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Gravity, Light, Quantum Computing and New Methods of Deep Space Exploration

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Abstract

Physicists speak of and describe the nature of "causal spaces" in physics: This work recognizes an unrecognized "causal space" or set of "causal spaces" in the nature of space-time and gravity: send a stream of particles at the speed of light ahead of a spacecraft or space vessels travelling through space, and, given the nature and potential of quantum information and quantum computing, program instructions on the particles travelling at the speed of light to spark an explosion at a specific time interval of light-years ahead of the spacecraft; the stream of particles travelling at the speed of light ahead of the spacecraft would thus have instructions to explode or spark an explosion, such as in or near an energy or fuel source like a nebula, that would generate a gigantic mass large enough to shrink space and pull stars and planets, and even possibly galaxies, toward the gigantic mass triggered by the explosion. Thus, space shrinks, and the distance required by the spacecraft to travel across the universe to particular stars, planets, solar systems, or galaxies reduces or shrinks. This strategy of space exploration is also the opposite or an opposite of all previous models of space exploration.

Keywords: Gravitation; Light; Quantum computing; Alternative energy; Deep space exploration; Opposites

Introduction

Physicist and philosopher Roger Penrose speaks of the geometry of classical physics, and the 20th and 21st century emergence of the geometry of space-time as involving the classification, identification, and recognition of "causal spaces" in physics [1, 2-13]. This work thus recognizes a completely unrecognized "causal space" or set of "causal spaces" in the nature and geometry of classical physics and astronomy, the nature and geometry of space-time (and, consequently, the nature, geometry, and engineering of quantum information and space travel): sending a laser stream of light ahead of a spacecraft, space vessel, or space vessels travelling through space, and, given the nature of and potential of quantum information and quantum computing, program instructions on the light to explode or spark an explosion at a specific time interval of light-years ahead of the spacecraft travelling in space; the laser stream of particles travelling ahead of the spacecraft at the speed of light would thus have instructions to explode or spark an explosion, such as in or near a energy or fuel source like a nebula, that would generate a gigantic mass large enough to shrink space and pull stars, planets, solar systems, and even possibly galaxies toward the gigantic mass triggered by the

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explosion. Thus, space shrinks, and the distance in space-time required by the spacecraft or space vessels to travel across the universe to particular stars, planets, solar systems, or galaxies reduces or shrinks; this strategy of space travel, instead of attempting to develop spacecraft that would travel at speeds at or near the speed of light, attempts to use the forces of physics, gravity, energy, and the potential of quantum computing for programming instructions on photons or particles of light, to generate an explosion or explosions light years ahead of a space vessel or vessels traveling in space that would be large enough to pull stars, solar systems, and possibly galaxies in the direction of the spacecraft or space vessels that sent the stream of particles ahead of the spacecraft or space vessels. Since it involves shrinking space or distances across space-time (creating shorter distances in the future) instead of attempting to build space-craft to travel at or near the speed of light across the established distances of the past, this strategy of space exploration is also the opposite or an opposite of all or virtually all previous models and theories of space exploration.

New Methods of Deep Space Exploration: Basic Concepts & Simplified Model:-

- Spacecraft.
- Light emitted by spacecraft programmed to spark explosion at a timed interval.
- Nebula or large fuel source or energy source identified by spacecraft light years distant from spacecraft.
- Light programmed at timed interval to spark gigantic explosion at large fuel or energy source.
- Massive explosion light years away from spacecraft pulls objects in the direction of the spacecraft, such as stars, solar systems, and planets.

Materials and methods: theory (including reviews of earlier Models of Space Travel and Exploration)

"Beam Me Up, Scottie!" is a popular line from the film and television series on interstellar space travel, Star Trek, in which the characters are able to instantaneously or near instantaneously travel to different space locations and planets by a kind of particle-deconstruction-reconstruction or transference that teleports the individual or individuals to different starships, space locations, or different planets. On the Star Trek series, the teleported individual to a new space location, planet, or different starship is the particle reconstruction or transference of the same identical individual, with the same memories and personality of the individual character or characters of the Starship Enterprise. Thus, the teleported individual or individuals are not clones of the individual or individuals from the Starship Enterprise, but are the identical characters with the same memories and personalities of the individuals that are transported from the Starship Enterprise to different space locations, including different planets and terrestrial locales of the planets.

