The Nature of Time
Travel

Time travel is possible in physical time but not in psychological time.

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Revisions:
4/1/2023 Corrected typo on slide 21
4/21/2023 Narration of slide 2 says Bugh retired from
          Lockheed Martin in 2014 but it was 2015.
5/26/2023 Added slide 39 of clarifications to slides 11-14

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About the Author:

- Maintained B-52 & KC-135 flight simulators in the US Air Force until 1979.

- Graduated from Devry Institute of Technology in 1982.

- Started working on flight simulators again at General Dynamics in 1982 in Fort Worth, Texas.

- This company division was later bought by Lockheed and Lockheed later merged with Martin Marietta to become Lockheed Martin.

- Electronics Engineer Senior Staff, working in the Flight Simulation Lab and later in the SIMSIL (Simulation and Systems Integration Lab) at Lockheed Martin Aeronautics Company in Fort Worth, Texas.

- Retired from Lockheed Martin in 2015 after 33 years

- Started the Vasant Corporation in 1996.

- Now CEO at Vasant Corporation where I have also researched unusual electromagnetic devices from inventors who claim they get anomalous electrical power output and some with gravity reduction effects.

Origin of this theory about time:

- This research of "time" itself was started back in 1994-95 just prior to research of so called "free energy" devices.

- "The Nature of Time" became chapter 28 of the Vasant Corporation's original publication: "Spin Wave Technology".

- See the original research here:
https://www.vasantcorporation.com/nature-of-time.php

- Some of my present-day views about time have changed since that original research on this subject.

- Specifically, I don't think dark matter and dark energy are best described the way I had in the original paper.

- Also, originally, I tried to distinguish between "cosmological" time and "psychological" time but now I feel it is better to leave these two as practically synonymous and introduction "physical" time to describe motion in time particularly at the subatomic level.
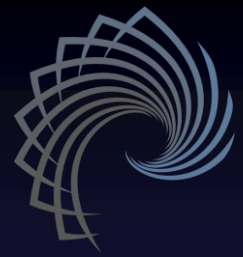
Hawking's "Cosmological" Time

- In his book "A Brief History of Time", chapter 9, "The Arrow of Time", Professor Stephen Hawking referred to "cosmological" time.

- Hawking explained in his book and later in a television documentary about our universe,

- If the matter of the universe expands outward, it is possible it also moves forward in time and

- If the universe contracts, it is possible that the matter of the universe could move backwards in time without our realizing it if our thought processes were also reversed.

- Hawking's explanation is important because it suggests a relationship between matter's direction of motion in space and matter's direction of motion in time.
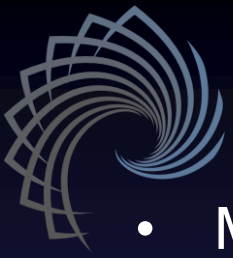
Clarification of Terminology

- Most scientists think of "cosmological" time as covering vast durations throughout the cosmos, ever since and maybe even before the beginning of the cosmos and with *most of* the matter of the cosmos flowing into the future.

- In this sense, "cosmological" time is synonymous with "psychological" time that we all use for organizing the events of life into the past, present and future.

- I'm proposing there is still another form of "time" better used particularly at very small scales to describe how subatomic particles move through time.

- For this presentation, this form of time is referred to as "physical" time.

- This "physical" time is best used when, for example, describing the motion of antimatter through time.

- More on this in the following slides.
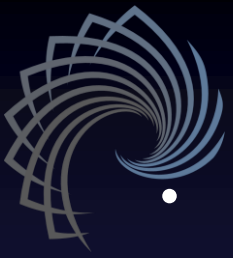
Einstein's Insights into Time

- In 1905, Einstein published his paper *"On the Electrodynamics of Moving Bodies"* *(English translation)*. Einstein introduced the concept that the rate things move through time is not the same for all observers and that it can vary depending on the speed and direction matter moves relative to an observer.

- In his paper, his original math shows that the "*velocity*" of light, rather than the "speed" of light, is the same for all inertial frames of reference. Reference: https://www.fourmilab.ch/etexts/einstein/specrel/www/

- This is actually an important point of his theory, however everyone, including Einstein himself, (*seemed to*)[1] fail to see this distinction and now only refer to the "speed" of light.

- The math indicates the possibility that not only the rate but also the direction of motion in time can vary relative an observer, but everyone ignored this because we all share a sense that things must be continuously moving in the forward direction in time.
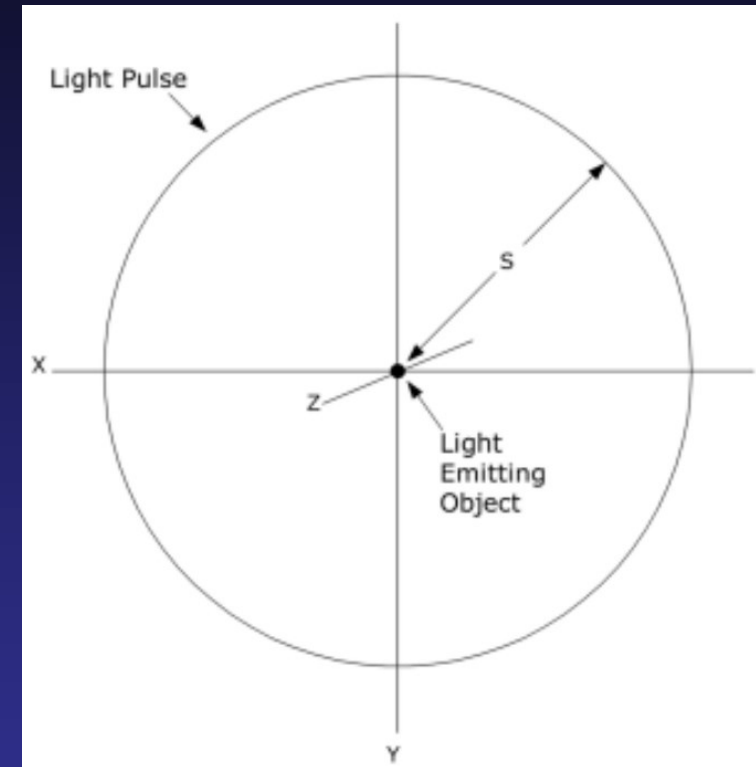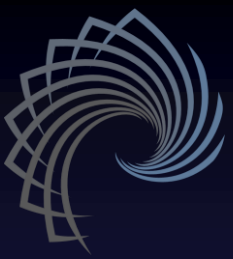
[1] see more on slide 29
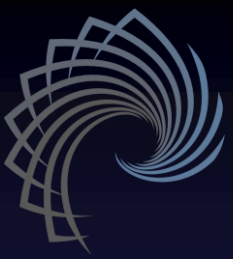
Analyzing Directions in Time in 3-Dimensional Space

- If *s* is the distance a light pulse travels from the origin during time *t* and

- If this arbitrarily chosen coordinate system makes *s* a <u>positive</u> distance and

- If *c* is the velocity a light pulse travels from the origin, and

- If *c* is always constant in any inertial frame of reference, then:

