gravity in intergalactic space vs. the smaller amount of negative gravity holding together solar systems and galaxies) and matter's energy is *mostly* positive: the apparent asymmetry of particles (with their positive energy) and antiparticles (with their negative energy) may be due to, as stated earlier, the need for the positive/negative components of everything to avoid direct contact and consequently not appear to be in the same "place" e.g. we might appear to live in a universe dominated by matter – this separation can either be in space or time (one can't exist without the other, as we know from Relativity) because all (components in a unification) are able to display both separateness/solidity (isolation in space) as well as the potential to appear anywhere and everywhere (in time as well as space). If gravity is forever pushing against matter, why don't gravitational-wave detectors pick up the waves literally all the time? In the sensitive LIGO (Laser Interferometer Gravitational Wave Observatory), a passing gravitational wave will slightly stretch one arm as it shortens the other – there are two arms which a laser beam travels along and is reflected by a mirror, the arms being 2-4 kilometres long and at a 90 degree angle – but only by a billionth of a billionth of a metre. In the universe, the refracted gravitational wave, with its negative energy, meets matter with its predominantly positive energy ... and the two tend to cancel (since the meeting of total negativity and total positivity is required for complete cancellation, it remains possible for the incomplete cancellation

of gravity and matter to produce some photons, and shrinkage on the order of 10^{-18} metre). If we built a detector from antimatter, we'd cause an enormous explosion (unless we isolated it from the ground and air it was located in), but we'd have a far better chance of finding gravity waves.

* Magnetism could operate in a similar way. When two like poles (north and north, or south and south) are placed close together, the lines of force – shown by sprinkling iron filings on a sheet of paper and placing the paper over the magnets – would repel each other because they resemble the unrefracted part of the gravitational wave which contributes to universal expansion. Two unlike poles (north and south) would attract because they resemble the refracted gravitational wave which feels friction - either with “magneton” particles composing magnetic waves, or with the opposing magnet itself, or with the lines of force between the magnets (thanks to mass-energy equivalence and magnetic waves behaving like particles) - and is diverted to a planet's, or another object's, centre. This divergence implies a very small angle of refraction at the planet's rim, followed by many increasingly large angles as interior density grows (see next paragraph) i.e. if we could see the wave, it would appear to curve and end in the planet's centre. So in magnetic attraction, we'd expect the lines of force between two magnets' ends to possess a curvature like that formed by successive angles of refraction (positive – a sphere has positive curvature). In magnetic repulsion, lines of force would curve like an unrefracted wave spreading out in the depths of space (the curvature would be negative or saddle-shaped). Sprinkle some filings on a sheet of paper and place magnets underneath – this is

what you'll see (and if preferred, all this can be described in terms of directional flow).

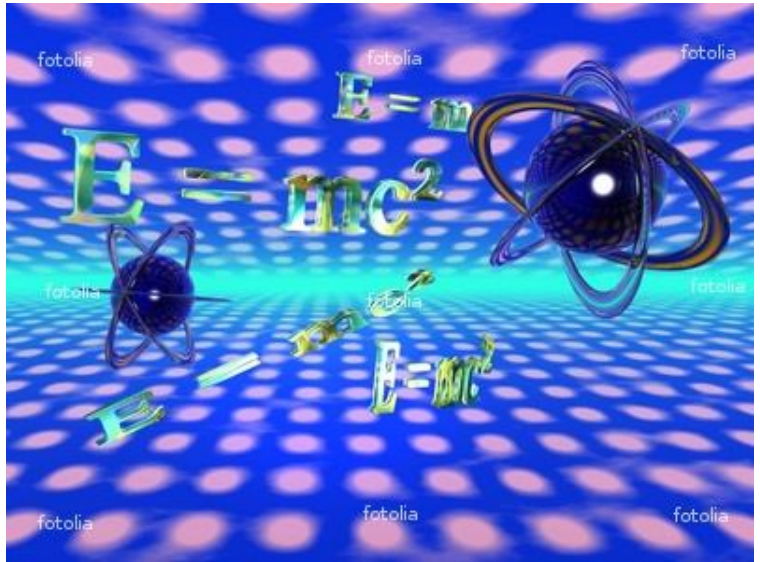


Magnetic field of bar magnets attracting

1) **The unrefracted gravitational wave** means starlight does in fact twinkle in space. It won't be detectable anytime soon, though. Since the electromagnetic force is 10^{36} times the strength of the gravitational force, the electric and magnetic fields of atoms in the atmosphere's air currents cause the electromagnetic twinkling observable to the eye, but this is a trillion trillion trillion times greater than the gravitational twinkling in space, and

2) **the refracted gravitational wave** heading for the sun “captures” the light from distant stars that appear close to the rim of the sun before it’s diverted to the centre of our star (string theory predicts that gravity’s gravitons interact with light’s photons**). Acting as a gravitational attractor, the refracted wave carries the light with it as it bends towards the sun’s centre. The light is not carried all the way but breaks free since photons have their own energy and momentum. However, the light is carried far enough to be deflected a tiny amount from its original path. According to Newton’s 3rd Law of Motion (to every action there is an equal and opposite reaction), the light will be deflected toward the sun by an equal and opposite amount to the gravity wave’s deflection to the solar interior. “Opposite” means the light wave travels *away* from the sun at approx. 186,282 miles per second and the gravity wave travels *into* the sun at the same velocity. “Equal” means, since experiments have shown the bending of starlight to be 1.75 seconds of arc (in geometry 60 seconds = 1 minute, 60 minutes = 1 degree, and there are 360 degrees in a circle), the refraction of gravitation from the solar rim is also 1.75 arcseconds (as density increases the deeper the gravity wave goes, the greater its refraction becomes).

