INTERGALACTIC AND TIME TRAVEL VIA BLACK HOLES POSSIBLE BECAUSE E=mc^2 CAN TRANSFORM INTO (E=0) + (m=c^2)

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Abstract -

For many years, I dismissed the idea of intergalactic and time travel via black holes as science fiction. Then one day, I started playing around with E=mc^2 to see what else could be done with it. One of the results fits in with modern ideas in physics and mathematics. And there seems to be an emphasis here on references to Stephen Hawking. So I have to say thanks for changing my mind, Drs. Einstein and Hawking.

Content -

CONVERTING EINSTEIN

E=mc^2 is, of course, Albert Einstein's famous equation relating energy, mass and the speed of light [Einstein, A. (1905) - "Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?" ("Does the inertia of an object depend upon its energy content?" - Annalen der Physik 18 (13): 639-643].

Let's represent the masslessness of photons, and also the masslessness of the theoretical gravitons, by zero. Should theories developed from Einstein's 1919 paper regarding mass^ be proven correct one day ie that mass results from photon-graviton interaction, we can replace the m with zero. This results in E=0*c^2 ie outside familiar circumstances, it is possible for E to equal 0. Having reduced the equation to nothing but E, m=0 and c^2=0 which means m=c^2. At first glance, m=c^2 seems to be saying mass exists at light speed. But the absence of E (energy) refers to there being no interaction of electromagnetic energy and gravitational energy,

and therefore no mass. If mass cannot be produced, mass-producing space-time/gravity must be described by zero.

^ Albert Einstein's "Spielen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle?" (**Do gravitational fields play an essential role in the structure of elementary particles?**), Sitzungsberichte der Preussischen Akademie der Wissenschaften, (Math. Phys.), 349-356 (1919) Berlin.

WHAT'S A BLACK HOLE?

The zeroness of space-time/gravity does not mean they don't exist. They obviously do. It means we can appear to relocate matter and information superluminally, or travel into the past and future, because distance equals zero and can be eliminated from both space and time. A supernova blows off gaseous material before exploding - forming a slower moving, cooler shell^^. Travelling at light speed, gravitational and electromagnetic radiation from the blast slams into that material. The temperature allows the gravitons' energy to interact with the photons', producing mass in the form of dust i.e. dust particles condense in the shell. Waves from deep space produce graviton-photon interaction, forming collapsing clouds from which stars form. If there's no interaction (possibly as a result of temperatures), no matter is created and there is no cloud of gas and dust. A black hole – formed of gravitational waves and electromagnetic waves - could result.

^^ Gall, C.; Hjorth, J.; Watson, D.; Dwek, E.; Maund, J. R.; Fox, O.; Leloudas, G.; Malesani D.; DayJones, A. C. "Rapid formation of large dust grains in the luminous supernova 2010jl". - Nature, Volume **511**, Issue 7509, pp. 326329 (17 July 2014). It was published online on July 9, 2014 (http://www.nature.com/nature/journal/vaop/ncurrent/full/nature13558.html)

A couple of paragraphs ago, it was shown that m=c^2 when E=0: that is, when no interaction of electromagnetic energy and gravitational energy

exists eg in the temperatures of black holes. This means space-time/gravity equals zero, which doesn't mean that black holes' gravitational effects are diminished but that distance equals zero. The absence of distance (in time as well as space) inside black holes makes them potential tools for time travel [Morris, Michael; Thorne, Kip; Yurtsever, Ulvi (1988). "Wormholes, Time Machines, and the Weak Energy Condition". Physical Review Letters 61 (13): 1446–1449].
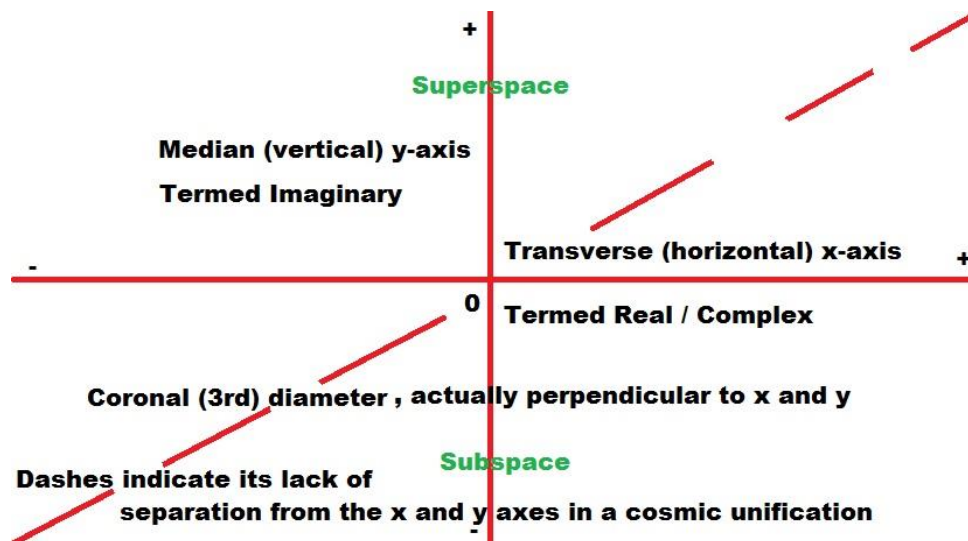
ERIC and SUSY (Entangled Real-Imaginary-Complex and SUperSymmetrY)