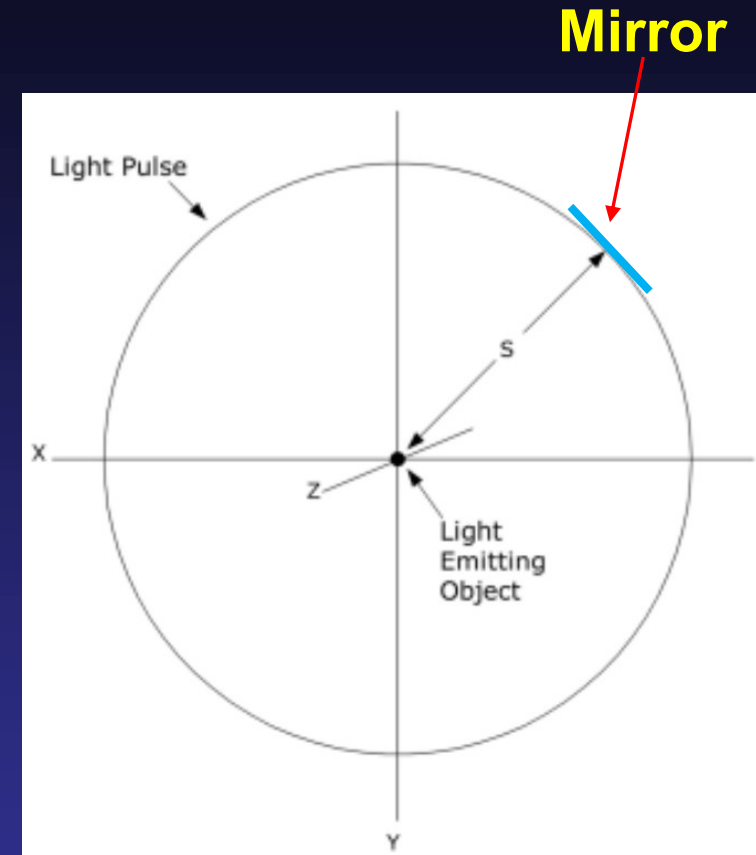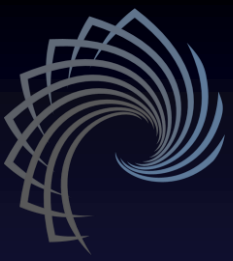- If c = s/t then t = s/c, so the light pulse must have moved in a <u>positive</u> direction in time.

Light Pulse

s

X

z

Light Emitting Object

Y

Mirror

- If we start a new time measurement when the light pulse reflects off the mirror and returns to the origin and

- If *s* is the distance the light pulse travels back to the origin during time *t* and

- If this arbitrarily chosen coordinate system makes *s* a <u>negative</u> distance and

- If *c* is always constant in any inertial frame of reference, then:

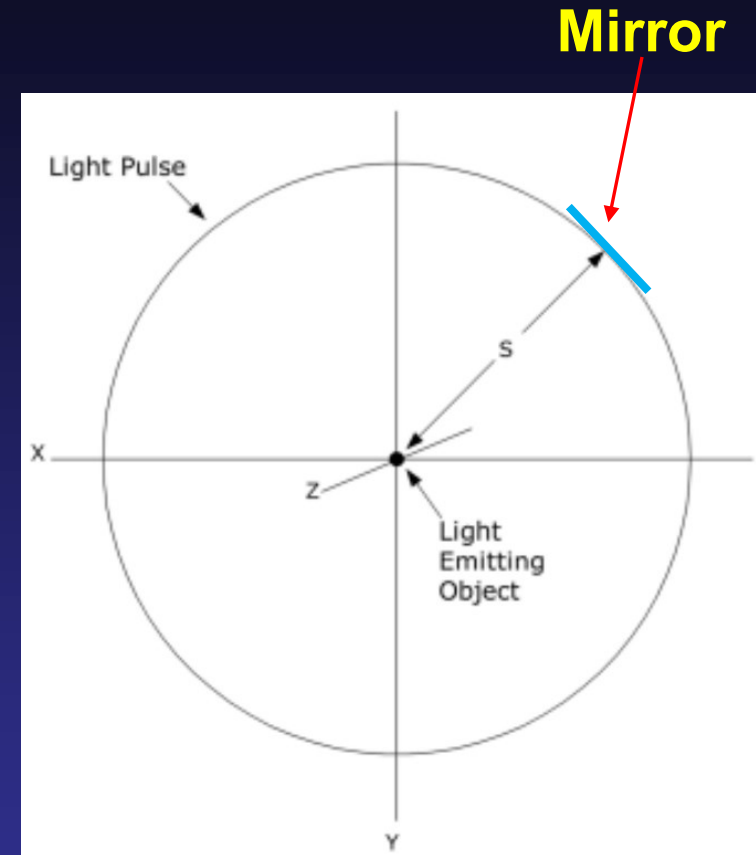- If c = s/t then t = s/c, then the light pulse must have moved in a <u>negative</u> direction in time.

Mirror

- Since the light pulse did not travel into the past of "psychological" time,

- Let's call this version of time: "physical" time.

- Whether this "physical" time is positive or negative depends on the arbitrarily chosen coordinate system.
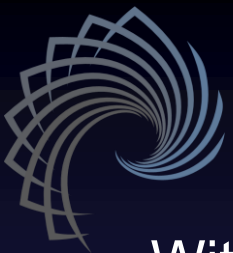

- The velocity of motion through physical space is all relative and

- The velocity of motion through physical time is also all relative.
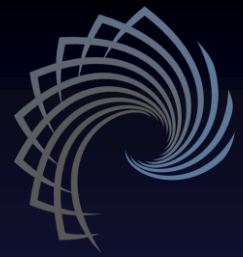
3-Dimensional Vectors in Time

- I don't know how to prove that physical time is 3-dimensional in nature and that it shares the same 3 dimensions as space, but

- Physical time can be represented that way, as follows:

- If $s^2 = x^2 + y^2 + z^2$ and c is the constant velocity of light, then

- If $c = s/t$ then $t = s/c$ and so $t^2 = s^2/c^2$ so then

- Substituting for s^2, $t^2 = (x^2 + y^2 + z^2) / c^2$ and so

- $t^2 = (x^2/c^2) + (y^2/c^2) + (z^2/c^2)$ and so $t = \text{sqrt}((x^2/c^2) + (y^2/c^2) + (z^2/c^2))$

- If we represent these proposed vectors in physical time as follows:

