

Review Article

Revolutionizing Electronics with Imaginary Computers and Matter-manipulating Bandgap Implants in the Brain as Well As Universe-creating Virtual and Augmented Reality

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A B S T R A C T

The electronics revolution is only beginning! It appears that we've come a very long way since computers occupied entire rooms a mere 60 or 70 years ago. Maybe we have come a long way – but here are a few examples of where computer science could end up taking humanity. They read like science fiction today – so called imaginary computers that use “imaginary time” and spacetime warping to be capable of performing calculations for potentially trillions of years without any time at all elapsing in “real time” – bandgap implants in the brain which could allow people to manipulate matter and energy mentally, and literally perform miracles (implantation wouldn't even require surgery) – and actually being able to create an infinite, eternal universe using virtual and augmented reality. Even outlining these possibilities in this short article necessitates some exploration into physics, so readers should think flexibly and not be confined to a particular scientific discipline.

Keywords: Future computers, Imaginary time of physics and maths, Bandgap implants in brain, Miracles humanized, Enlisting virtual and augmented reality to create the universe

Introduction

Our present approach to developing computers has gone about as far it can. The problems of chips generating too much heat - and of quantum uncertainties making transistors hopelessly unreliable at the scale of atoms - demand a new approach. This article is proposing that the successor to today's silicon technology (and tomorrow's quantum computers) lies in new concepts of time. An “imaginary” computer using the Complex Number Plane's vertical axis of imaginary time can perform calculations at the familiar rate of time's passing while the horizontal axis of “real” time sees absolutely no elapsed time (the possibility of

no time passing in the normal sense is hinted at by Special Relativity's time dilation or slowing of time).

We'll someday be able to do the same things with the brain and universe that we now do with computers. We'll be able to record and share any information in any part of the brain. We'll be able to transfer (download) the brain's contents into another body or an android - infinite times if necessary - and thus say hello to immortality. When quantum mechanics and General Relativity are united into quantum gravity or the Theory of Everything, we'll have access to everything in space and time.

The band-gap structures this article speaks of would need

to deal with forms of matter like genes. They could add or delete anything and everything we choose by emulating computers' copy/paste function to add things; as well as their delete function, to remove things (these feats make me wonder if people really can walk on water and perform other miracles). The revolution - but also evolution, because the revolution results from many incremental steps, one after another – may ultimately result in humans actually being able to create an infinite, eternal universe using virtual and augmented reality.

Going Beyond Quantum Computers With Imaginary Time And Spacetime Warping

unites one time dimension with three space dimensions. Today, so-called imaginary numbers (such as i , which equals $\sqrt{-1}$) describe so-called imaginary time. Imaginary time is a concept derived from special relativity and quantum mechanics. Geometrically, imaginary numbers are found on the vertical axis of the Complex Number Plane, allowing them to be presented perpendicular to the real axis of space-time as we know it. One way of viewing imaginary numbers is to consider a standard number line, positively increasing in magnitude to the right, and negatively increasing in magnitude to the left. At 0 on this x-axis (the so-called real axis), a y-axis (the so-called imaginary axis)