** Gravitons and photons interact via mass-energy equivalence (described by $E=mc^2$). A gravitational wave acts as an attractor and captures light by feeling friction with the mass-energy of the photons. This causes gravitational refraction or bending in which part of the gravity travels in the direction of the centre of each photon in the light (once it reaches the centre, the 3rd Law of Motion accounts for the photons' reaction of being attracted to the gravitons). Compared to the other forces we know; gravity is incredibly weak and the weak "equal but opposite" reaction cannot overcome the heaviness of macroscopic objects which consequently don't float off towards the gravity doing the pushing. Photons, when pushed towards the surface, are so tiny and light that they do recoil from the push – saving us from perpetual darkness.



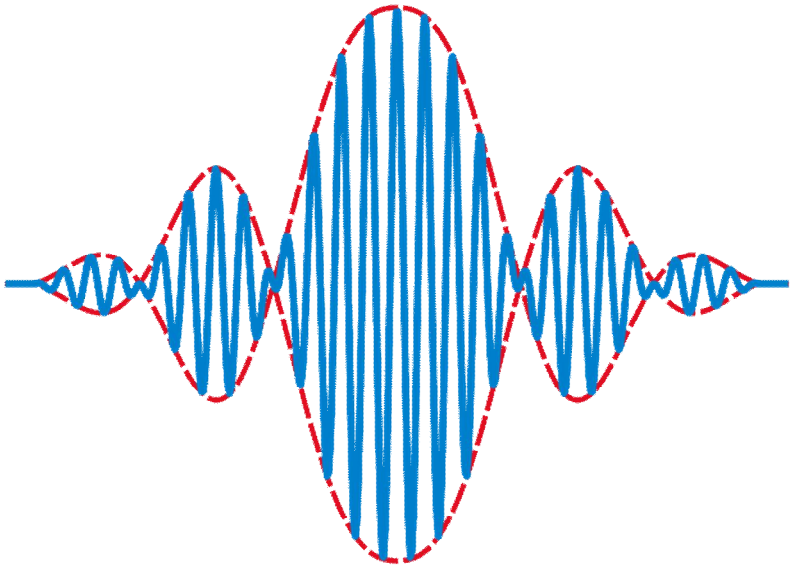
In a universe with an electronic foundation,
 $E=mc^2$ has the binary digits of 1 and 0 –
and is therefore $E=m^1+0$

What type of wave can a gravitational wave be? There are 2 basic wave motions. Electromagnetic waves, such as light, consist of varying magnetic and electric fields vibrating at right angles to each other and to the direction of motion – they are **transverse** waves. Sound waves are transmitted by the vibrations of the particles of the medium (such as air) itself, the vibrations being in the direction of wave motion – they are **longitudinal** or **compressional** waves. Gravitational waves must share some properties with transverse waves, in order to travel through the vacuum of space (or space-time). Longitudinal sound waves cannot do this – nor can they undergo polarization (a state in which rays of light, or similar radiation, exhibit different properties in different directions – ordinary light vibrates in all directions, but polarized light vibrates in only one direction e.g. when they are passed through a crystal of the mineral tourmaline which transmits rays in which the vibrations are confined to a single plane). In this hypothesis, gravity is diverted to a planet's, or another object's, centre. This divergence implies a very small angle of refraction at the planet's rim, followed by many increasingly large angles as interior composition changes and density grows i.e. if we could see the wave, it would appear to curve and end in the planet's centre. The idea that gravity waves must end in a planet's centre comes from Isaac Newton's work which says gravity depends on the distance between the centres of objects. They could do so because any wave would meet others coming from different directions and if they were out of phase (with one at maximum amplitude in its cycle and the other at minimum amplitude, perhaps as a result of entering the planet's surface at varying

altitudes or encountering different materials and densities during their journeys into the planet), they'd undergo destructive interference and cancel each other. Both transverse and longitudinal waves can undergo refraction and give rise to interference phenomena.

Gravity waves might also share some properties with longitudinal waves. This idea comes from seismic (earthquake) waves. If a gravity wave travels to our planet's centre, it must pass through the liquid outer core to the solid inner core. The seismic Secondary or S waves are transverse in nature and vibrate rock from side to side, or up and down, or both – all motions that require the resistance of a solid. S waves cannot traverse liquids and the outer core. However, the seismic Primary or P waves are compressional (longitudinal) and can negotiate both solids and liquids.

So gravitational waves seem to require both transverse properties (to travel through space [space-time] like electromagnetic waves) and compressional properties (to travel through Earth's outer core, like seismic P waves and sound). If we visualize such an oscillation, we'd see in our mind's eye a spring with regions that alternately compress and dilate (the longitudinal or compressional component) with the compressions rising to an amplitude several times higher than the dilated portion then falling to become the dilated portion (this would be the transverse component). Physicists call this a wave packet (or wave train) with no dispersion - a wave packet whose "envelope" (short burst of the wave that travels as a unit and has the large amplitude) changes or oscillates i.e. has dispersion would inevitably be out of phase with other gravity waves met in the planet's centre and would guarantee cancellation as well as confirmation of Isaac Newton's work which says gravity depends on the distance between the centres of objects. Quantum mechanics ascribes a special significance to the wave packet - it is interpreted to be a "probability wave" describing the probability that a particle or particles in a particular state will have a given position and momentum.



