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TOPOLOGY AND THE MAGNETIC MONOPOLE REPLACE UNIVERSAL EXPANSION WITH MAGNETIC DATA SWAPPING

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Abstract
Rajan iyer sent me a link to the tegs 2025 conference in budapest, hungary which he chaired (i was unable to attend, and i thank him very much for the link). I saw part of the talk about expansion of the universe and turning the universe inside out. Since i'm a researchgate member who couldn't attend the conference, i'd like to offer some thoughts about why there's no cosmic expansion (that's admittedly an extraordinary claim, which is why i've supplied extraordinary, but scientific, thoughts). I think the movement of galaxies away from each other is not evidence that the universe is expanding. I believe it means the universe itself is the magnetic monopole physicists are seeking. Let me explain (this 1st section may not seem relevant at first but the ideas of spacetime's composition become essential when trying to tell how the universe could actually be static at the largest scale). Here are some of the subjects in this article - universe as magnetic monopole, building blocks of space-time, holographic principle, quantum mechanics only superficially probabilistic, maths and physics explaining massless gluon, real and imaginary numbers, advanced and retarded waves, mobius strip, klein bottle, wick rotation, aharonov-bohm effect, frames of reference, multiverse-universe unification, dark matter and dark energy modified, flat and simply connected cosmos, model of universe in virtual and augmented reality, steady state theory and creation of mass, data swapping and galaxy displacement.

Keywords: universe as magnetic monopole, building blocks of space-time, quantum mechanics only superficially probabilistic, multiverse-universe unification, dark matter and dark energy modified, flat and simply connected cosmos

Quantum certainty, holographic principle, and composition of spacetime -
The mathematical universe hypothesis (muh) is a speculation put forward by physicist and cosmologist max tegmark [1, 2]. It speaks of "altogether different equations and mathematical structures." This article could use such structures in the following way - one dimensional (1d) electrical pulses could form binary digits that could encode 2d mobius strips which would be the next level up in particles' structure. Cosmology's holographic principle suggests the 3rd dimension results from information in the 2nd dimension. The 2nd d might be the mobius strips comprising particles and the 3rd d might be capable of being deleted by programming the binary digits (used in electronics) which act as hidden variables that aren't confined to one location but are compatible with quantum mechanics (not with known probabilistic quantum mechanics but with quantum certainty, for they give precise calculations). When subatomic particles appear in two places at once, the holographic principle can be combined with the precision of unrecognized quantum certainty. Then the particles would actually be in one place (quantum entangled) since the 3rd d of space between their centers would be eliminated (since we live in space-time, the time taken to travel the distance between particles is also eliminated). The 3rd dimension we normally perceive could be thought of as composed of figure-8 klein bottles i.e. It could be thought of as the union of pairs of mobius strips [3] or as projection of the information inherent in particles' constituent strips. Since so-called "imaginary" numbers are essential in quantum mechanics, the 4th dimension of time might be described by the complex plane's wick rotation which is often regarded as nothing more than mathematical convenience. Adapting a

paper by albert einstein [4] - if electromagnetism's photon and gravitation's graviton are composed of trillions of mobius strips, electromagnetic and gravitational interactions could produce the mass and quantum spin of every other particle, including the bosons of an atom's strong nuclear force, * weak nuclear force, and even the higgs boson (the possibility of excitation of the higgs field resulting from photon-graviton interaction would mean the field is a union of electromagnetic and gravitational fields). All of the information in the universe is contained in two-dimensional packages trillions of times smaller than an atom (in this case, the 2d package is the mobius strip).

* The strong nuclear force's massless gluon could be formed by cancellation. Wick rotation can exemplify cancellation of the real and imaginary components within the universe's complex mathematics if wick isn't restricted to being thought of as mere convenience or trickery. Wick is a circle containing two axes that intersect at its origin - a horizontal x-axis whose "real" ends are labelled 1 and -1, plus a vertical y-axis with "imaginary" ends *i* and -*i*. Whenever a point on this complex plane is multiplied by *i*, it moves a quarter rotation around the origin or center of the plane (counterclockwise). Start with 1, multiply by *i* then by *i* again *($i^2 = -1$)*, then add the 1 and -1 to get 0 (cancellation of gluon mass). The above paragraph illustrates motion from right to left in the upper half-plane. Movement from left to right in the lower half-plane must also exist ie**:** $-1 \times i^2 = 1$. In physical terms, this bidirectional motion can be expressed as a wave moving in two directions. This article is discussing binary digits as well as the topological mobius and klein as the basic composition of subatomic particles. The discussion is therefore related to quantum mechanics. Imaginary numbers are essential in quantum mechanics. So a possibility worth considering is that wick rotation, with its inclusion of imaginary numbers, is built into the mobius strip (and into the klein bottle, which is a union of a pair of strips). The electric pulses and binary digits of computation embrace the first dimension with the 2nd and 3rd being addressed by the mobius and klein plus their formation of photons and gravitons which interact to produce bosons and fermions. Could the 4th dimension of time be represented by wick rotation whose real and imaginary numbers act as a timepiece, displaying and recording the movement of particles? The two directions waves move in would then not be in space but would reside in time - one could travel forwards in time, the other back in time. As physicist john cramer says, "in summary, it appears that advanced waves (the ones going back in time) do exist and have been detected. Much more work must be done to ensure that this effect is real and can be extended, but the physics implications are gigantic." [5]