From the standpoint of the philosophy of science, this is also an interesting way of distinguishing between clones and identical: A clone is not necessarily an identical person with the same memories and personality characteristics of the individual person that is cloned, even if the clone was a genetic identical to the earlier person; however, in the Star Trek model of interstellar teleportation or interstellar space transference, the identical individual with the same memories and memories of social interactions is teleported instead of, say, a clone of an individual being recast or teleported to a new space location, different spacecraft, or new planet. In Ursala Le Guin's short story on cloning and space exploration, Nine Lives, a group of 10 clones are part of a space mission. The clones are portrayed as cooperating with each other and performing group tasks at a higher skill level than individuals and groups that are not products of cloning. The clones form a primordial social group, socialize together, and share personality characteristics. Thus, the clones are not identical with identical memories, identical previous experiences, and identical personality characteristics. It is possible to consider another model of cloning, different than producing or transporting identical, and different than producing and transporting clones under Le Guin's model of a primordial social group performing similar and related tasks together. That is, it

is possible to clone an individual with a large set of potential talents in the sciences, arts, and engineering, and then raising the clones to go or enter different specialties in the division of labor of cultural, economic, and engineering production; that is, raising and rearing the different individual clones to go into or enter particular scientific specialties or fields within the sciences, particular engineering specialties, or the arts and performance, or also possibly specialties in business (such as the technology sector and computer science, or other business areas such as banking, finance, insurance, construction, or transportation). In this model the clones with potentially heightened talents across many different fields might be raised to enter particular fields or specialties within the cultural, economic, and scientific division of labor. Presumably, this model of cloning is or would be useful for colonizing other planets by heightening or increasing the capabilities and performance of different functions within and across the division of labor of scientific specialties, engineering and technological specialties, the arts and entertainment, and business specialties. Successful space colonization would imply moving or re-constituting the division of labors of large, complex societies to other planets and solar systems. Since Sci-Fi portrayals of physical reality including space travel and exploration are comparable to "thought experiments" in physics, I also shall discuss another set of models of space travel and exploration in science fiction stories and films: Compared to Star Trek's teleportation model, another model of space travel and exploration is the Star Wars franchise of movies and spinoff novels: the vehicles travel faster than the speed of light; that is, the Millennium Falcon or other space vehicles are able to dispel contemporary laws of physics (in which light travels faster than any other wave or particle). The Millennium Falcon and other starships are able to accelerate through "hyperspace," and thereby evade threats such as incoming Imperial Starships or interstellar bounty hunters. By accelerating to "hyperspace" and traveling faster than the contemporary laws of physics would allow, the Millennium Falcon and other starships are able to traverse distances in space faster than the speed of light; thus, instead of a spaceship such as the Millennium Falcon requiring years to travel to particular planets, stars, or solar systems (the Alpha Centauri star is closest to the earth at 4.2 light years, the center of the Milky Way galaxy 27,000 light years, and the Andromeda galaxy 2.5 million light years), the Millennium Falcon is able to traverse similar distances in a few minutes or hours. (I acknowledge that earlier science fiction portrayals of space travel before the Stars Wars franchise of films involve space travel and exploration faster than the speed of light; however, I use the example of the Millennium Falcon and the Star Wars franchise of films and novels for the simplicity of the example). Since the Millennium Falcon is able to traverse light years in a few minutes or hours using the science fiction of "hyperspace," the science fiction of Star Wars' "hyperspace" is more exciting than the contemporary laws of physics (by which light travels faster than any other wave or particle).

Overview of earlier models of space travel, including Sci-Fi portrayals of space travel:

- Spacecraft, rockets travelling through space at high speeds to specific positions or locations in space-time;
- Spacecraft travelling faster than the speed of light;
- Teleportation of individuals and objects through space time;
- Spacecraft disappearing and jumping through holes in the fabric of the universe and reappearing in other positions or locations in space-time.

The at once famous and infamous science writer Arthur C. Clarke has inspired physicists with his statement, "the only way to discovering the limit of the possible is to venture a little way past them into the impossible." In a similar way, rocket scientist and former NASA employee Werner von Braun has stated of physics and engineering: "I have learned to use the word 'impossible' with the greatest caution."