Wave packet

Acceleration (due to either approaching an appreciable fraction of light's velocity or experiencing massive gravitation, such as from a black hole) mimics the universe's expansion, no doubt because matter and space are both made of "space-time bits" i.e. they're both produced by the binary digits emanating from the hyperspace computer. There would inevitably be mass increase in the universe as some of the "dark energy" expanding the universe naturally becomes, according to mass-energy equivalence, particles of matter. More precisely, the increase in dark energy as our subuniverse expands (due to increased transmissions from hyperspace "creating" more space and time) is responsible for the extra particles – and acceleration mimics this expansion, also producing mass increase. There would also be relative length (and volume) contraction in the universe since each particle would occupy a smaller proportion of our subuniverse's length/volume as expansion continues (and acceleration mimics this). We've seen that spacetime can be twisted into a Mobius strip - picturing spacetime as a length of paper in somebody's hands, it'd be twisted by applying forces in opposite directions viz. by turning one hand away from the body while simultaneously turning the other hand towards the body. In truth, twisting space-time would be a movie-like "special effect" accomplished by the hyperspatial computer. Though there would be an initial increase in time (as noted earlier in this paragraph), this would only be obvious in the so-called "dark matter" portion of the Mobius. Seemingly, increase of time would be the norm but the twist – affecting all parts of a unified universe - means dark matter (time) decreases by

the time it reaches the 5% of the Mobius that is the materialism our physical senses perceive (this “decrease of time” is mimicked by acceleration and may also be termed “time dilation”). (The figure 5% comes from the Wilkinson Microwave Anisotropy Probe’s measurements of the universe’s dark energy, dark matter and ordinary matter content – since the universe is contained in, or unified with, each of its particles; transferring the results from the cosmic to the quantum is valid.)

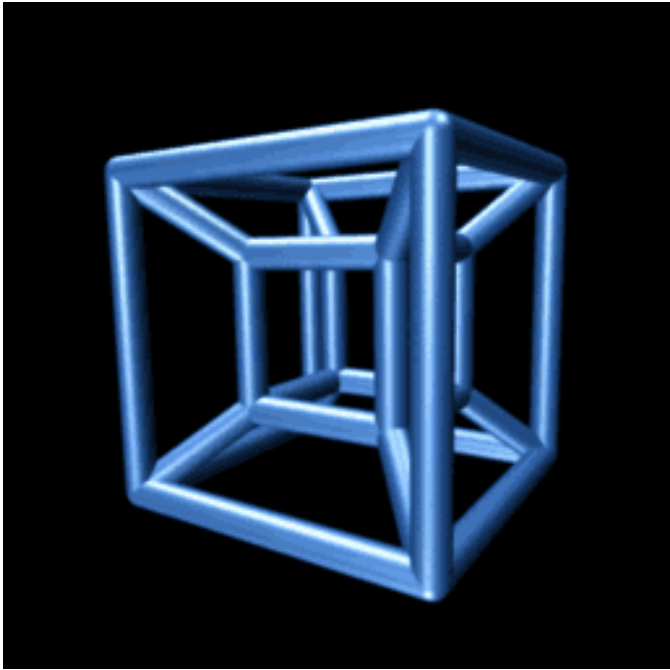


Twisting space-time would be a movie-like “special effect”

If everything is a union of positive and negative energy, every matter particle and force-carrying particle would be too. And the strings the Large Hadron Collider might detect (being the parts of particles' Mobius loops it could see since those parts would be space/ordinary matter) might come in both positive and negative varieties. In 1928 English physicist Paul Dirac (1902-84) proposed that all negative energy states are already occupied by (then hypothetical) antiparticles (particles of antimatter). Building on this results in proposal of strings and antistrings – mathematics has positive and negative quantities, and computers (whether in hyperspace or not) generate maths, causing reality to be both positive and negative; and unconventional cosmologist Max Tegmark is correct when he says mathematical formulas create reality. Building on Mobius loops and negative energy also explains why electrons don't spiral into the nucleus of the atom when orbiting it like planets around a star would, according to the theories of Newton

and Maxwell, cause the electrons to continuously emit electromagnetic radiation and this loss of energy would result in their crashing into the nucleus. As we've noted, fractal geometry tells us that what is outside or inside a Mobius loop is the same as the loop itself. So we can visualise an atom as a Mobius loop (the outside could be the universe and the inside could be a subatomic particle – with those two being One because of unification). We can imagine a 72% (WMAP's hyperspace figure) flow rate into the "dark matter" part of the atomic Mobius becoming not merely a 23% (WMAP's dark matter figure) flow into the ordinary matter but becoming a negative 23% flow (the variation in different directions caused by the twist need not be an increase and decrease of positive energy but may be the radiation of negative and positive energy). That is, energy is of course radiated – into atoms and from those special orbits or stationary states which Danish physicist Niels Bohr (1885-1962) said radiation would not be continuously emitted from, and wouldn't contribute to an electron-nucleus collision. But it isn't energy as we know it. There is no exclusively positive radiation emitted – the energy is predominantly "less than nothing" i.e. negative - mathematics has positive and negative quantities, and computers (whether in hyperspace or not) generate maths. Therefore, Bohr was correct to introduce the quantum into the atom and to "quantise" electron orbits – the "quantum jump" or "quantum leap" in which an electron's transition between orbits or energy levels occurs instantaneously without occupying the space between orbits is also explicable by computers in hyperspace generating mathematics and making electrons disappear from one orbit and instantly

reappear in another orbit. Since $E=mc^2$ means energy must contain particles and negative energy must contain antiparticles (e.g. electromagnetic energy is composed of photons), anti-photons are emitted from the electrons which are consequently not radiating energy and do not spiral into the nucleus. In his 1988 book "A Brief History of Time", Stephen Hawking says on p. 68 that "In the case of the force-carrying particles (like the photon), the antiparticles are the same as the particles themselves." Thus, the "photons" which are emitted during the quantum leaps of electrons from higher to lower energy levels could actually be antiphotons. (thanks to "QUANTUM: Einstein, Bohr and the Great Debate About the Nature of Reality" by Manjit Kumar – Icon Books, 2008 for inspiring these thoughts)



A tesseract, or 4th dimension equivalent of a cube (in a real tesseract, all lines would be at right angles)