- $t_x^2 = x^2/c^2$ and $t_y^2 = y^2/c^2$ and $t_z^2 = z^2/c^2$ then
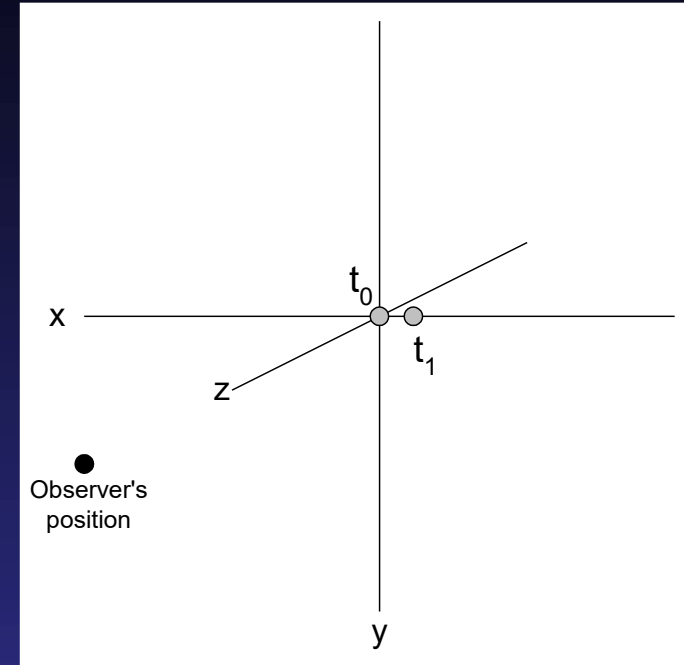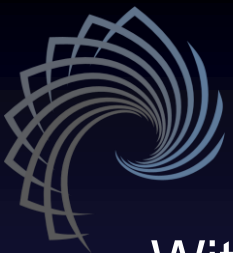
- $t = \text{sqrt}((t_x)^2 + (t_y)^2 + (t_z)^2)$

over explaining aka beating this idea to death

- With $t_x^2 = x^2/c^2$, $t_y^2 = y^2/c^2$ & $t_z^2 = z^2/c^2$ then

- If a far away observer on the z axis observes multiple light detectors along all axes and measures a light pulse moving only in an x direction starting at the origin at t_0, then at t_1 she will measure a total travel time $t = t_1 - t_0$

- If the start & stop positions are very close, and

- with x = the distance traveled in the x direction, and

- with the distance traveled in the y & z directions remaining zero,

- then $t_x = \text{sqrt}((x^2/c^2) + (0^2/c^2) + (0^2/c^2)) = \text{sqrt}((x^2/c^2)) = x/c$ so then

- from the observer's point of view, t_x represents the total time that the light pulse traveled through time while traveling in only the x direction.

over explaining aka beating this idea to death

- With $t_x^2 = x^2/c^2$, $t_y^2 = y^2/c^2$ & $t_z^2 = z^2/c^2$ then

- If a far away observer on the z axis observes multiple light detectors along all axes and measures a light pulse moving only in a y direction starting at the origin at t_0, then at t_1 she will measure a total travel time $t = t_1 - t_0$

x

z

t_1

t_0

● Observer's position

y

- If the start & stop positions are very close, and

- with y = the distance traveled in the y direction, and

- with the distance traveled in the x & z directions remaining zero,

- then $t_y = \sqrt{(0^2/c^2) + (y^2/c^2) + (0^2/c^2)} = \sqrt{(y^2/c^2)} = y/c$ so then

- from the observer's point of view, t_y represents the total time that the light pulse traveled through time while traveling in only the y direction.
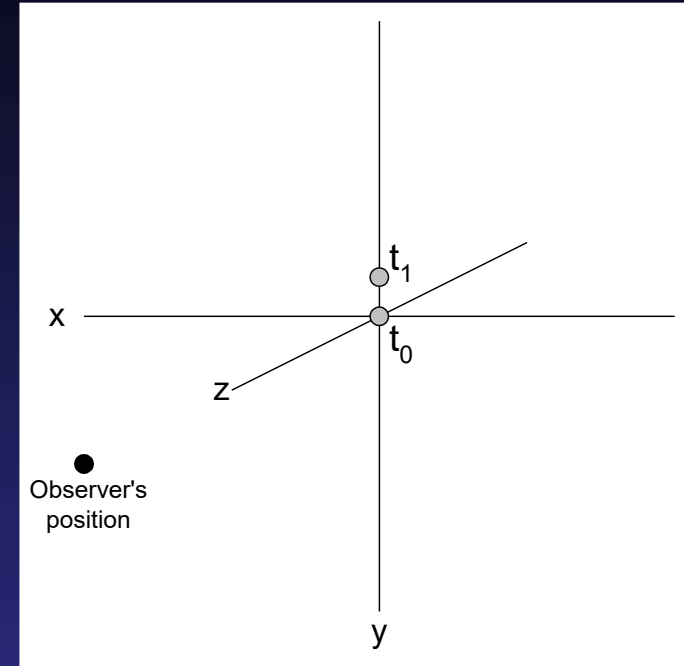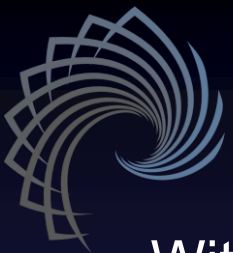
over explaining aka beating this idea to death

- With $t_x^2 = x^2/c^2$, $t_y^2 = y^2/c^2$ & $t_z^2 = z^2/c^2$ then

- If a far away observer on the z axis observes multiple light detectors along all axes and measures a light pulse moving only in a z direction starting at the origin at t_0, then at t_1 she will measure a total travel time $t = t_1 - t_0$

- If the start & stop positions are very close, and

- with z = the distance traveled in the z direction, and

- with the distance traveled in the x & y directions remaining zero,

- then $t_z = sqrt((0^2/c^2) + (0^2/c^2) + (z^2/c^2)) = sqrt((z^2/c^2)) = z/c$ so then

- from the observer's point of view, t_z represents the total time that the light pulse traveled through time while traveling in only the z direction.
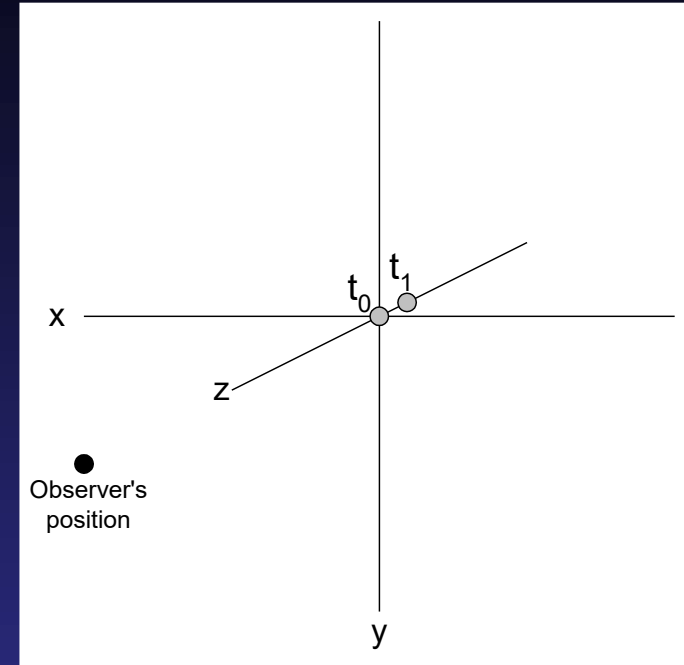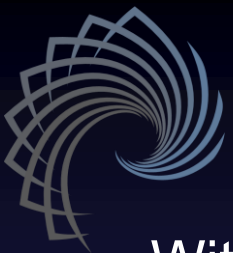
over explaining aka beating this idea to death

- With $t_x = x/c$, $t_y = y/c$ & $t_z = z/c$ then

- In all 3 of the previous instances, if an observer measures $t = t_1 - t_0$ as a positive value and also,

- has the psychological sensation of moving forward through time while taking the measurements but,

- the light pulse moved in a negative direction on any particular axis, then despite the observer measuring a positive value for t_n,

- In physical time, the value of t_n would be a negative value.