Results: new models of interstellar space travel and exploration

In this short correspondence, I introduce another potential model or models of interstellar space travel that may be useful for science (and also the visualization and portrayal of space travel and exploration in science fiction stories, franchises, and films). The counter-intuitive idea is to send a laser stream of particles at the speed of light ahead of a spacecraft travelling in space; given the potential capacity of quantum computing, it is in principle possible to program or direct information on the photons or particles that would travel at the speed of light ahead of a given spacecraft travelling in space; the potential for quantum computing is sometimes discussed as a means for continuing "Moore's Law" in computer science and computer technology; however, since the nature of computing is programming instructions, another horizon for quantum computing is programming instructions on electromagnetic spectra that may travel at the speed of light; (this also suggests that the direction of the design of more powerful lasers is not necessarily to build more power lasers that might knock down doors or knock down other sizeable or massive objects, but to program instructions on light or other electromagnetic spectra to 'instruct' or 'tell' matter and energy what to do, like programming instructions on light or other electromagnetic spectra to spark explosions, at a timed interval of a specified number of light years ahead of spacecraft that released or emitted the light or other electromagnetic spectra); In this section I split the model into four related models of space exploration, with the first model being a model of the absolute potential for programming instructions on photons and electromagnetic spectra to generate explosions at timed-intervals (ahead of a spacecraft), and a related simpler model for programming instructions on photons or electromagnetic spectra travelling ahead of a spacecraft that, at a timed interval light-years ahead of the spacecraft, would trigger or spark an explosion in or near a energy or fuel source such as a nebula; thus, given the potential for quantum computing and quantum information to program instructions on photons or possibly other electromagnetic spectra that may be distributed ahead of a spacecraft travelling in space, there is the capacity for the stream of particles travelling ahead of a spacecraft or space vessels to trigger an explosion into a giant mass at a timed interval of light years ahead of and away from the spacecraft that would be large or massive enough to pull stars, planets, solar systems, and, in principle, galaxies towards the exploded mass, thus shrinking space for space travel and exploration across the universe; (this strategy in effect implies the capacity to program instructions on light or electromagnetic spectra to explode into a mass equivalent to a star or large star, thus suggesting the possibility of programming the instructions on light or electromagnetic spectra to trigger nuclear explosions in space and the energy and mass required to generate a large star with the mass large enough to pull objects towards the new star, including planets, stars, and solar systems); moreover, a related and technologically simpler strategy would be for the laser stream or laser streams of light photons travelling ahead of the spacecraft or space vessels to be programmed to trigger or spark an explosion at a timed interval of light years that may explode in or near a large nebula or mass of gas that may provide the fuel and energy for a large explosion, large enough to generate a massive object that would pull stars, planets, solar systems, and, in principle, galaxies towards the massive object; thus, this strategy also would shrink space required for travel across the universe (this strategy in effect implies the capacity to program instructions on light or electromagnetic spectra to spark an explosion in or near a nebula of gas that might provide the energy and mass to generate a new mass or new star large enough, in principle, to pull planets, stars, and solar systems towards the new massive object, thus shrinking space for space travel and exploration across the universe). Two other related strategies of space exploration include (TABLE 1):

- programming instructions on light or electromagnetic spectra travelling at the speed of light to travel light-years ahead of a spacecraft, and, at a timed interval, to in effect re-program stars to increase their energy and mass, or

- re-program stars to explode. (Note: Models of Deep Space Exploration may vary in their complexity; however, the models still may have greater potential and scientific realism than, say, "Dyson spheres," i.e., attempts by construction companies to build gigantic structures around stars that are supposed to harness light and energy from the stars, and that are large enough not to melt or be destroyed from the heat of stars: Osmanoz comments that designing Dyson spheres for neuron stars may be unrealistic because "the Dyson construction" would have to be "unrealistically massive" and "cannot be considered seriously" [14,15]

TABLE 1**. New methods of deep space exploration: simplified model**

Forces, principles involved	Light, quantum computing	Energy, fuel source	Light, energy, mass, quantum computing	Gravity, Light, Quantum computing,
Spacecraft	Light emitted by spacecraft programmed to spark explosion at a timed interval	Nebula or large fuel source or energy source spacecraft light years distant from spacecraft	Light programmed at timed interval to spark gigantic explosion at large fuel or energy source	Massive explosion light years away from spacecraft pulls objects in the direction of the spacecraft, such as stars, solar systems, and planets