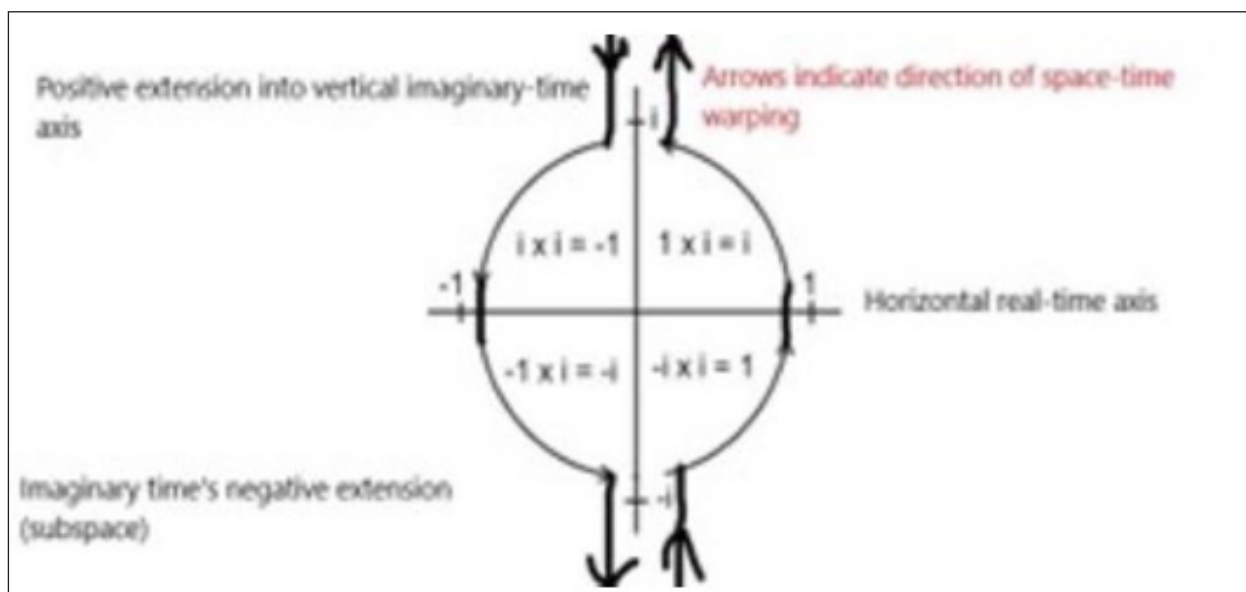


Figure 1. Direction of Space-Time Warping (With Imaginary Time and Subspace) (adapted from reference 1)

Our present approach to developing computers has gone about as far it can. The problems of chips generating too much heat - and of quantum uncertainties making transistors hopelessly unreliable at the scale of atoms - demand a new approach. This article is proposing that the successor to today's silicon technology (and tomorrow's quantum computers) lies in new concepts of time. An "imaginary" computer using the Complex Number Plane's vertical axis of imaginary time can perform calculations at the familiar rate of time's passing while the horizontal axis of "real" time sees absolutely no elapsed time (the possibility of no time passing in the normal sense is hinted at by Special Relativity's time dilation or slowing of time). Referring to diagram 1, space-time is warped and the computer's processing is performed in imaginary time (possibly for trillions of years) - but space-time is warped again so the results can be retrieved in real time where no time at all has elapsed.

For nearly a hundred and twenty years, science has accepted the concept of space-time which was formulated by Russian-German mathematician Hermann Minkowski and

can be drawn with "positive" direction going up - "positive" imaginary numbers then increase in magnitude upwards, and "negative" imaginary numbers increase in magnitude downwards.

The ultraviolet catastrophe, also called the Rayleigh-Jeans catastrophe, is a failure of classical physics to predict observed phenomena: it can be shown that a blackbody - a hypothetical perfect absorber and radiator of energy - would release an infinite amount of energy, contradicting the principles of conservation of energy and indicating that a new model for the behaviour of blackbodies was needed. At the start of the 20th century, physicist Max Planck derived the correct solution by making some strange (for the time) assumptions. In particular, Planck assumed that electromagnetic radiation can only be emitted or absorbed in discrete packets, called quanta. Albert Einstein postulated that Planck's quanta were real physical particles (what we now call photons), not just a mathematical fiction. From there, Einstein developed his explanation of the photoelectric effect (when quanta or photons of light shine on certain metals, electrons are released and can

form an electric current). So it appears entirely possible that another supposed mathematical trickery (imaginary time) will find practical application in the future in the form of Imaginary Computers.

Extra Dimensions And Space-Time Warping

To introduce you to the idea of extra dimensions, consider this – Professor Itzhak Bars of the University of Southern California in Los Angeles says, one whole dimension of time and another of space have until now gone entirely unnoticed by us.²

The temporal dimension would be “imaginary” time and the spatial dimension would be “imaginary” space, which must exist since time cannot exist apart from space (just as there is space-time, there would be imaginary space-time which is possibly the realm of dark matter and dark energy). Now suppose engineers warp space-time so the functioning of a computer’s processor takes place in so-called imaginary time. If warping is looped so results emerge in so-called real time, its calculations would be retrieved instantly after they were entered into the computer because billions of years might pass in imaginary time yet no period at all could elapse in our real time. These warps and loops are viable because they’re inspired by Einstein’s Special Relativity – and propose the use of space-time warping which, though in its infancy, is a technology being worked on today by places like NASA.