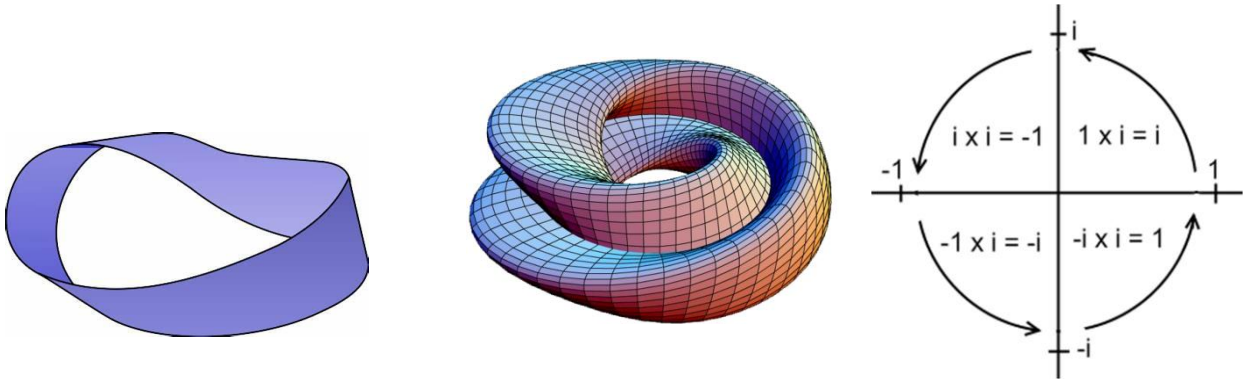

Figure 1 - (left to right) mobius strip, figure-8 klein bottle, wick rotation (source - google search of public-domain images)

Aharonov-bohm effect and magnetic monopole

A very interesting comment by prof. 't hooft in zeeya merali's article is the "discovery that unifying

the forces of physics requires the existence of magnetic monopoles." Here are some monopolar thoughts - https://qspace.fqxi.org/news/165296/gerard-t-hooft-and-13508-lhc-physicists-are-among-this-years-us$3million-breakthrough-prize-winners

As a thought experiment, suppose that electricity and magnetism are exactly the same thing - this thought experiment will be backed up in the text underneath fig. 2 and its caption by the scientific experiment conducted in 1986 by akira tonomura and his colleagues. [6] the only apparent difference between them is the frame of reference.

While an observer stationary with respect to an electric charge will see it as a source of electric field only, a second observer moving relative to the first will see the same charge as a source of both electric and magnetic fields in a way dictated by special relativity. [7]

Every particle of matter has a quantum spin of ½ which means it must be completely rotated twice (through 720 degrees) to resume the same quantum state. And a mobius strip needs to be travelled around twice to reach the starting point. A possible result is that the mobius is involved in the composition of particles. Instead of focusing on the mass of particles following the contours of the strip, we could imagine the electric charges of all the universe's particles - positive, negative, totally canceling and neutral, or partly cancelling and reduced - obeying the undulations of the mobius.

Recalling the frames of reference, this waviness can also represent magnetic polarity. A classical view could be adopted in which magnetic polarity is associated with positive/negative/neutral/reduced charges of individual particles. Then it'd be natural to believe that, just as particles can have (overall) either positive or negative electric fields, they can also possess the single polarity of either a north or south magnetic field. Or a topological interpretation could be adopted. Since this involves mobius strips as components of matter, it might be called a quantum-mechanical interpretation. In this, attention is not concentrated on individual and separate particles. Quantum mechanics and general relativity are combined to show how the topological and subatomic quantum world might be joined with the cosmic world. In the cosmic, the collection of the universe's particles, electric fields, and magnetic fields are united by obeying one thing - the following of mobius undulations. This quantum mechanical - or unified field - view doesn't say individual particles include magnetic monopoles. It says the cosmos itself may be the monopole. If the universe only has either a north or south pole, this superasymmetry of known temperature-magnetism interactivity might account for hemispherical power asymmetry where the cosmic microwave background (cmb) has very slight temperature differences in its celestial hemispheres.