Louis de Broglie (1892-1987) is the French physicist who answered “yes” to his question: if light waves can behave like particles, can particles such as electrons behave like waves? He was correct to say standing electron waves exist (the wave occupies every part of its orbit around the nucleus) and Niels Bohr was correct to impose the condition of allowed and forbidden electron orbits. My hypothesis is similar to Albert Einstein taking the wave theory of light and developing the light-quantum (photon) theory. I take standing electron waves and develop particles using negative energy. But the above does not try to invalidate wave-particle duality – it says standing electron waves and particles using negative energy are both valid concepts. It affirms wave-particle duality since it says an electron (or any particle), being a positive energy-negative energy hybrid, can display separateness/solidity/isolation (and appear as a particle) as well as possessing the ability to appear anywhere/anywhen and everywhere/anywhen (display as a wave – perhaps as a standing electron wave that surrounds an atomic nucleus). If we limit ourselves to an objective, “out there” reality; we’d mistakenly assume an electron occupies every possible spot around the nucleus and there are no forbidden orbits since the electron can be anywhere and everywhere (read about American physicist Richard Feynman’s idea that the entire universe might consist of just one electron on pp. 277-279 of “Physics of the Impossible” by Michio Kaku – Penguin Books, 2009). This assumption is inaccurate because Bohr’s model of the atom, with its allowed and forbidden electron orbits, accurately predicts spectral phenomena and chemical properties of elements in the periodic

table. The accurate interpretation of electrons being able to exist anywhere and everywhere is that reality is not limited to our traditional way of looking at things but that we live in an “everything is everywhere and everywhen” universe i.e. in a cosmic-quantum unification.

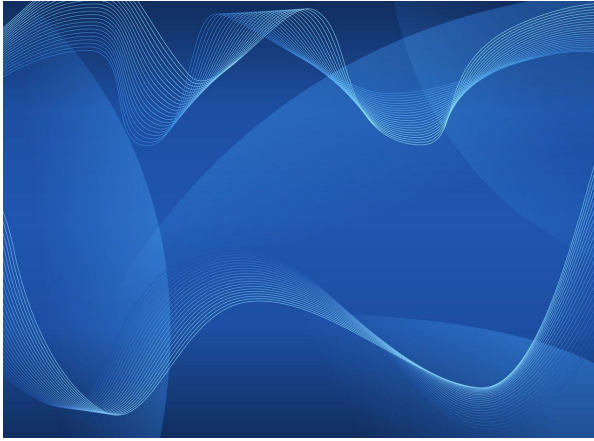
Group →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period ↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Uub	113 Uut	114 Uuq	115 Uup	116 Uuh	117 Uus	118 Uuo
Lanthanides	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu			
Actinides	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr			

The Periodic Table of elements – no. 1 (H) is hydrogen, with its atomic number (no. of protons) equaling 1

How can we unite two things mentioned in the last half-dozen paragraphs: standing waves (formed by the interference of waves of equal frequency and intensity travelling in opposite directions) and probability waves (wave packets which, in this hypothesis, describe gravitational waves)? The above shows that a portion of the gravity waves heading to the sun are diverted to planetary centres. Prior to diversion, the waves would have equal frequency and intensity, and be in phase. This implies that they are, in fact, wave packets without dispersion – when they meet in a planet's centre and cancel, it would not be because the wave packets have dispersion but would be because the wave packets have no dispersion and become out of phase (undergoing destructive interference) as a result of entering the planet's surface at varying altitudes or encountering different materials and densities during their journeys into the planet.

What happens to the gravity waves that are diverted away from the sun and towards a planet but are miles above that planet's surface, though still within its atmosphere? Viewing the planet from a point between the sun and the planet, the waves would be refracted less and less as altitude increased. Light gases can escape from the outer shell of the atmosphere (about 250 miles up). So at a height of approx. 250 miles, gravity waves could still be diverted by mass from their journey to the sun's centre but their refraction would be negligible at that altitude. Even if photons of electromagnetic waves have mass, refraction would remain negligible since experiments put the mass of a photon (if it has any) at less than 10^{-18} (a billionth of a billionth) of an electron volt ($1 \text{ eV} = 1.60217646 \times 10^{-19}$ joules).

When these upper-atmosphere gravity waves meet, they'd be in phase and would constructively interfere with each other – where two wave troughs or crests meet, they coalesce to produce a new, bigger trough or crest. Being the interference of waves of equal frequency and intensity travelling (according to our view from between the planet and its star) in opposite directions, the gravity waves could be the standing electron waves which occupy every part of that particle's orbit around the nucleus. The scattering of these waves, also known as graviton scattering, could form not just an electron but any particle. Like the earth orbiting the sun, there would be a centre of gravity the electrons and atomic nucleus share. The sun and the earth orbit their common centre of gravity which, owing to the masses of sun and earth, is extremely close to the sun. In the same way, the nucleus and electrons orbit their common centre of gravity with the nucleus which, since a proton is approx. 1836 times as massive as an electron (and a neutron about 1839 times), is extremely close to the nucleus (if not inside it). So we could have, for example, standing proton waves and standing neutron waves (neutrons share constituency of the nucleus with protons).



Waves

Where the in-phase waves converge and constructively interfere, we can also imagine the gravitation acting as an attractor and combining with electromagnetic waves to produce the electron, proton, neutron etc. in the form of the envelope (short burst of the wave that travels as a unit) of a wave packet or probability wave, which is united with the standing wave.