- If the light pulse were to move in a direction, relative to the chosen coordinate system, that was negative on all 3 axes, then,

- the correct value for $t = \sqrt{(t_x)^2 + (t_y)^2 + (t_z)^2}$ would be a negative number in physical time.
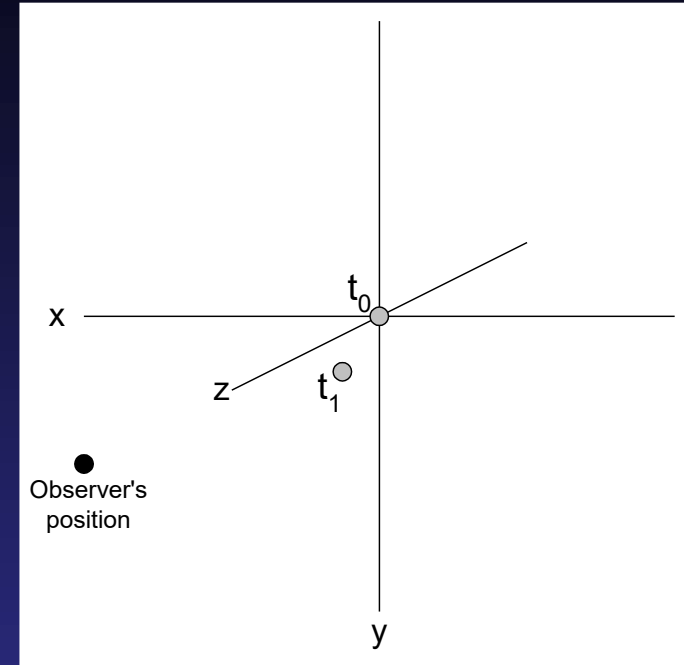
Summarizing Motion of Electromagnetic Energy through Physical Time

- It is only motion of electromagnetic energy through physical space that causes its motion through physical time.

- In flat spacetime, the velocity through both space and physical time remains "c", where c = (distance through space)/(duration through physical time).

- The direction of this motion through physical time is all relative just as motion through space is relative.

- Even when the direction in physical time works out to be a negative value per an arbitrarily chosen coordinate system, still observers of any such motions will sense that they are moving forward in "psychological" time.

- It is my contention that regardless of whether electromagnetic energy moves in a straight trajectory or in a vortex of electromagnetic energy, still it is its motion through space that causes its motion through physical time.
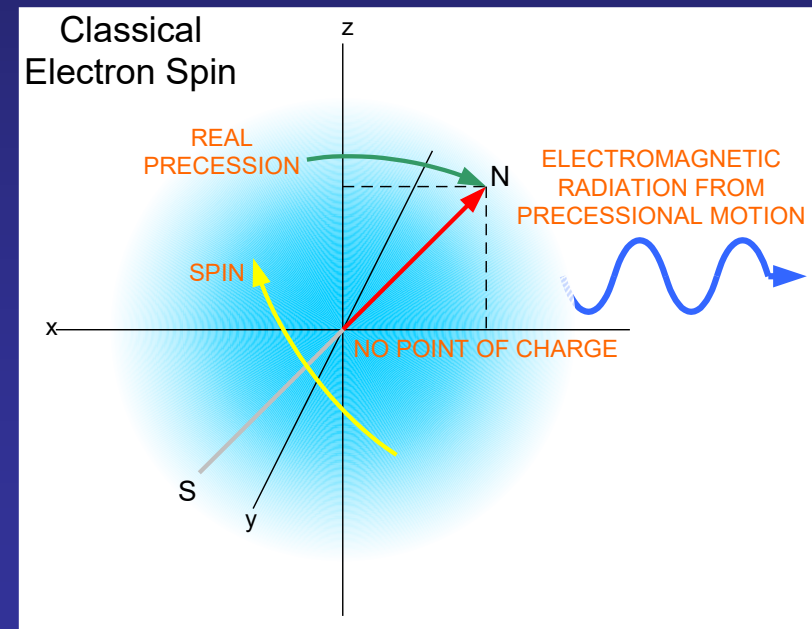
(A brief digression)

- Currently, the classical idea of particle spin has been abandoned.

- Historical assumptions regarding what the classical characteristics of a particle like the electron would be, were later proved to be wrong.

- Rather than adopting a more accurate classical model, a quantum model has been adopted, even though it requires renormalization.

- To understand how matter spins in space and time, it is necessary to explain with a more accurate classical model.

Quantum Electrodynamic Electron Spin

SPIN UP
"AS IF" IT PRECESSES
POINT CHARGE (INIFINITE ELECTRIC FIELD STRENGTH REQUIRING RENORMALIZATION)

Classical Electron Spin

REAL PRECESSION
ELECTROMAGNETIC RADIATION FROM PRECESSIONAL MOTION
SPIN
NO POINT OF CHARGE
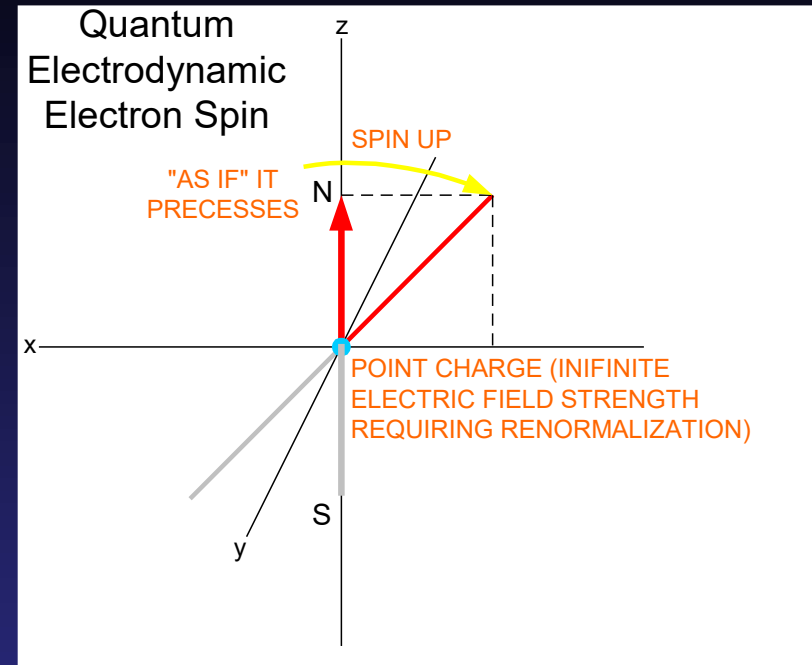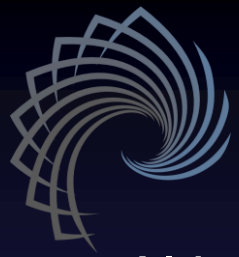
Subatomic Particle Spin in Time
(A brief digression continued)