What if the electric dipole moment of a universe's particles cause the positive and negative charges to precisely cancel and make the universe neutral? The condition of electric and magnetic fields being identical means cosmic magnetism would be "neutral" at the largest scale, and the universe would not be a magnetic monopole. Nor would the cmb have hemispherical power asymmetry (hpa). This is not a problem at all - just a reason to think harder about monopolarity. Electric charge can be seen as a source of both electric and magnetic fields. It's known that charges exist, so cosmic magnetism cannot be neutral - the universe really can be the monopole and account for superasymmetry. The concept of neutrality is better applied to the electric dipole moment and the perfect cancellation of positive and negative charges to produce the neutral photon and graviton

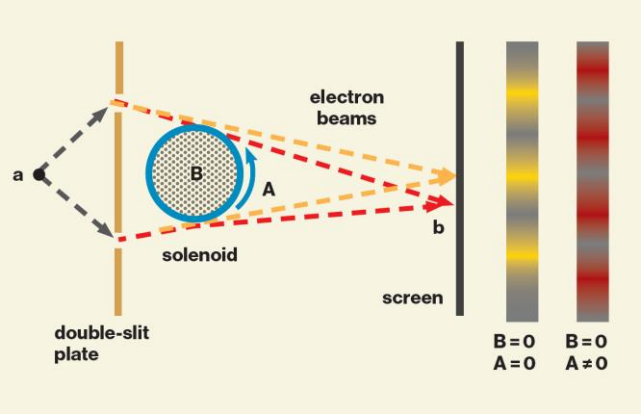

Figure 2 - the aharonov–bohm effect: electrons from 2 slits pass by a solenoid (an electromagnet) on its upper and lower side. The electrons form interference patterns on the screen. Without a magnetic field in the solenoid, the interference pattern is like the yellow palette. With a magnetic field inside the solenoid but not outside, the electrons form the interference pattern shown on the red palette. In quantum mechanics, the result is interpreted as being directly related to the vector potential which causes the shift of the interference pattern. (google search, like fig. 1)

The electromagnetic equations of 19th century scottish physicist james clerk maxwell had been written in terms of both the electric ***(e)*** and magnetic ***(b)*** fields and a concept called the "potentials." There are 2 electromagnetic potentials - an electric scalar one, often denoted by φ **;** and a magnetic vector potential, denoted by **a**. An electrically charged particle like an electron is affected by **a**, despite being confined to a region in which both the magnetic field and electric field are zero. The physical reality of electromagnetic potentials (**a** not equalling zero) was shown by the experiment of dr. Tonomura et al.

Referring to fig. 2 - the vector potential causes the shift of the interference pattern but it could be said that magnetism affects the charged electrons by causing the shift since the vector potential is magnetic. * if an electric and magnetic field are identical (except for the frame of reference), then the electric charges will also affect the solenoid's magnetic field. By extension, the combined charges of all the particles in the universe will affect cosmic magnetism. The magnetic aharonov–bohm effect is also closely related to paul dirac's argument that the existence of a magnetic monopole can be accommodated by maxwell's equations if both electric and magnetic charges are quantized. An electron and its charge are quantum (subatomic) and quantized - see quantum certainty, holographic principle, and composition of spacetime. Magnetism would also be quantized if an electric and magnetic field are identical (apart from the reference frame). The universe's combined charges can thus shift cosmic magnetism away from the human- or astronomic-scale detection of magnetic fields of individual particles, objects, even galaxies. They'd shift magnetism to a universal scale with the cosmos itself being the magnetic monopole and possibly accounting for the cosmic microwave background's hemispherical power asymmetry.

* If an electric field is a magnetic field seen from a different set of space-time coordinates (a different reference frame), the vector potential could be a magnetic field in a 3rd set of time-space coordinates.

Hemispherical power asymmetry could even be related to the levitation of moon dust at lunar sunrise and sunset. The dust particles float approximately ten centimetres above the surface and cause a bright arc of light (horizon glow) which nasa has attributed to emission and re-absorption of electrons in the

dust generating unexpectedly large electrical charges and repulsive forces. [8] known temperature-magnetism interactivity would manifest not as superasymmetry in the cosmic microwave background. It would appear as magnetism - in its electrical reference frame - displaying as electrostatic activity in the moon dust's electrons when temperatures change significantly at lunar sunrise or sunset.