The nature of the particle formed would depend on the shape of the wave packet i.e. on frequency, amplitude, distances between envelopes. This sounds similar to the vibrating strings in physics' string theory to me – the theory says, according to p. 84 of "Workings of the Universe" by Time-Life Books 1991, "Standing currents (combinations of clockwise and anticlockwise currents) generate the four-dimensional properties of familiar space-time. The standing waves also account for some of the properties of the graviton, the theoretical particle that carries the gravitational force". Building on the above paragraphs dealing with graviton/photon interaction*, this supposes matter acquires all its properties (including mass) by the superimposing of electromagnetic and gravitational waves – being so much more powerful than gravity, electromagnetism would be responsible for virtually all of an object's "heaviness". This is an explanation of wave-particle duality – it says standing waves and particles (wave-packet envelopes) are both valid concepts. It affirms wave-particle duality since it says an electron (or any particle), being a positive energy-negative energy hybrid, can display separateness/solidity/isolation (and appear as a particle) as well as possess the ability to appear anywhere/anywhen and everywhere/everywhen (display as a wave). It's also an explanation of how gravitational energy would be unified with matter (and positive like it) and the universe could be more than a vast collection of the countless photons, electrons and other quantum particles within it; it could be a unified whole that has particles and waves built into its union of digital 1's and 0's. So we can visualize the electron as either the envelope of a wave packet (particle) or as a

standing electron wave that occupies every part of the particle's orbit around the nucleus. Similarly, Earth can be visualized as many envelopes of wave packets (it contains approximately 1.33×10^{50} atoms) or as a standing terra-wave: it occupies every part of its orbit around the sun** in the eyes of any Little Green Man, or Woman, whose senses are not limited like ours and can detect every instant of its apparent motion (every bit of space/instant of time exists forever like an individual frame of a movie and when these are displayed in rapid succession, what we call motion comes into being).



LITTLE GREEN MAN

* The section on photon-graviton interaction says “The light is not carried all the way but breaks free since photons have their own energy and momentum.” Why do electromagnetic and gravitational waves combine here to produce matter and mass? It must be because this paragraph deals with in-phase gravity waves that converge from directly opposite directions and constructively interfere to produce a matter-forming wave packet’s envelope i.e. a subatomic particle. When they converge, they act like 2 hands coming together and catching a ball. Actually, photons are absorbed and emitted just as in laser cooling but instead of a laser beam slowing down atoms, the envelope slows (and traps) the photons. Not all the gravity waves striking a planet’s surface or entering its interior would reach the absolute centre. Wherever a wave is and whatever its refraction, there is a high chance of it destructively interfering with a wave refracted from another location. But the wave following it might make it all the way to the absolute centre before getting cancelled. Thus, some waves manufacture the particles composing a planet – a vital process in the nebula surrounding our sun nearly 5 billion years ago, as well as in the aftermath of the big bang of nearly 14 billion years ago - while some produce what we call gravitational attraction to the planet’s centre. It’s unlikely a wave could proceed beyond the centre (and even come out the planet’s opposite side) since there are simply so many waves capable of cancelling it.

Gravity, together with electricity and magnetism, is not only the origin of mass - we're incorrectly accustomed to thinking the reverse: that mass (e.g. of a planet) produces gravity. Gravitation + electromagnetism can also be viewed as producer of the strong and weak forces of the subatomic world. The strong force binds protons and neutrons to form the atomic nucleus, and also holds quarks together to form protons and neutrons and mesons. It is viewed in this book as gravitons (the force-carrying particles responsible for gravity) being diverted to the centre of a subatomic particle where they meet gravitons coming from different directions. They form the envelope of a wave packet which traps photons and renews or refreshes the proton or neutron like computers refresh the images and writing on their screens. The strong force is 10^{38} (100 trillion trillion trillion) times the strength of gravity because it's the product of the electromagnetic force (a trillion trillion trillion times gravity's strength) combined with 10^2 (100) gravitons per electromagnetic photon*. This process doesn't occur on incredibly larger planetary scales because the range of the strong force is only 10^{-15} (a millionth of a billionth) of a metre - possibly due to gravitons being able, on the huge scale of a planet, to produce large gravitational waves which are capable of cancelling each other.

* To keep things simple, let's assume the graviton and photon have the same strength. This may be fantastically unrealistic, but it won't interfere with the truth of the message being conveyed here – and we'll find this simplicity useful soon since it triggers the idea of gravitons and photons transforming into each other. Absurd? We'll see ...

The weak force is responsible for the radioactive decay of subatomic particles and initiating hydrogen fusion in stars. This book's interpretation of it relies on the previous mention of antigravity in black holes, and comparing the emission of antigravity to the type of radioactive decay called beta decay (in which a beta particle – an electron or its antimatter counterpart, the positron – is emitted). GP bosons (graviton-photon composites) experiencing electrical repulsion with other particles until they reach, or even travel beyond, the event horizon can legitimately be compared to quantum (subatomic) processes. This is because the universe is a fractal – a fragmented geometric shape whose subdivisions are, at least approximately, copies of the original that are reduced in size - and is a cosmic/quantum unification. The weak force is 10^{25} (10 million billion billion) times gravity's strength because it's the product of the electromagnetic force combined with 100 billion anti-gravitons of antigravity*. That is, it's 10^{36} times the strength of gravity divided by 10^{11} (100 billion) which is the exponent 36 minus the exponent of 11 ... which is 10^{25} .

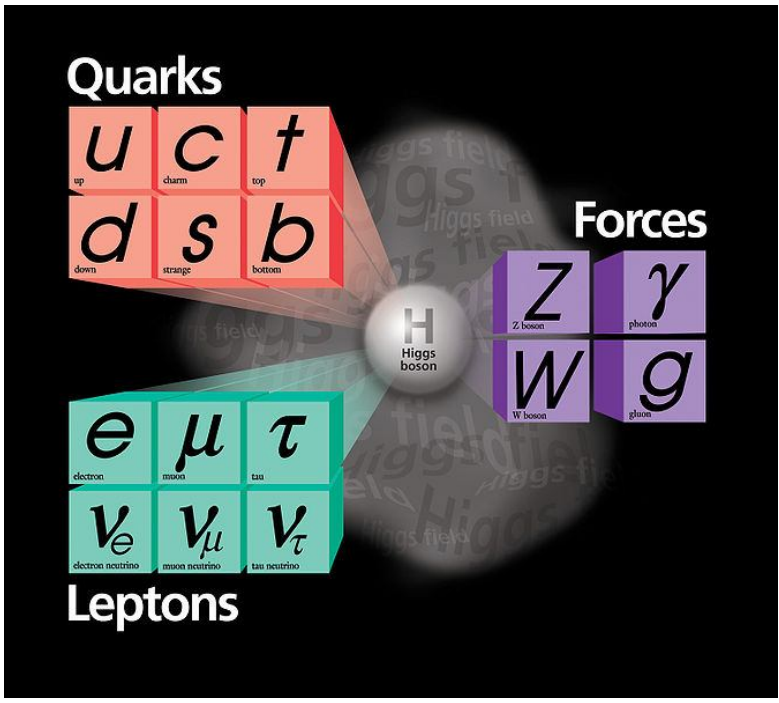
* Again ... to keep things simple, let's assume the graviton (or anti-graviton) and photon have the same strength.