- Although a classical electron would always be radiating away electromagnetic energy,

- It would also be absorbing electromagnetic energy radiated by all other electrons in the universe.
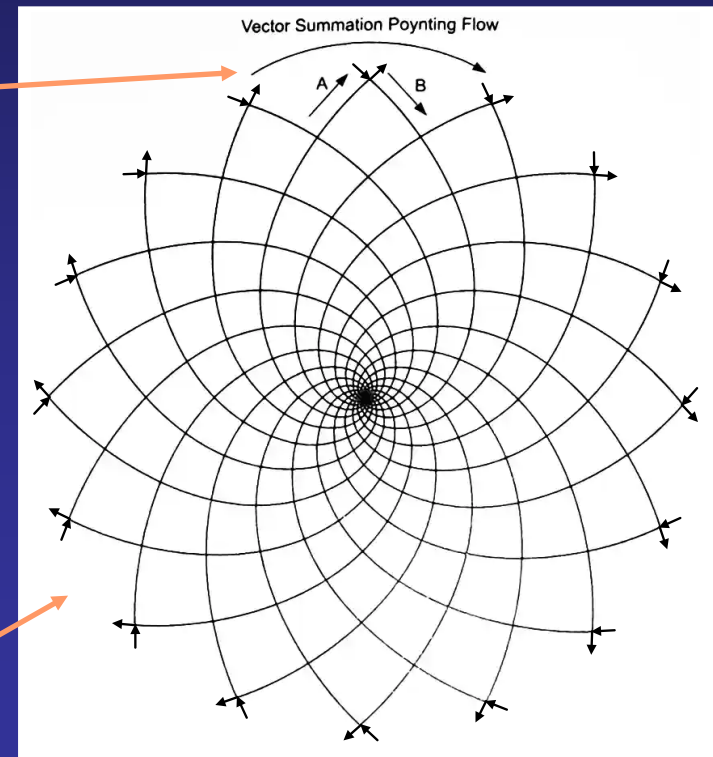
- A classical electron's spin might be the vector summation of both inward and outward flows.

- If the flow in space is what causes its flow in time, then it is possible that no matter how fast or slow the flow, it is faster or slower in its flow through time as well such that regardless, the ratio of space traversed to time traversed remains "c", the velocity of light.

Classical Electron Spin

REAL PRECESSION

ELECTROMAGNETIC RADIATION FROM PRECESSIONAL MOTION

SPIN

NO POINT OF CHARGE

Vector Summation Poynting Flow

Looking down into the real spin axis, not the precession axis
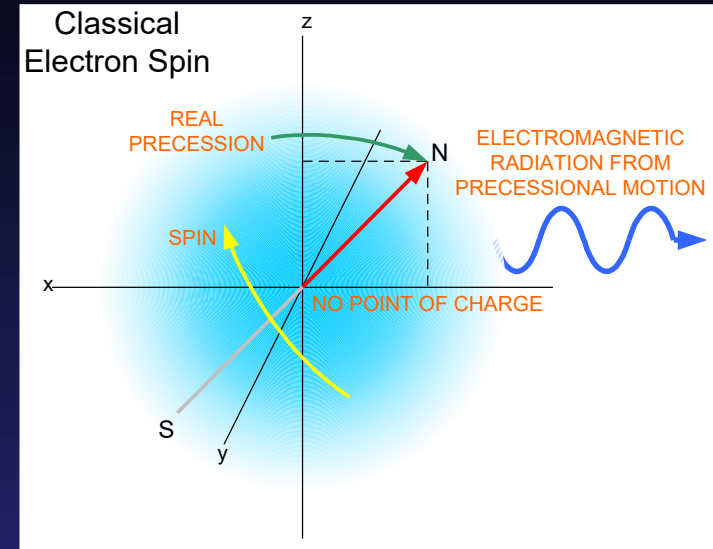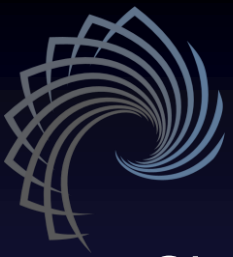
OK, but what exact is spinning?

(A brief digression)

- Short answer: That same stuff that gives space the characteristics of magnetic permeability and capacitive permittivity.

- These characteristics determine the elasticity of space and so also the velocity of light.

- The specific amounts of these characteristics set how fast a compression or expansion of spacetime will propagate.

- The same thing that allows straight line propagation of electromagnetic energy also allows various types of vortex motion of electromagnetic energy (particles).

- The original quaternion version of Maxwell's equations may do a better job of representing this.

ε_0 permittivity of free space $8.85 \, 10^{-12} \, \dfrac{farad}{m}$

μ_0 permeability of free space $4\pi 10^{-7} \, \dfrac{henry}{m}$

$$c = \sqrt{\frac{1}{(\varepsilon_0 \mu_0)}} = 2.99792458 \times 10^8 \, m/s$$
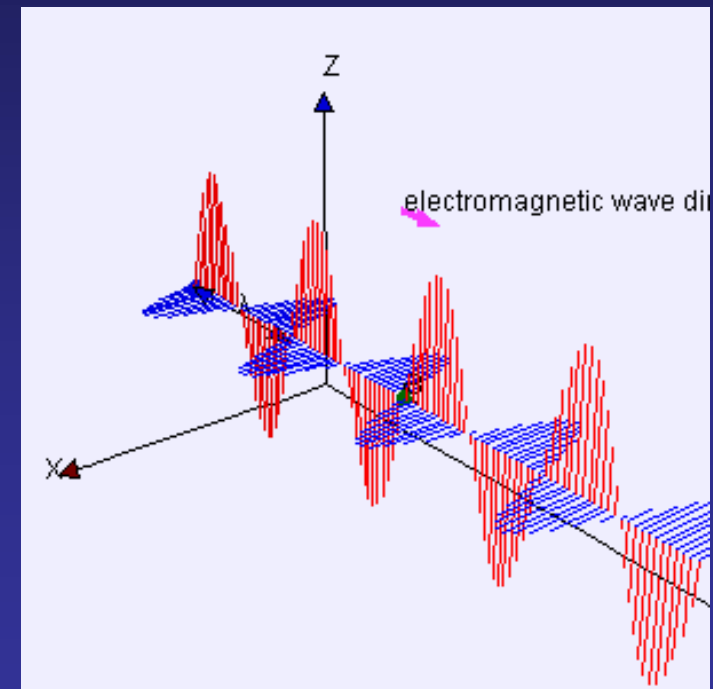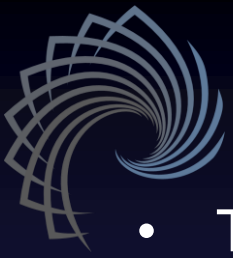
OK, but what exact is spinning?
(A brief digression continued)

- This Wikipedia page https://en.wikipedia.org/wiki/Special_relativity, is incorrect when it says: "*the Michelson–Morley null result (and subsequent similar experiments) demonstrated that the historically hypothesized luminiferous aether did not exist*."