Visualize space-time as defined by a horizontal diameter, a vertical diameter, and a third diameter that's perpendicular to both of these (see diagram below). These represent the cardinal directions gravitational waves can travel. One direction along the horizontal axis corresponds to going forwards in time and is called "real". The reverse direction along the horizontal axis corresponds to going backwards in time and is called "complex". The vertical axis represents the "imaginary time" described by the imaginary numbers of physics. The terms real, imaginary and complex come from the corresponding numbers in maths. And the 3rd diameter may allow sideways movement in time* - to complement forward motion in time, backward motion, and up-down movement in imaginary time.

*Visualize the diagram below as a 3-D horizontally-oriented crystal block interlocking with a vertical block of equal volume. Then "sideways" time is not separate from, but unified with, the x and y axes. It does not represent a 6th space dimension but is merely extension of space-time's axis, as well as of the imaginary and complex hyper-spacetimes**. Only 5 space dimensions can exist – along with real time, imaginary time and complex time.

** This unreal, negative hyperspace may be home to what is called Dark Matter, which is invisible and can only be detected gravitationally. One way of determining if dark matter belongs to a higher dimension would be to

measure its gravitational effects in space dimensions (see "A Brief History of Time" by Stephen Hawking – Bantam Press 1988, pp. 164-165). In three dimensions, the gravitational force drops to 1/4 if one doubles the distance. In four dimensions (4th-dimensional hyperspace), it would drop to 1/8 and in five dimensions (5th-dimensional hyperspace) to 1/16. The positive direction on the x-axis (representing the 3 space dimensions of real space-time) is in continuous contact with the negative direction on x (the 5 space dimensions of complex space-time). Therefore, real gravity is perpetually amplified by complex gravity. Using Professor Hawking's figures, the amplification equals ¼ x ¼ ie doubling the distance in 5 space dimensions causes gravity to become 1/16 as powerful. Alternatively, the gravity's strength is reduced 4 times and this number is multiplied by another 4 to reduce it 16 times overall. It is not ¼ x -¼ since numbers have the same property regardless of direction on the Complex Number Plane (they increase in value). To conserve this property, the second one must be +¼ if the first one is +¼. In the 4 space dimensions represented by the imaginary axis, this y-axis is half the distance (90 degrees) from the real x-axis that the complex x-axis is (it's removed 180 degrees). So gravitational weakening from doubling distance in 4 space dimensions = (reduction of 4 times multiplied by another reduction of 4 times) / 2, for an overall reduction of 8 times to a strength of 1/8.

[Superspace is regarded in particle physics as the outcome of the theory of supersymmetry (SUSY) which relates the two classes of elementary particles – bosons (force-carrying particles) and fermions (particles of matter).

This article relates bosons to fermions through binary digits and the Mobius strip. Translation into matter could be via photons of electromagnetic waves and gravitons of gravitational waves being disturbances in electromagnetic and gravitational fields. These disturbances are known as virtual particles and are equivalent to energy pulses. Some photons can be detected as electromagnetic waves, those that can't be directly detected by a particle detector are called virtual photons - this example using photons unites the former (energy pulses) with the latter (fluctuations in a field): "A Brief History of Time" by Stephen Hawking; Bantam Press 1988, p.69 - also,"The Grand Design" by Stephen Hawking and Leonard Mlodinow; Bantam Press 2010, p.113). The virtual particles thus produce the pulses of energy that produce the binary digits of 1 and 0 that encode pi, e, $\sqrt{2}$ etc. Since never-ending numbers are built into the universe; space and time could stretch infinitely in every direction, as well as eternally into the past and into the future. Our observable universe would be finite in extent and age. The literally infinite beginnings and endings of the infinite number of "sub"universes would be equivalent to the universe-as-a-whole possessing no definable beginning or ending. Matter particles [and even bosons like the Higgs, W and Z particles] are given mass by the energy of photons and gravitons interacting in 'wave packets' (interaction within this term from quantum mechanics results in wave-particle duality). You have to go around a Mobius strip twice to arrive at your starting point - and matter particles have quantum spin described as ½, which means they must be turned through two complete revolutions to look the same ("A Brief History of Time" by Stephen Hawking – Bantam Press, 1988, pp.66-67).