An example of a FRACTAL –
an image repeated on all scales

A GP boson is also another explanation of the electroweak force (unification of electromagnetism and the weak force – for which Abdus Salam, Sheldon Glashow and Steven Weinberg were awarded the Nobel Prize in Physics in 1979). And it's a possible means by which photons could travel from the core of the sun. This is an estimated 10,000 to 200,000 year journey which they begin as gamma rays and, after much absorption and re-emission, radiate from the solar surface as lower-energy infrared (heat) rays, visible light waves and ultraviolet rays. They might travel in tandem with a graviton - giving credence to Einstein's belief that gravitation and electromagnetism are related (gravitons and photons joining in wave packets to create matter supports his belief, too). Gravitons and photons traveling in tandem from the sun's core is a partial concession to the popular idea of gravity emerging from within bodies. The heat from radioactive elements inside a planet or moon might also cause infrared photons to team up with gravitons and radiate outward. But this is just a minor, secondary cause of gravity – the principal source is the push exerted by gravitational waves deep in space and making the universe expand. This push can also explain planetary orbits around the sun as well as the moon's effect on tides, however -

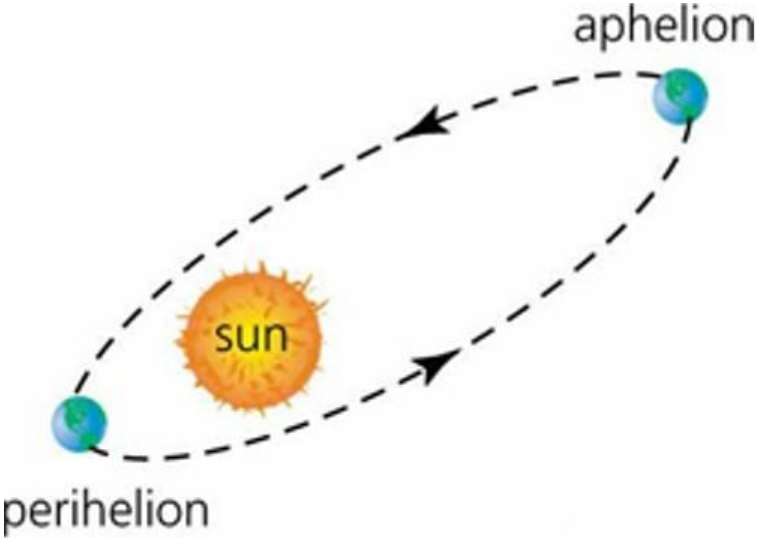
What is the role of gluons (the strong force's carriers) and the W^+ , W^- and Z^0 particles (the weak force's carriers)? All four particles have been discovered – but what do they do if the strong and weak nuclear forces don't exist? They could simply be products of graviton-photon interaction: the strong nuclear force could be gravity "added to" electromagnetism while the weak nuclear force could be gravity "subtracted from" electromagnetism (identical to antigravity and electromagnetism being added). We can say all particles are the product of gravitational/standing/probability waves or, to put it another way, their properties – such as mass, charge and spin – are determined by different combinations of the flow of binary digits (1's and 0's) around a Mobius loop. Look back to the illustration of a Mobius strip on page 12. The bottom of it looks like part of a circle while the top has a twist. This particular orientation can be referred to here as "spin 1" – it only looks the same if it's turned round a complete revolution of 360 degrees. A photon has spin 1 and when it interacts with a graviton (which has spin 2 and looks the same if turned round 180 degrees or half a revolution), the particles' orientations can either be the same with both having the twisted part of the Mobius on top, or dissimilar with one having the twist on top while the other has the twist on the bottom.



The Standard Model of Particle Physics – this book would permanently delete the Higgs boson or field, and insert the Graviton (the particle transmitting the force of gravity) as the undisputed centre of attention

If oriented the same way, they undergo constructive interference and reinforce to produce a massive W^+ , W^- or Z^0 that must be turned 360 degrees to look identical i.e. it has spin 1. Slight imperfections in the way the Mobius loops fit together determine the precise nature of the binary-digit currents and therefore of exact mass or charge. If oriented dissimilarly, they undergo destructive interference and partly cancel (there's little or no twist now – both top and bottom of the new Mobius resemble parts of a circle) to create a massless, chargeless gluon that is identical if turned 360 degrees and similarly possesses spin 1. Quarks combine into protons, mesons and neutrons but are never found in isolation and cannot be observed directly. Should gravitons on Earth always be combined with photons, they'd likewise be incapable of unambiguous detection. Photons may be detectable on Earth because of similarities between this book and the neutrino theory of light. The neutrino theory of light was proposed in 1932 by Louis de Broglie and suggests the photon is a composite particle composed of a neutrino-antineutrino pair. It's based on the idea that emission of a photon corresponds to creation of a particle-antiparticle pair and absorption of the photon to the pair's annihilation. Neutrinos are subatomic particles sometimes called "ghost particles" since they hardly ever interact with matter. My "graviton theory of light" proposes that photons are absorbed when captured in wave packets by gravitons and emitted when graviton-photon pairs come into existence (in black holes; resulting from heat generated by radioactivity in planets; in the sun's core; in wave packets).