- These experiments only showed that an aether could not be measured by the methods used and with wrongs assumptions as to what the characteristics on an aether would be.

- Scientist had assumed that matter was one thing and aether was a different thing that matter would move relative to.

- But "matter" is just various types of vortices of aether that spin both in space and in time, specifically, physical time.

- People objecting to an "aether" can substitute the word "aether" with: "that which gives empty space the characteristics of electrostatic permittivity and magnetic permeability".

Subatomic Particle Spin in Time

- It is the spin motion, precessional motion, nutational motion, orbital motion and thermal motion of particles that also causes these motions in time.

- Within any arbitrarily assigned coordinate system, each complete spin, precession, nutation and orbit of an electron in space and return to similar coordinates will also cause a return to similar coordinates in physical time.

- Macroscopic motions of matter in physical time are also occurring but mostly, it is the motions of subatomic particles that are responsible for the sensation that things are moving forward through psychological or cosmological time.

- The past and future exist only as concepts in our minds that we use to organize events chronologically in psychological time.

- Memories are stored in our brains by cells made of particles that continuously change in the present while spinning in physical time.

Matter and Antimatter Motion in Time
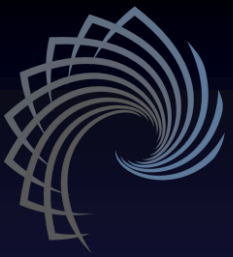
- Feynman is noted for saying a positron is equivalent to an electron that is moving backwards in time.

- In this cloud chamber, as time progresses, both the track of the electron and the track of the positron progress from left to right.

- At the middle and last clock, the electron is said to have traveled into the future to those positions and the positron is said to have come from those positions in the future on its way backward in time to where it meets with the electron on the left.
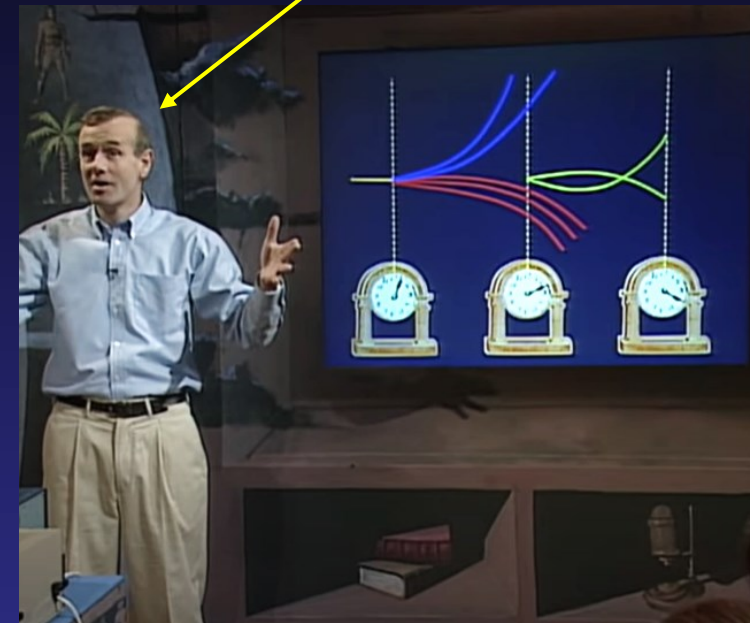
Visualizing Antimatter with Bubble Chambers - Christmas Lectures with Frank Close – YouTube

Famous theoretical physicist
Richard Feynman - Wikipedia

https://en.wikipedia.org/wiki/Antiparticle#Feynman%E2%80%93Stueckelberg_interpretation

- If we try to interpret this in psychological time, with a past, present and future, it causes causality issues because something would have had to make the positron be at the correct position and trajectory in the future to start its motion in time into the past to just happen to be in the right place to meet with the electron.

Visualizing Antimatter with Bubble Chambers - Christmas Lectures with Frank Close – YouTube

- If we interpret this in physical time, there is no past and no future, just different positions in time correlating to different positions in space but all in the present.

https://en.wikipedia.org/wiki/Antiparticle#Feynman%E2%80%93Stueckelberg_interpretation

- The clocks measure the matter of the clocks spinning and moving in time from microscopic spin, precession, nutation, orbital and thermal motion in time plus the macroscopic motions in time of the clock internal parts. Only relative motion in space causes motion in time.
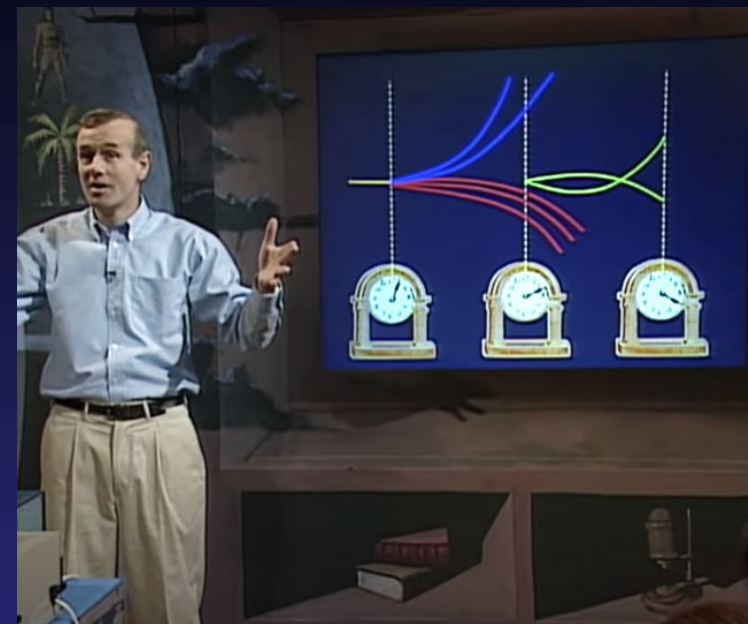
Antimatter Spin in Physical Time

- Similar to the trajectories of a positron versus an electron in a magnetic field are explained on the previous slide,

- Those portions of the flow of an electron that have spin in a positive physical time direction with positive spin in space, are reversed in physical time for a positron.

Vector Summation Poynting Flow

- For a positron, the flow is now going in a negative flow direction *in physical time* with a positive flow direction in space.

- With a positron, the inward and outward flows are curving in the opposite directions through the magnetic field of the center.

Vector Summation Poynting Flow

- Side note: The trajectories of these curves is somewhat similar to the electron's and positron's curved trajectories through a magnetic field of the top diagram.