USA theoretical physicist Ronald Mallett is also doing experimental work on space-time warping (which is gravitational warping, since General Relativity defines gravity as the warps and curves in space-time) for the purpose of developing scientific time travel. He describes his work - called the Space-time Twisting by Light (STL) project:

“In Einstein’s General Theory of Relativity, both matter and energy can create a gravitational field. This means that the energy of a light beam can produce a gravitational field. My current research considers both the weak and strong gravitational fields produced by a single continuously circulating unidirectional beam of light. In the weak gravitational field of a unidirectional ring laser, it is predicted that a spinning neutral particle, when placed in the ring, is dragged around by the resulting gravitational field.”³

Digital Brain, Digital Universe

Let’s build on the opinion of Max Tegmark, MIT professor of cosmology, that the universe is literally composed of mathematics. [4] Building on his belief, let’s say electronics’ binary digits (BITS) of 1 and 0 - aka base 2 maths - are the ultimate composition of, and are used to “draw”, Mobius strips. Then two Mobius strips can unite to form a figure-8 Klein bottle. [5] Trillions of Mobius strips can form a photon, and trillions of more complex figure-8 Klein bottles can form the more complex graviton (the photon and graviton would

form from the topological Mobius and Klein [as well as binary digits], thus producing gravitational-electromagnetic unity). (The Klein is immersed, not embedded, in the 3rd dimension - a photograph of a stapler is a 2-dimensional immersion of a 3-dimensional stapler, and an immersion may have self-intersections; embeddings have no self-intersections.) If the whole universe is projected from 2D (as proposed by the holographic-universe theory), then both gravitational and electromagnetic waves must be projections from 2D, too i.e. from the Mobius strip which is made up of binary digits. Therefore, the range of frequencies (aka bandwidth) called gravitational and electromagnetic waves is composed of BITS. The universe is a mass of this gravitational-electromagnetic unification (and there is nothing except sufficient bandwidth).

If the brain and the universe are ultimately composed of binary digits, we’ll someday be able to do the same things with the brain and universe that we now do with computers. We’ll be able to record and share any information in any part of the brain. We’ll be able to transfer (download) the brain’s contents into another body or an android - infinite times if necessary - and thus say hello to immortality. When quantum mechanics and General Relativity are united into quantum gravity or the Theory of Everything, we’ll have access to everything in space and time. Then we can upload the products of the brain’s frontal cortex anywhere to influence anything. We can either add to it (mimicking a computer’s copy/paste function), remove (delete) part of it, or change the way it proceeds (reprogram it).

I don’t think it’ll be possible to change history or to reprogram something to behave differently from the way future history has recorded. This is because I believe time can be visualized as a Cosmic DVD where our brains and consciousnesses take the place of the DVD player’s laser. This is plausible if we accept the Block Universe theory which developed from Special Relativity’s non-simultaneity of events for different observers. In the Block Universe, all time coexists (the entire past, the present, and every point in the future all exist at once). Everything in the Cosmic DVD’s time exists at once but we’re only aware of an extremely limited number of events at any instant (these make up our present).

Bandgap Implants In The Brain

“In solid-state physics, a band gap, also called an energy gap or bandgap, is an energy range in a solid where no electric current can exist. In graphs of the electronic band structure of solids, the band gap generally refers to the energy difference (in electron volts) between the top of the valence band and the bottom of the conduction band in insulators and semiconductors. It is the energy required to promote a valence electron bound to an atom to become a conduction electron, which is free to move within the crystal lattice and

serve as a charge carrier to conduct electric current. It is closely related to the HOMO/LUMO gap[^] in chemistry. If the valence band is completely full and the conduction band is completely empty, then electrons cannot move in the solid; however, if some electrons transfer from the valence to the conduction band, then current can flow. Therefore, the band gap is a major factor determining the electrical conductivity of a solid. Substances with large band gaps are generally insulators, those with smaller band gaps are semiconductors, while conductors either have very small band gaps or none, because the valence and conduction bands overlap.”⁶[see Figure 2]

[^] Highest Occupied Molecular Orbital and Lowest Unoccupied Molecular Orbital, respectively. “molecular orbital” is a mathematical function describing the wave-like behavior of an electron in a molecule. The energy difference between the HOMO and LUMO is termed the HOMO–LUMO gap.