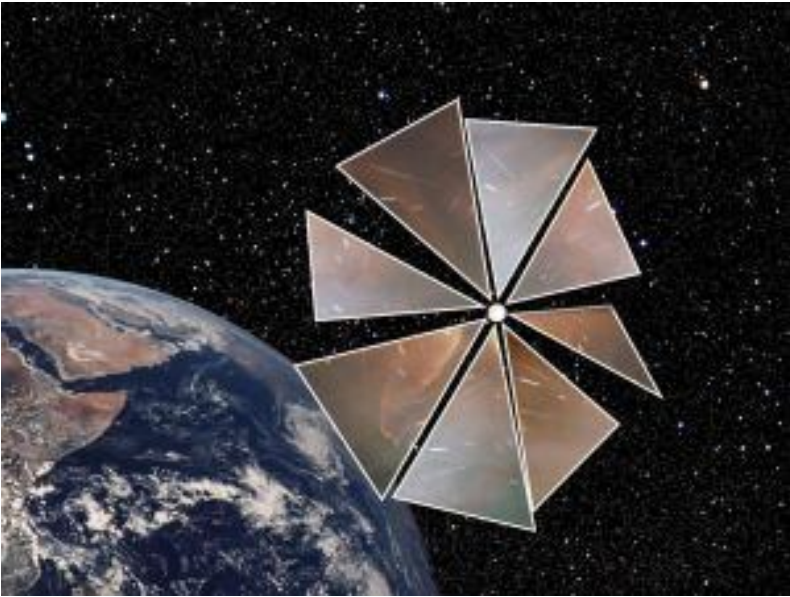
** Why is Earth's orbit the shape of a flattened circle – an ellipse?



As gravitational waves travel from the outer solar system towards the sun (as a starting point, let's say they're coming from the lower right in this picture), they'd push the orbiting Earth (at aphelion, its farthest distance from the sun – 152 million km) to the upper left. But gravity waves are also coming towards the sun from that direction. So Earth's progress to the upper left is stopped and it follows the line of least resistance to waves pushing it from both the lower right and upper left – this corresponds to the path indicated by the arrow pointing left. When it reaches perihelion (its closest approach to the sun – 147 million km), the waves from lower right are pushing it back while waves from the upper left are pushing it forward. Our planet follows the boundary between waves assaulting it from opposite directions and its inertia compels it to follow the arrow pointing right. Upon reaching aphelion again, the tug-of-war (oops, I mean push-of-war) continues and Earth's momentum causes it to go left. We mustn't forget the waves that are coming from the outer solar system perpendicular to the waves already mentioned. They push Earth towards and away from the sun at its perihelion and aphelion points. The balance between these forces reinforces, using the explanation of lower-right and upper-left waves, the planet's tendency to stay in the illustrated orbit. The sun's position in the illustration is exaggerated – it should be closer to the centre of the ellipse since the difference between perihelion and aphelion is only about 3%. The existence of this difference might rely on the planet manifesting to us as a multitude of matter-forming wave-packet envelopes which divert some gravity waves to the interior – thus slightly upsetting the balance of gravity waves from

opposing directions at Earth's particular location relative to the sun. Gravity waves don't cancel out until they reach the middle of a planet, so all the particles between that middle and the highest atmosphere (or surface, in the case of airless planets) would be a product of gravitational/standing/probability waves and would be continuously refreshed by those gravity waves. This refreshing must also include photons (particles of light). Space is predominantly positive – think of gravity waves, which are nothing more than the warping of space, with their relatively small refracted and negative portion causing our “attractive” gravity plus their relatively enormous unrefracted and repelling portion causing cosmic “antigravity” and universal expansion. It's like matter which is also predominantly positive (think of particles of matter versus particles of antimatter). We can add this to the process of gravity waves refreshing photons to see that there's an extremely deep unity in nature, and to further conclude that we live in a cosmic-quantum unification. A unification implies that we can say gravitons are photons or, no doubt more accurately, that gravitons and photons transform into each other.

This isn't unprecedented since neutrinos, having mass, can change (oscillate) between the type produced by nuclear fusion in the sun's core and two types that weren't caught by detectors on Earth after radiation from the sun (this meant only a third to a half of the sun's predicted neutrino output was detected prior to 2002 when the new understanding of neutrino physics was introduced). The particles called neutral B mesons can also spontaneously oscillate between their matter and antimatter states since they have mass. Particle types are fixed if the particles are massless, so gravitons and photons shouldn't oscillate from one to the other. So photons must have mass after all (it was previously speculated in this book that they might). It couldn't be otherwise because Einstein proposed, and experiments confirm, that photons have momentum (the quantity of motion of a moving body). And momentum is defined in physics as the product of the mass and velocity of an object ($p=mv$). More needs to be stated, though - at speeds that are a significant percent of the velocity of light, the approximation that momentum is a product of rest mass and velocity is not accurate. At the high speeds dealt with by Special Relativity, determining momentum must consider mass and *change* in velocity (acceleration).



Artist's depiction of Cosmos 1 project testing a solar sail whose blades are made of mylar, with proposed spacecraft (white dot) in centre. The 2005 launch didn't succeed, thanks to a rocket failure preventing it from reaching orbit.