- The spin, precessional and nutational motions of matter and antimatter particles are cyclical in physical time and in physical space and,

- Since these motions are all relative anyway, lets call a positive spin direction in physical time, the direction that all electrons in the universe are spinning, precessing and nutating as they exchange electromagnetic energy with each other.

- Classically, they must radiate and absorb electromagnetic energy from their precessional and nutational motions and if they are in orbitals in atoms, then from orbital motions also.

- So then, a positron's opposite spin direction in physical time would be the direction in which its cyclical motions in physical time are in the opposite directions of an electron but still remaining synchronized with the electromagnetic energy exchanges among all positrons and electrons by their mutually radiated and absorbed electromagnetic energy.

I know this all needs more diagrams and explanation, but I'm limited it time for this presentation.

Representing Motion in Physical Time

- Please review the presentations "Spinwave Technology" and "A Link between Electromagnetism and Gravity" to help understand these concepts better. As any particular charged particle spins and precesses, its North end will be swinging around to positions that are most aligned with South fields arriving from all other particle spins in the universe, especially from more local matter.

- This is just like any particular spin within a spinwave except now they are harder to detect because they are part of a universal sea of standing waves.

- So, for antimatter, like a positron, its North end ought to align to South fields similar a North end of an electron dipole but its vector in time would be in the opposite direction.

- Possibly, light and all frequencies of electromagnetic energy can propagate through space with a time vector in physical time that is aligned against the direction the energy propagates through space, but it could be hard to detect the difference.

- If we use the equation from slide 10 to represent motion through time: $t = \sqrt{(x^2/c^2) + (y^2/c^2) + (z^2/c^2)}$,

- Then "t" can be a complex number with values for "t" having a real component and an imaginary component. Many physicists already use the term "imaginary time"; however, I'm not sure if this explanation of an imaginary component to motion in physical time translates exactly to how other physicists use this term.

- If the direction of propagation in space, of any particular portion of electromagnetic energy, is in exactly the same direction as its motion in physical time, or exactly opposite, then its direction in physical time will be a real number with no imaginary component.

- But if the motion through space of a particular portion of matter or electromagnetic energy is, for example, directly in the x direction and if "t" has an imaginary component, then it means the direction it propagates through physical time is partially in the x direction but skewed or warped partially into the y and/or z direction also.
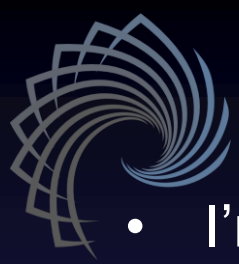
- I'm not sure I'm putting the idea across correctly.

- Maybe another way to say it, "c" should be a real number for matter and a real number for antimatter, however if matter (or energy's) motion in physical time is neither in phase nor 180 degrees out of phase with its motion in space then the resultant "c" will be a complex number with an imaginary component.

- If electromagnetic energy propagates through space that is warped, twisted, expanded or contracted then "c" may not remain constant and then it becomes difficult to solve the equation for "t" when "c" is not constant. There become too many unknown variables. In any case,

- I am postulating that we can see particles of matter spinning in space and physical time that have real number vectors in the "t" direction, (exactly aligned with or against motion through space).

- But if the direction in the "t" direction is skewed enough, we might not be able to see or interact with that matter anymore.

Cyclical Phase Angle of Motion in Physical Time versus Space

- Again, referring to this equation from slide 10 to represent motion through time: $t = sqrt((x^2/c^2) + (y^2/c^2) + (z^2/c^2))$,

- And referring to the cyclical spin, precessional and nutational motions of particles in physical time versus in physical space, if the directional vector in physical time is in the same direction as its motion in physical space, we can call that a 0-degree phase shift in time versus space.

- For antimatter, it would have a 180-degree phase shift in its cyclical motions in physical time versus space.

- In both cases, "t" would be a real number without any imaginary component.

- I'm contending that the cyclical phase of motions of matter in physical time can be twisted or warped into other phases in physical time versus or relative to their motions in physical space.

What Einstein may have known:

- Remember on slide 6, Einstein "seemed to" not see the significance of "c" being the velocity of light rather than just the speed of light? There was strategic value in keeping this secret.

- I am contending that either Einstein or government scientists figured out the significance and then they started promoting the math and idea of using just the "speed of light" in future published physics research.

- There was once a secret project called "The Philadelphia Experiment", with a goal of making matter invisible on RADAR, Except the popularized "Philadelphia Experiment" might have been a disinformation champaign to cover actual experiments that were somewhat similar but not the same.

- But any actual experiments with invisibility never transported matter to other locations in cosmological or psychological time, only to other spin and precessional phases in physical time.

- I am also contending they realized a few other things from these experiments as detailed on the next slide.

5/26/2023

29

Other Phases in Spacetime

1. When matter is slightly shifted in phase in how it spins and precesses in time versus space, then it can pass through matter that is not shifted in phase. John Hutchison in Canada has also done experiments that demonstrated this, causing pieces of wood to be interleaved with steel at the atomic level.

2. If matter is shifted in phase enough to become invisible, matter does not become isolated in the universe, rather there is already lots of other matter at those shifted phases and for this other matter, among all of it, relatively speaking, it is still all in-phase with itself, just as all matter in our universe maintains itself as in-phase from its continuous exchange of energy that maintains a sea of standing waves.

3. I'm contending we live in a multiverse, not just a universe and that travel to and from other "phases" in spacetime is possible.

4. I am contending a very compartmentalized portion of the world's military-industrial complexes already have these capabilities.
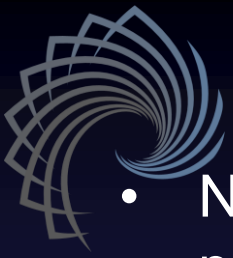
Other Frequencies in Spacetime

- Not only can the phase be shifted in how matter and energy propagate through time versus space, but also

- A continuously shifting phase in time versus space, is equivalent to the matter and energy existing at different fundamental frequencies relative to the matter of our universe.

- There is the possibility that existence of finer matter at higher frequencies is fundamentally superior compared to here and life that has advanced technologically enough to travel to universes of matter at higher frequencies may find life there better than here.

- This is still regarding the motions of aether as waves and vortices of various kinds all at many different phases and frequencies.

- Universes at higher frequencies in the aether are not the same as "heaven".

- I'm guessing that many, extremely large, droplets of aether, each making up its own isolated multiverse, would appear as stars in the sky on the way to the lowest region considered "heaven".

# Visitors from other Phases and Frequencies in Spacetime

- It theoretically should be possible to travel to other phases in spacetime, i.e., other universes; however,

- I have not seen any _verifiable_ evidence that life, like Big Foot, etc. from close alternate phases sometimes wanders into our phase.

- I have found no _verifiable_ evidence that we have been visited by ETs.

- Every lead I track down regarding technologies based on a better understanding of time, are all pointing to secret projects by humans.

- Private citizens as far back as the 1920s have been inventing things that can be explained with a better understanding of how matter and energy move through time.