In this article, superspace is the aggregate of all the spaces and includes sub-, real, and complex space. The world's largest and most powerful particle collider, the Large Hadron Collider (LHC) on the France-

Switzerland border, has found no evidence for supersymmetry thus far and some physicists have decided to explore other ideas (Ellis, John: "The Physics Landscape after the Higgs Discovery at the LHC": 14 April 2015: arXiv:1504.03654)]

UNREAL COMPUTERS, IMAGINARY SPACESHIPS AND COMPLEX UNIFICATION

Even if a computer operated continuously for billions of years in imaginary time, its final calculations would be retrieved instantly after the problems were entered into the computer because no period at all could elapse in our "real" time - a computer working in complex time delivers results at any desired point in the past. And a spacecraft using imaginary time, but "real" space, could fly to Mars or a galaxy many billions of light-years distant without any time elapsing in real time. The craft (though macroscopic) is in 2 places at once viz the beginning and end of its journey. It would necessarily also be at every point between the start and finish. Suppose all the mass, electromagnetism, gravitation etc in space, and time, forms a Unification*. Then, what could prevent the craft from being at - being quantum entangled with - every point in space (actually, spacetime) at once?

*The gravitational field can create electromagnetism, and their interaction produces matter (along with its short-range strong and weak nuclear forces). Step 1 can be described this way - gravitational waves may be called quadrupole because they vibrate in 4 directions: up-down, side-to-side, forwards-backwards, and in time (the progress of the first 3 motions which, in a cosmic unification, are entangled with past and future motions). Then the wave is split into a dipole electromagnetic wave - possibly by quantum gravitational lensing, whose non-subatomic-scale counterpart can split the image of an astronomical object into several images. Viewed in a snapshot of space (as stationary), the EM wave only vibrates in two directions: the up-down of one component, and the side-to-side of its other component (the components are electrical and magnetic). The smallest excitations of electromagnetic and gravitational waves - the photon and the

theoretical graviton - could then interact in Erwin Schrödinger's "wave packets" to give matter Wave-particle Duality. Another way of looking at the split is: when Einstein penned E=mc^2, he used c to convert between the mass units in space and the energy units of mass moving through space ie of time (c^2 refers to an observer co-moving with … moving in a similar fashion, or along with … a light beam and its velocity). The conversion number is 90,000,000,000 (light's velocity of 300,000 km/s x 300,000 km/s) which approx. equals 10^11. Gravity waves with a strength of 10^1 are, via quantum gravitational lensing, concentrated 10^24 times after they're focused to form matter (to 10^25, weak nuclear force's strength - giving the illusion that a weak nuclear force^ that is not the product of gravitation exists). Waves are magnified by the matter's density to achieve electromagnetism's strength (10^36 times gravity's strength) i.e. 10^25 is multiplied by Einstein's conversion factor [10^11] and gives 10^36 (this gives the illusion of the existence of electric and magnetic fields that are not a product of gravitation). (The gluons that bind mesons would likewise be either products of gravitation or, like quarks#, replaceable by the more fundamental 1's and 0's.) After absorption by atoms, the depleted remnant of the gravity waves is re-radiated from stars, planets, interstellar gas and dust, etc. It's radiated as gravitational waves (a Gravity Wave Background, challenging the idea that Cosmic Inflation was necessary to generate gravitational waves) which have lost most of their energy or strength during formation of forces (returning to a strength of 10^1). Since gravity can produce electromagnetism, it's also radiated as all types of electromagnetic waves – including an infrared background whose heat output exceeds that of the stars alone, in addition to a microwave background. The latter challenges the idea that existence of the cosmic microwave background proves the universe began with the traditional Big Bang.

^ Remember, this is only one example: the so-called weak force's strength isn't constant and varies with distances [more info in "The Strengths of the Known Forces" by theoretical physicist Matt Strassler [May 31, 2013] -

http://profmattstrassler.com/articles-and-posts/particle-physicsbasics/the-known-forces-of-nature/the-strength-of-the-known-forces/

"It is certainly possible that some alien beings ... would make the same experimental observations that we do, but describe them without quarks." [Stephen Hawking, Leonard Mlodinow – "The Grand Design" – Bantam Press, 2010, p. 49]. So I'm going to turn into that book's alien being and describe observations without quarks, but with a more basic quantum process that says space and all particles are, ultimately, composed of virtual particles and bits and maths. (Interpretation of particle tracks in a detector might cause them to be misidentified as caused by actual particles called quarks, instead of as being the result of virtual particles producing digital patterns that imitate the properties of quarks.)