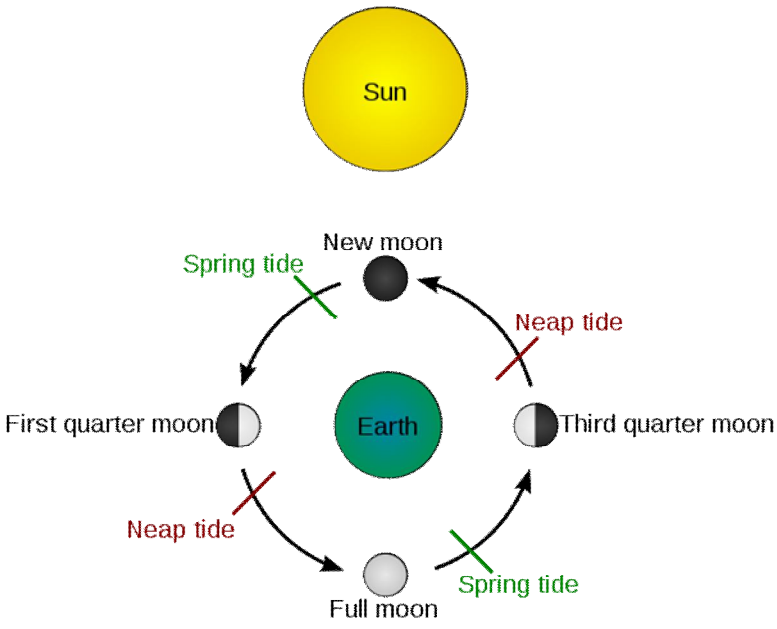
We must turn to Newton's 2nd Law of Motion which tells us what happens when a force is applied to a moving body – the 2nd Law states Force equals mass times acceleration ($F=ma$). Let's use the example of solar sails, a form of spacecraft propulsion that uses the pressure of light from a star or laser to reflect off enormous ultra-thin "sails", and push them to speeds of 100,000 miles per hour in just under 3 years – absorbing surfaces only produce half the acceleration, and the solar wind (streams of electrons and protons from the Sun) increase the spacecraft's velocity much less than the photons. It wouldn't be unnatural to interpret $F=ma$ as the FORCE exerted on the sail by the light depending on the MASS of the sail and causing ACCELERATION of the sail. American professor of physics Walter Lewin said, in a video I saw on Wikipedia (the free Internet encyclopedia), "The 2nd Law is perhaps the most important law in all of physics" and "Can the 2nd Law be proven? No." So I feel justified in slightly altering the words interpreting it to "the force exerted on the sail depends on the mass of the photons multiplied by their acceleration" – experiments say the mass of a single photon is less than a billionth of a billionth of an electronvolt (a 100 watt lightbulb burning for 1 hour equals 2.2 trillion trillion electronvolts) yet acceleration is tremendous since photons in the sun's dense core are lucky to travel a millimeter in a second but they travel through the vacuum of space at nearly 300,000 *kilometres* per second. A photon with mass means the so-called speed of light, c (for *celeritas*, a Latin word translated as "swiftness" or "speed"), wouldn't actually be the speed at which light moves but would be a constant of nature that is the maximum velocity

any object could theoretically attain in space-time (gravitational waves, being space-time, would still travel at c). Massless gravitons could transform on those occasions when they're in physical union with photons (forming what I've referred to as GP bosons) - they could perform computer-like refreshment of photons by becoming them in a "quantum leap" that employs the 1's and 0's creating all energy and matter, which is another way of describing what page 122 referred to as "Slight imperfections in the way the Mobius loops fit together determin(ing) the precise nature of the binary-digit currents and therefore of exact mass or charge".

In this way, we'd see not just photons when we open our eyes in a sunny spot but a mixture of photons and gravitons. And when we fall over, we could blame not just gravity for our bruises but a mixture of gravity and light. Gravity waves don't cancel out until they reach the middle of a planet, so all the particles between that middle and the highest atmosphere (or surface, in the case of airless planets) would be a product of gravitational/standing/probability waves and would be continuously refreshed by those gravity waves. Being the product of binary digits, it'd also be possible for these waves to be programmed to undo the damage caused by (or even to prevent) earthquakes, hurricanes, volcanic eruptions, tsunamis, nuclear accidents, shark and lion attacks, disease and death, the time (in about 5 billion years) when the sun becomes a red giant that might swallow earth or at least boil away its water and blast most of its atmosphere into space, etc.

PS Followup to the sentence “the more mass, the more gravity is diverted” on p. 87 - Similarly, there is more mass when ocean currents meet land (islands or continents) than when they exist in bodies of water (lakes or oceans). At the beach, we can see large waves but in Lake Superior, tides are only about 2 inches and are completely masked by changes due to wind and atmospheric pressure (an earthquake underneath the lake would produce large waves). Why do tides follow the moon in its orbit around Earth? It isn't because the moon pulls on the earth but can be explained this way - When the moon is at first or third quarter, gravitational waves heading towards the sun from the outer solar system push against the earth and keep the ocean's water level from rising too high (illustrated by the neap or lower tides). On the other side of the planet, a neap tide is experienced because of gravity waves from the opposite side of the solar system which were not diverted into the sun. They traveled past it and are able to push against Earth if they're diverted by the planetary mass. When at the full position, some of those gravity waves from the solar system's edge are diverted by the moon's mass into the lunar interior, and this decrease in gravity's push against the earth permits a spring (high) tide. The Bay of Fundy, on southeast Canada's Atlantic coast, has the highest tides in the world (reaching about 50 feet or 15 metres) but this is due to the unique shape of the bay, strong winds, low atmospheric pressure ... *not* any pull by the sun and moon. At new moon, some gravity waves approaching Earth's satellite from the opposite side of the solar system would likewise allow a spring tide if they're diverted into the moon. This pushing from the edge of the solar system would cause the Pioneer spacecraft to be closer to Earth than predicted (they're about 7 billion miles away but still within the solar system). Being responsible for Earth's orbit and the

planet's momentum, gravity's push could also cause the moon's distance from the earth, or the astronomical unit (Earth's distance from the sun) to increase since there would be no "pull" on the moon by the earth, or on the earth by the sun. Experiments have shown that the Moon is moving away from Earth at a rate of 38 mm (1.5 inches) per year, and that the astronomical unit is growing by an estimated 5 to 7 cm (2 to 2.8 inches) per year.



Continuing the theme of “scientific imagination”-
you’ve heard of Star Trek, now view my fictional
Time Trek on the Internet at

<http://studios.amazon.com/scripts/3293>