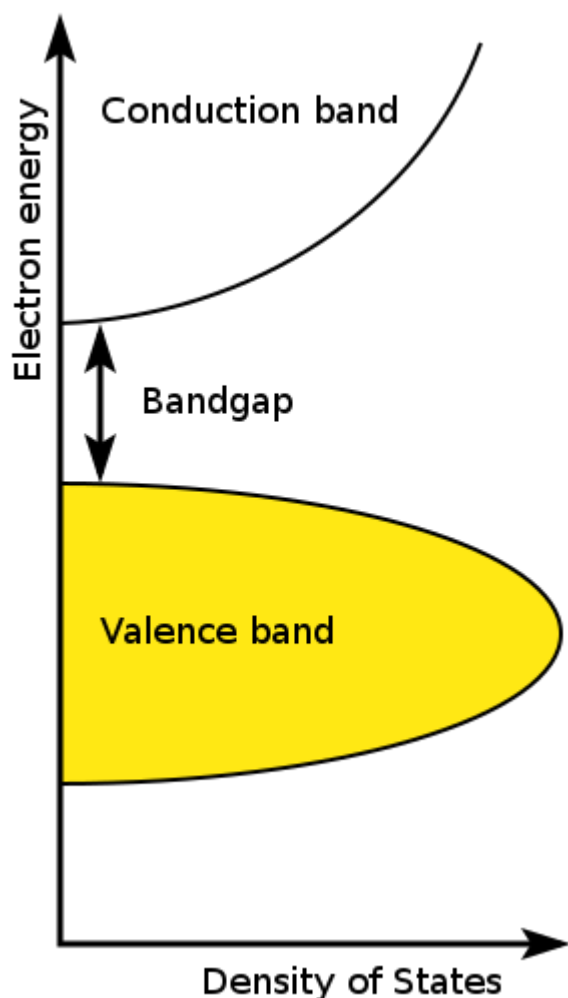


Figure 2 - A sketch of the bandgap between valence band and conduction band in insulators and semiconductors. (Public Domain image)

“(Morpho) butterflies create color 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.”⁷

It appears that advances in engineering and biology will enable humans, like the morpho butterfly, to selectively add and delete wavelengths of light (of energy). 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, X-rays and gamma radiation are all forms of light. Suppose matter acquires all its properties (including mass) by the interaction of electromagnetic and gravitational waves (see the section below on vector-tensor-scalar geometry) - the day will come when we can add or delete wavelengths of matter,[^] anywhere and anytime we choose!

[^] Deleting would be producing gaps in the energy forming matter, while adding would be – to use a word from computer language - “pasting” waves of matter to fill in energy gaps (bandgaps). A century ago the founder of Wave Mechanics, Louis de Broglie, treated electrons as standing waves, thus introducing matter waves and wave-particle duality.

It is anticipated that 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 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 this article speaks of would need to deal with forms of matter like genes. They could add or delete anything and everything we choose by emulating computers’ copy/paste function to add things; as well as their delete function, to remove things (these feats make me wonder if people really can walk on water and perform other miracles).

Vector-Tensor-Scalar (Vts) Geometry

“Dust grains assemble by chemical bonding. Once they are sand or gravel sized, how they continue to stick is a mystery. Metre-sized rocks should spiral into the star rapidly due to disk drag (the gas orbits a little slower than the rocks as a pressure gradient partially supports it). Once rocks somehow get past these barriers, they collide with each other in a chaotic and random way assembling the planets.”⁸

The following method – see Figure 3 - of building planets is preferred to collisions between rocks and dust in the disk because most planetary systems seem to outweigh the protoplanetary disks in which they formed, leaving astronomers to re-evaluate planet-formation theories.⁹

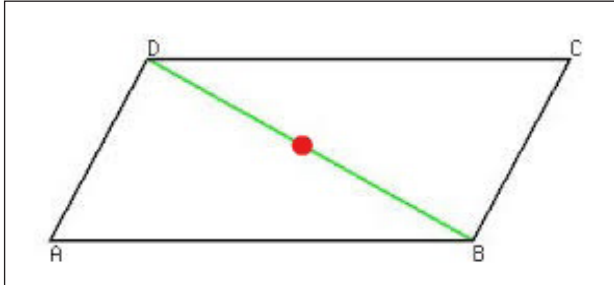


Figure 3 - VTS (VECTOR-TENSOR-SCALAR) GEOMETRY - Interaction of Gravitation and Electromagnetism Produces a Momentum in Gravitons and Photons (and a Pressure Which is Known as Mass).

Figure 3 VTS (VECTOR-TENSOR-SCALAR) GEOMETRY - Interaction of Gravitation and Electromagnetism Produces a Momentum in Gravitons and Photons (and a Pressure Which is Known as Mass). Explanation of geometric display of mathematics' vectors, scalars, and tensor calculus adapted from¹⁰

A vector is a quantity which possesses both magnitude and direction. Two such quantities acting on a point may be represented by two adjoining sides of a parallelogram, so that their resultant is represented in magnitude and direction by the diagonal of the parallelogram (AD and CD, for example, can symbolize the electromagnetic and gravitational vectors ... while the resultant green diagonal of DB substitutes for the interaction of those two forces). A scalar variable is representable by a position on a line, having only magnitude e.g. the red dot on the diagonal, symbolic of the Higgs boson. A tensor is a set of functions which, when changing from one set of coordinates to another, are transformed in a precisely defined manner (e.g. changing from the coordinates of AD and CD to those of the green diagonal, or of the red dot, is a transformation performed in a particular way).