A NEW SPACE-TIME (TO BLACK HOLE OR NOT TO BLACK HOLE)

If the spacecraft is entangled with every point in space-time at once, one of those places would be inside any specified black hole, making it unnecessary to try and enter the hole in the traditional manner of a spacecraft flying into it. In this particular case, the entanglement with every point in time – a variation on time travel – is used to enter a black hole and utilize it for ... time travel. Using time travel for the purpose of time travel is obviously unnecessary, but it does demonstrate the possibility of black holes in this regard. It appears that being in the black hole means real space is used – and the lack of distance in time means imaginary time is employed. It also appears that entanglement with every point in space (time's permanent partner) might be used to enter black holes and utilize them for intergalactic travel. Again, using black holes for intergalactic travel is unnecessary if you're already entangled with every point in space-time. But if you're not entangled, and have another means of entering the hole, it could be used to get you somewhere else in the cosmos. Being in the hole means real space is used, and also means there's no distance. Maybe this lack of distance (in space-time, both in space and time) means imaginary time can be used with the coordinates of navigation to instantly arrive in the Virgo cluster of galaxies (the centre of the cluster is 54 million light years away), or anywhere else in the universe. Maybe the no-distance principle can be extended from the black hole to Virgo via cosmic

unification/entanglement, just as entanglement is capable of deleting distance between explorers on Earth and the black hole. Perhaps the real space/imaginary time combination is, to borrow a word from science fiction, known as subspace.

Even without entanglement, it may be possible to enter a black hole without being shred into long, thin pieces – a process called spaghettification, and caused by the black hole's tidal forces. The relatively insignificant gravitational forces associated with Earth push your head and feet down without any noticeable difference, though the difference does exist. Experimenters have shown that a clock on the ground floor of a building 25 metres tall runs more slowly than one near its top, and attributed the difference to gravitational effects ("The Cosmos", a 1988 book in the series "Voyage Through the Universe": Time-Life Books Inc., p.50). Assuming you fall feet first - the extreme gravitational waves associated with a black hole push your head towards the hole with tremendous force but are vastly magnified in the 5 or 6 feet between one end of you and the other. This results in your feet being much, much closer to the black hole's centre and you become a long, thin strand of "space-ghetti"☺

At http://www.huffingtonpost.com.au/entry/neil-degrasse-tyson-black-holes-video_n_5480837.html?section=australia, astrophysicist and cosmologist Neil deGrasse Tyson says on November 6th 2014, "We think there are ways where you can survive your trip through a black hole on a very special pathway into it," he said. "The equation of the black hole that comes to us from Einstein, the general relativity equations, tell us that a whole new space-time opens up inside that black hole -- in the future history of your life." So we might be able to fly into black holes and use their "whole new space-time" (things like subspace and imaginary time?*) for intergalactic and time travel.

*Imaginary time partly developed from Relativity. From Special Relativity, actually - but General Relativity developed from the Special Theory, as Albert Einstein's ideas about uniform motion grew into ones about

accelerating motion. And if this article is correct; subspace is connected to, and part of, imaginary time.

THE COSMOS AS QUANTUM COMPUTER (SUPERPOSED 1 + 0 = 0)

When distance is eliminated, more than the space between objects is deleted (this allows intergalactic travel). Space within objects can be deleted, too (permitting a singularity to have zero size – and also producing a qubit, where 1's and 0's are superposed and turn the cosmos into the ultimate quantum computer). Therefore, removing distance easily unifies everything in space-time into one thing: a product of the gravitational field. All past and future universes are entangled with the present universe (is this the real meaning of the word "multiverse"?)

$E=mc^2$, when viewed as $E=0$ and $m=c^2$, also supports this article's earlier statement that gravitational ripples can proceed in the 'reverse' direction along the horizontal axis (not in so-called 'real' time, but in 'complex' time)." This is because $m=c^2$ can only create 0 (the deletion of distance in black holes, which are entangled with the cosmos) if either m or c^2 represents a retarded wave travelling forward in time – and the other (again, either m or c^2) represents an advanced wave travelling backward in time. "Physics of the Impossible" by Michio Kaku (Penguin Books, 2009) states on p.276, "When we solve (19th-century Scottish physicist James Clerk) Maxwell's equations for light, we find not one but two solutions: a 'retarded' wave, which represents the standard motion of light from one point to another; but also an 'advanced' wave, where the light beam goes backward in time. Engineers have simply dismissed the advanced wave as a mathematical curiosity since the retarded waves so accurately predicted the behavior of radio, microwaves, TV, radar, and X-rays. But for physicists, the advanced wave has been a nagging problem for the past century." Albert Einstein's equations say gravitational fields carry enough information about electromagnetism to allow Maxwell's equations to be restated in terms of these gravitational fields. Therefore, gravitational waves also have a "retarded" wave and an "advanced" wave. They can travel forward or backward not only in space, but in time too. Believing

matter results from gravitational-electromagnetic interaction means matter can also go back and forth in time.