Multiverse and accelerating spreading of galaxies

Suppose quantum gravity one day goes far beyond unifying quantum mechanics and general relativity. It might unite everything in space and time. Assuming the universe is everything that has existed or will exist, the multiverse could be timelike or all the things that happen at different zeptoseconds in this universe (a zeptosecond is the smallest unit of time ever measured and equals 10^−21 s or a trillionth of a billionth of a second). That quantum gravity from the far future could unify all the times in the multiverse with the one physical universe, making the multiverse part of the universe. Unifying the timelike multiverse with the material universe could be achieved with a combination of the holographic principle and quantum certainty in which quantum mechanics is only superficially probabilistic since it obeys chaos theory's principle that there is hidden-order-within-apparent-disorder. In "quantum certainty, holographic principle, and composition of spacetime" it was asked "could the 4th dimension of time be represented by wick rotation whose real and imaginary numbers act as a timepiece, displaying and recording the movement of particles?" Such displaying and recording brings to mind the digital video disc (dvd). If the universe functions like a dvd that we watch movies with, the multiverse-universe unity wouldn't only exist in a future where spacetime warping is routine. This is because all times exist simultaneously since the whole dvd exists, although only sights and sounds from each fraction of a second are perceived as the disk is played. Similarly, we can't normally perceive the future, but all times co-exist in the cosmos and the future instantly affects the past and present. This makes the multiverse observable constantly.

"aharonov-bohm effect and magnetic monopole" said, "if the universe only has either a north or south pole, this superasymmetry of known temperature-magnetism interactivity might account for hemispherical power asymmetry where the cosmic microwave background (cmb) has very slight temperature differences in its celestial hemispheres." This superasymmetry would not only affect the motions of photons in the cmb. It would also influence the movements of galaxies since those are, like photons, ultimately composed of binary digits, mobius strips, figure-8 klein bottles, and wick rotation. Slower and more rapid motions of photons translate into cooler and warmer temperatures in the cmb while galactic movement translates into approaching or receding velocities - demonstrated respectively by the gravitationally bound galaxies in the local group and all of the "island universes" existing billions of light years away. This hints at a possible effect on gravitons which, in this article, are also built from figure-8 klein bottles and wick rotation.

If the universe is infinite in every direction, a galaxy would recede from its neighbours in every direction - those surrounding it in the same plane, and those above or below it. This apparent increase in the size of the universe could never be an actual increase (infinity can't be enlarged). But there would be an increase in the effect on each galaxy by the universe's polarity. Being a macroscopic part of the cosmos, each galaxy shares the cosmic polarity - whether it be north or south - and is thus repelled by "empty" space. The greater the distances between galaxies become, the greater is the repulsion and the diffusion of galaxies is accelerated. Should our cosmos have both a north pole and south pole, it would necessarily be finite (picture the two poles of the earth). But if it was a monopole, with only one or the other, that north or south pole could be spread throughout its volume and our cosmos could be infinite in space and infinite in time (eternal). The already-infinite universe is composed of the bits and topology making up photons and gravitons (and galaxies). When the distances

between galaxies increase, there's no increase in the size of the cosmos. The bits and topology of the galaxies are displaced x lightyears by magnetic repulsion, assuming the position formerly occupied by the bits and topology of photons and gravitons in a process called data swapping. These force-carrying particles adopt the former location of a galaxy, with their magnetism providing more repulsion and acceleration. The galaxies observed today will eventually be out of sight (apart from those in the gravitationally bound local group) but the universe never becomes empty. This is due to the conservation of mass-energy which states that mass can be converted into energy, and vice versa (think of albert einstein's famous equation e=mc^2). Photons and gravitons interact to produce mass (see this article's first section) and in time, structures that may be called dwarf or satellite galaxies or protogalaxies which are currently attributed to the early universe existing a few hundred million years after the big bang. Last century's steady state theory - proposed by fred hoyle, hermann bondi, and thomas gold - said mass is continuously created at a rate equal to one hydrogen atom in each quart of space every half-billion years. [9]

Dark matter and dark energy

This heading is a reply to the lack of evidence in physics for the existence of the particles of dark matter. While it's possible to assume dark particles will eventually be detected, remaining open to other explanations is scientifically advisable. A modified view of dark matter is suggested here which resides on the y-axis of the complex plane and is only one dimensional. In that case, it wouldn't be comprised of particles or have the 3 dimensions of familiar space (familiar space-time is on the x-axis). It would be one-dimensional (1d) like the electric pulses creating the binary digits (bits) of one and zero used in electronics. The bits may be thought of as the ultimate composition of fermions and bosons **...** And as modified dark matter. Applying 1's and 0's to bosons and fermions was inspired by sources such as john wheeler's "it from bit", (10) max tegmark's mathematical universe hypothesis, (1, 2) and melvin vopson's information physics. (11) the electric currents can be regarded as modified dark energy that has no connection with alleged cosmic expansion. The dark energy would be added to galaxies, preventing the rapidly orbiting stars in a galaxy's outskirts from flying off into space.