Discussion: the philosophy of opposites on how to shrink space for deep space exploration, or new causal models of gravity-space time and space exploration

Elon Musk has written and given press conferences on techniques and strategies available for space exploration to Mars, the Moon, and space exploration to planets within our solar system. **How to address the problem or problems related to Deep Space Exploration beyond our solar system?** My work addresses the problems of Deep Space Exploration in new ways: send a stream of light photons or other electromagnetic spectra at the speed of light ahead of a spacecraft or space vessels, and, given the potential of quantum computing and quantum information, program instructions on the light photons or electromagnetic spectra to spark or detonate an explosion, such as at or near an energy or fuel source such as a nebula, at a timed interval light years ahead of the spacecraft that would generate a mass large enough to pull stars, planets, solar systems, and possibly galaxies in the direction of the spacecraft or space vessels that released the light photons or electromagnetic spectra light years earlier. Additional variations on this model are given in the previous section. I have thus introduced potential causal models of space travel and exploration that shrink space instead of attempting to design spacecraft that travel near the speed of light (or that travel much faster than the speed of light, as in science fiction portrayals of space travel that dispel the contemporary laws of physics). As discussed, physicist and philosopher Roger Penrose speaks of "causal spaces" in the geometry of physics: that is, that the geometry of classical physics, and the 20th and 21st century emergence of the geometry of space-time, involves the classification, identification, and recognition of "causal spaces" in physics. Thus, this work recognizes a completely unrecognized "causal space" or set of "causal spaces" in the nature and geometry of classical physics and astronomy, the nature and geometry of space-time (and, consequently, the nature, geometry, and engineering of quantum information and space travel): sending a stream of particles at light speed ahead of a spacecraft, space vessel, or space vessels travelling through space, and, given the nature of quantum information and quantum computing, programming instructions on the light to explode or spark an explosion at a specific time interval of light-years ahead of the spacecraft travelling in space; the stream of particles at light speed travelling ahead of the spacecraft would thus have instructions to explode or spark an explosion, such as in or near a large nebula, that would generate a gigantic mass large enough to

shrink space and pull stars, planets, solar systems, and even possibly galaxies toward the gigantic mass triggered by the explosion. This shrinks space, and shrinks the distance in space-time required by the spacecraft or space vessels to travel across the universe to particular stars, planets, solar systems, or galaxies. From the point of view of gravity space-time, the distance in space-time between the future and the past shrinks. Moreover, this strategy of space exploration is the opposite, or at least an opposite or set of opposites, of all previous models and theories of space flight and exploration, i.e., using the forces of physics, energy, and the potential for quantum computing to program instructions on photons or electromagnetic spectra travelling at the speed of light to generate new causal spaces that reduce distances between stars and galaxies and shrink space (creating distances of the future) instead of attempting to build spacecraft that travel near or at the speed of light across distances of the past. (There is another possibility for generating gigantic explosions in space, though these 'in principle' possibilities may be more difficult than using nebulae or supernovae as potential fuel or energy sources for generating gigantic explosions in space: Penrose and Floyd, and, more recently, Comisso and Asenjo, suggest that it may be possible to extract energy from spinning black holes: thus, in principle, the energy released from black holes also could be used as energy sources to trigger large explosions in space; however, as suggested, this may be more difficult to using nebulae or supernovae as energy or fuel sources) [6,10]. This paper thus describes a new model or set of models of interstellar space travel and exploration, and a new causal model or set of causal models of space travel; thus, it is a new model or set of models of interstellar space travel that may generate intellectual property for space exploration. Theoretical physicists N.S. Kardashev and V.S. Strelnitskij have suggested that a way of potentially ranking civilizations in the universe would be to rank civilizations by their capacity to extract, exploit, or generate energy at the level of nearby stars and galaxies; this new model or set of models of space travel and exploration in principle suggests related ways of ranking civilizations: rank civilizations by their capacity to generate or create new stars, such as from from remnant masses in the universe, i.e., nebulae of gas or from giant gaseous planets (space explorers might seek to generate new stars in desolate areas of the universe that might require new stars to provide light and energy for new or pre-existing solar systems); or, rank civilizations by their capacity to shrink space for space travel and exploration to stars and solar systems in a universe in which, as Edwin Hubble discovered, galaxies are separating from each other at accelerating rates [16,17].

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Statement

"The author declares no conflict of interest."

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