Two sides thus illustrate the graviton's spin 2 and the photon's spin 1. The resultant diagonal represents the interaction of the sides/vectors ($1 \div 2 =$ the spin $\frac{1}{2}$ of every matter particle). Tensor calculus changes the coordinates of the sides and diagonal into the coordinates of a single (scalar) point on the diagonal. This scalar point is associated with particles of spin zero. [11] If the mass produced during the photon-graviton interaction (the energy and momentum of photons and presently hypothetical gravitons produces a pressure we call mass*) happens to be $125 \text{ GeV}/c^2$, its union with spin 0 produces the Higgs boson.** $125 \text{ GeV}/c^2$ united with spin 0 means the central scalar point of

the Higgs boson is related to the vector of the graviton's spin 2, and the Higgs field is therefore united with the supposedly unrelated gravitational field (together with the latter's constant interaction with the electromagnetic field).

Material from a star could fall onto a neutron star, heating it up and causing it to emit radiation. Then the energy and momentum of the photons and presently hypothetical gravitons would be the interaction of electromagnetism (the charged particles and strong magnetism) with the neutron star's powerful gravity. This results in wave-particle duality. The heating could produce gravitational and electromagnetic radiation which would produce the mass and quantum spin of subatomic particles - instead of only radiation being emitted, jets of matter would be emitted too (normally, the matter would be emitted as beams or jets from the neutron star's magnetic poles).

** GeV/c^2 originates with $E=mc^2$ solved for m ($m=E/c^2$, or mass equals the Energy of 125 Giga - billion - electron Volts divided by the speed of light squared). The short version is that the mass of the Higgs particle is 125 GeV.

Universe-creating Virtual and Augmented Reality

In the section of the article regarding VTS Geometry, gravitational and electromagnetic waves form every massive particle in the universe. The waves have retarded and advanced components¹² which cancel and produce entanglement / unification.*

1's and 0's composing electromagnetic and gravitational waves would compose both "advanced" waves going back in time and "retarded" waves going forward in time. The retarded components with +x motion in time can obviously cancel the advanced components with -x motion in time, producing entanglement. Albert Einstein's equations in the theory of General Relativity say gravitational fields carry enough information about electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. This was discovered by the mathematical physicist George Yuri Rainich. [13] Therefore, gravitational waves also have advanced components going back in time. Reliance on bodily senses – extrapolated to our technology – tells us things and events are distinct and separate. Therefore, the one particle forming the cosmos (in a functional sense - every particle being entangled with every other) is interpreted by us and our scientific instruments as "particles being in two or more places at once" (instead of being in one position i.e. unipositional, from the Latin *unus* meaning one).

Creating something which has always existed seems to be a paradox – whose definition is "a seemingly absurd or contradictory statement or proposition which when investigated may prove to be well founded or true". On the subject of paradox, 20th-century physicist Niels Bohr

said, "How wonderful that we have met with a paradox. Now we have some hope of making progress". He also said, "Your theory is crazy, but it's not crazy enough to be true". Hopefully, the crazy ideas in this article are "crazy enough to be true". So, how might it be done? A model of the cosmos might be built that uses the infinite number pi and imaginary time, and resides in Virtual Reality (artificial, computer-generated simulation). The entanglement (quantum-mechanics style) in the simulated universe is unable to remain separate from the entanglement existing in our perceived reality because computers using so-called "imaginary time" (which is defined by numbers with the property $i^2 = -1$) remove all boundaries between the two universes. This enables them to become one Augmented Reality (known now as technology that layers computer-generated enhancements onto an existing reality but seen here as the related layering of virtual reality onto other points in time and space). The poorly named imaginary time of physics and mathematics unites with pi (both are necessary to generate a non-Big-Bang cosmos i.e. an infinite universe which, because space and time can never be separated, is eternal). This manipulation of time, space, and the universe with virtual and augmented reality might possibly be produced by the two-valued binary-digit system used in electronics traversing a wormhole, or shortcut between folds in space and time, designed by humans of the far future. The augmented reality which is layered on "other" points in space-time actually isn't transmitted to other points - because of unipositional quantum mechanics, only one ever exists. Thus, transmissions to any (apparently other) places or times wouldn't be restricted to the speed of light but are instantaneous.

Conclusion

Let the revolution begin! Let's build so called imaginary computers that use "imaginary time" and spacetime warping to be capable of performing calculations for potentially trillions of years without any time at all elapsing in "real time". Let's build bandgap implants in the brain which could allow people to manipulate matter and energy mentally, and literally perform miracles (implantation wouldn't even require surgery). And let's build an infinite, eternal universe using virtual and augmented reality.

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