Paragraph from (12)

Static universe (see background information in start of "quantum certainty, holographic principle, and composition of spacetime")

In physics, a redshift is an increase in the wavelength, and corresponding decrease in the frequency and photon energy, of electromagnetic radiation (such as light). Hubble's law - cosmological redshifts of all light sources are proportional to their distances from earth - implies the universe is expanding. To the very end of his writings, astronomer edwin hubble favoured the model where no true expansion exists, and therefore that the redshift "represents a hitherto unrecognized principle of nature." [13] as explained above, the "unrecognized principle" may be termed *magnetic displacement.*

Physicist melvin vopson writes, "in an expanding universe, the entropy will always increase because more possible micro states are being created via the expansion of the space itself/universe." [14] therefore, avoiding a cosmological end from entropy requires the universe to be static. When a particle appears to be in more than one place at once, the holographic principle can be combined with quantum certainty. Then the particle obeys common sense and, like a macroscopic object, would actually be in one place (quantum entangled). The cosmos appears to be infinite and eternal, neither expanding nor contracting - the lack of expansion/contraction means the universe would be a static (in one place) and macroscopic version of one of its particles. Referring to figure 1's klein bottle, note that the klein

bottle's two different colors (representing positive and negative curvature) fit together to produce the outline of a doughnut. A doughnut (or strictly, a torus) is technically flat. If continuously deformed like a mass of clay, it has the same topological properties as a flat surface (like a piece of paper). When many figure-8 klein bottles are grouped together, a procedure analogous to computer art's sky replacement will cause binary digits to fill in any gaps or holes in the same way that computers can make a sky that's blue from horizon to horizon. In other words, the digits "smooth out" the klein bottles to produce general relativity's regular space (often likened to a rubber sheet). But the klein doesn't become multiply connected like the doughnut. Only the doughnut's outline (with its hole filled in) is adopted and the bottle retains the property of simple connectedness. (Informally, if an object in space consists of one piece [the outline of one filled-in doughnut] - and has no holes passing all the way through it, it is called simply-connected.) According to the paper "cosmic topology," a flat universe that is also simply connected implies an infinite universe that extends endlessly in all directions. [15]

Origin of infinite universe

The switching of bits - bi(nary) (digi)ts - between "one" and "zero" is comparable to the "quantum fluctuations" associated with big bang theory. The following speculation proposes a method whereby a universe that's infinite and eternal - neither expanding nor contracting - could share another correspondence with the big bang viz a definite time of creation. 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 (both quantum and macroscopic) 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, an "infinite decimal" whose digits after the decimal point go on forever (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). The augmented reality which is layered on "other" points in spacetime actually isn't transmitted to other points - because of the quantum entanglement of every particle (massive or massless) in spacetime, 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. They merely need to traverse the width of one graviton in order to reach infinite distances into the past, the future, or the never-ending universe. (paragraph from [16])

Conclusion

This article has proposed a link between the 19th, 20th, and 21st centuries. Specifically, the electromagnetism experiments of michael faraday and the electromagnetic equations of his mathematical friend james clerk maxwell are related to albert einstein's research with frames of reference and the statement by nobel laureate gerard 't hooft that "unifying the forces of physics requires the existence of magnetic monopoles." Maxwell's magnetic vector potential, which he developed from the results of faraday's work, is identified with magnetism and, thanks to reference frames, with equivalent (not

merely intimately connected) electricity. Coupled with time and space being static at the largest scale (neither expanding nor contracting), magnetic-electrical equivalence leads to the universe itself being a magnetic monopole. The forces of physics are therefore unified according to 't hooft's words and the theory of everything, or according to this article quantum gravity, is clearly the right direction to pursue. Speaking of the static universe, the cosmological constant einstein introduced to achieve a static cosmos does not appear to be a mistake. Removing it was a blunder. As proposed in the paragraph on dark matter and dark energy, electric currents can be regarded as modified dark energy that has no connection with alleged cosmic expansion. Perhaps these currents are in the form of all particles possessing an electric dipole moment where positive and negative charges can completely or partially cancel.

Statements

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

There are no potential conflicts of interest.

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