- New insights and technologies are being kept from the public by a few key players in the military-industrial complexes of the world.

- Humans are keeping their own new technologies secret from humans for the benefit of very few and to the extreme detriment of everyone else and the whole planet.
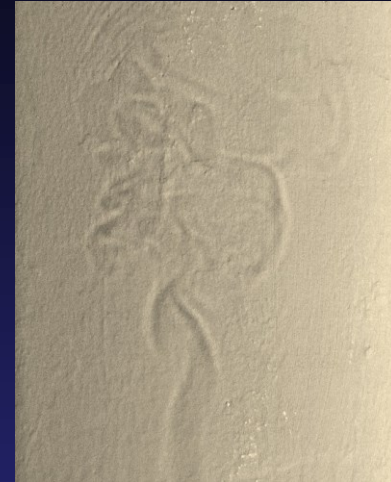
Entropy and Time's Arrow

- The direction we all travel in cosmological or psychological time is often defined as that direction in which overall entropy increases, in other words, hot things and cold things tend to move towards equilibrium.

- Side note: A positive direction in psychological time might also be defined as that direction for which we have no memories and a negative direction in psychological time would be that direction for which we do have memories.

- Entropy is something experienced and measured in cosmological or psychological time; however, it occurs while matter and energy move in all directions in physical time.

- While spinning and moving in all directions in physical time, things tend to become more random in cosmological or psychological time.

- This is mostly due to rectilinear interactions since rotational interactions of electric or magnetic dipoles tend to move to more ordered states.
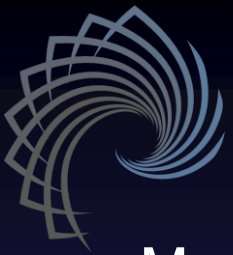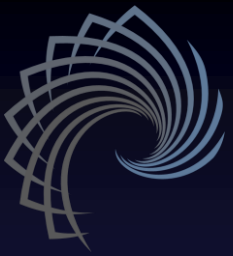
Unleashing Maxwell's Demon

- Many so called "free energy" devices have been reported to become colder during operation.

- In one case, the electrical output was briefly shorted and had frost at the sight of the short.

- Many years ago, a television documentary about UFOs did a detailed analysis of a particular UFO photo.

- The UFO was stationary when the photo was taken even though there was a slight breeze.

- The scientists analyzing the photo found there was a trail of refracted air coming off to the side of the UFO, like from a candle or a hot car's surface on a cool day.

- However, this trail had a downward trajectory indicating a trail of cooled air coming off the surface of the UFO.

- How is entropy reversed? How is time flow reversed?

example from a candle

- Is there a connection between antimatter and the phenomena of "free energy" devices getting colder during operation?

- If electromagnetic energy is reflected by the induced motions of charged particles of antimatter, does it also get reflected at least a small amount in a negative phase in physical time relative the cyclical phase that "normal" matter is spinning and exchanging energy in physical time?

- When "normal" matter interacts with antimatter (i.e. matter spinning in the opposite direction in physical time), then all the matter and all the antimatter's energy converts to electromagnetic energy.

- Does "free energy" arise from interactions between "normal" matter and matter that spins only slightly in a different cyclical phase in physical time?

- This needs more research.

Torsion Fields

- Within physics, the subject of "Torsion Fields" could and should be a completely legitimate field of study and research,

- However, this field is currently saturated with disinformation, pseudoscience, wrong math and wrong information.

- There is the possibility that this is not by accident.

- Those people within the military-industrial complex who have already developed technology in this field do not want anyone else to make progress in this field.

- It is up to major universities to present legitimate research and terminology related to "torsion fields" and to call out anyone and everyone spewing out disinformation regarding "torsion fields".

- This may also relate to the Electromagnetic tensor, which is a valid term and study of it may best be done in quaternion math as Maxwell used originally.

Summarizing the Nature of Time

- The idea of time as being a 4th dimension with things moving from the present into the future is not correct and in fact, there is no actual past or future to travel to.

- This form of time is just a "psychological" perception and concept of how things move through time.

- To understand the physics of our universe and our multiverse, it is better to measure motion of matter and energy in "physical" time.

- At the subatomic level, particles have repetitive or cyclical relative motions in physical time, going both + and – in x, y and z directions.

- Antimatter's motion in physical time is also cyclical and better described as a 180-degree phase shift relative to normal matter's motions in time rather than a continuous motion into the past.

- New technologies are possible based on a better understanding of how matter and energy move through physical time.

THE END

- In case this is not clear already, it might be possible that electromagnetic energy can move faster or slower through both space and physical time all while maintaining the same ratio of "c", the velocity of light.

- Regarding atomic interactions among matter within an electromagnetic rotating reference frame.

- It might be possible to create this change of both while "c" stays the same

- Two 90 degrees out of phase lasers could be used or similar with microwaves or lower frequencies.

- This ought to change the size of the matter, yes?

- https://news.mit.edu/2017/faster-way-make-bose-einstein-condensates-1123
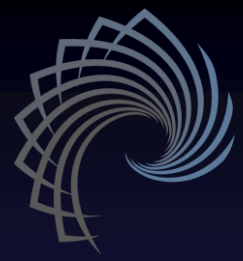
Clarification of slides 11 through 14
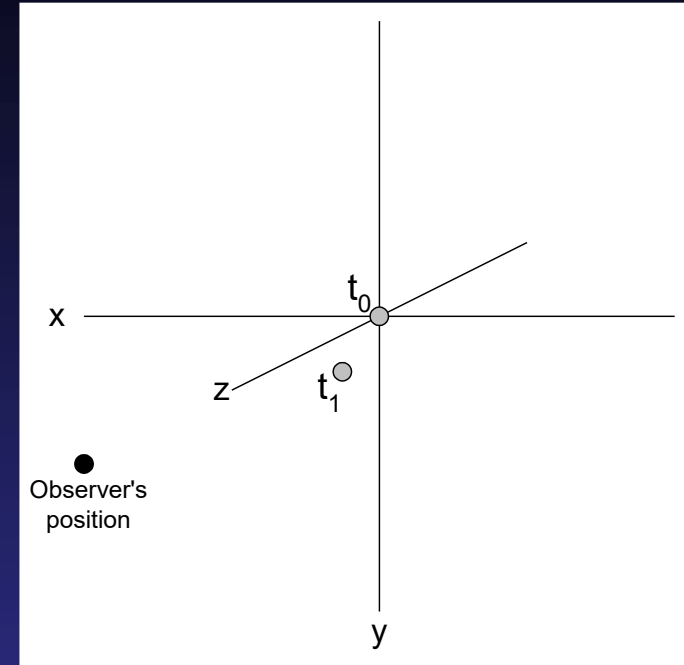
- In the back of my mind, I knew I needed more clarification at the time of slide creation but ran out of room for more text and forgot to add it later anywhere else, but;

- In this thought experiment, please assume that the observer's position does not matter because the light pulse sensor at the t_1 position of each slide uses an electrical cable *(not shown)* to the observer's measurement equipment and every cable from every light sensor of each slide is of equal length.