

Time travel using hole teleportation

Essay written for the FQXi contest on the Nature of Time

Constantin Leshan

s. Octeabriscoe, r-l Singerei, Rep. Moldova

E-mail: leshan_c@yahoo.com

For time travel using hole teleportation we must create a very complicate “digital” force field around body in order to forbid its teleportation in space and enable teleportation in time. Hole teleportation is a sole method able for teleportation of matter in space and time travel because this method envelop a object with absolutely impenetrable surface which cuts all causal and physical interactions with environment. For this reason, all other methods create paradoxes at time travel; for example through wormholes objects from past and future can interact gravitationally due to appear many problems with conservation laws, causality violation and so on. There is description of a real experiment of Time travel/teleportation of nucleus.

Context:

1. The definition of Time Travel (teleportation in time).
2. The hole theory of time travel; there are three fundamental steps for travel in time.
3. Hole Teleportation successfully avoids the most part of paradoxes at time travel.
4. Classical and quantum explanation of Time Travel, using hole teleportation theory
5. Time travel and teleportation of matter using Bohr complementarity principle or wave-particle duality.
6. The description of the real experiment for time travel/teleportation.

1. Definition. Time Travel (teleportation in time) is the movement of objects or elementary particles from one moment of time to another without existence in the intervening time interval. In other words, Time Travel is a disappearance of object in one time and reappearance in another, without existence in the time interval between these events.

2. The hole theory of time travel; there are three fundamental steps for travel in time

Imagine we want to travel in the time, for example to send a human in the future. A human’s body interacts gravitationally and mechanically with (**present**) environment – Earth and atmosphere. Every second billions of air atoms interact with his body, billions of photons from the Sun heats the body and vice versa, the human’ body continuously emits the thermal radiation into environment. Thus, a human body interacts very intensively with **present** environment (Earth, Sun, and atmosphere). Nevertheless, in the future, we want to send a human, there is other (from future) Sun, Earth, atmosphere. Logically thinking, the human cannot interact simultaneously with objects from past and future. For example, it is physically impossible for him to interact simultaneously with the past and future atmospheres because gas atoms needs space. If the body interacts with present atmosphere, it excludes interaction with future atmosphere. Besides these atmospheres, have different temperature and pressure. Thus if we want to send a human in the future, first we must isolate a human from our “present” environment. For this purpose, we need the best isolation material to construct an isolated chamber for time traveler. Well, we can isolate this man from our atmosphere, Sun’s light and Earth’s magnetic field. However, remains interaction with Earth’s gravity, neutrino and high-energy radiation that penetrates through all known materials. Our technology today cannot shield the gravity and neutrinos. There is a single solution to use a hole teleportation technology: we must envelop a human with a closed hole surface, consisting of vacuum holes. It is a perfect isolation able to shield even gravitation and neutrinos, because fundamental fields and particles cannot propagate through a hole, since a hole is a total absence of space and time.

Besides hole spheres hide all macroscopic characteristics of bodies as the shape, mass, the number and position of compound atoms, physical interactions between compound particles. Therefore, all bodies enveloped by the hole spheres look as unstructured identical elementary particles. It allows using quantum laws and entanglement for time travel.

Thus, **the first step** for time travel is absolute isolation from environment. The time traveler enveloped by a hole surface does not interact with his environment (from present) and is ready to interact with future (or past) environment.

The second step for time travel: we must send a human outside of finite universe. Since matter cannot exist outside of the universe, object must reappear instantly in the real universe, in a random point of space. Such displacement satisfies to definition of teleportation because object disappears in one place and reappears in another without traveling through intervening space. In hole teleportation the first and second steps coincides because the procedure of creation of closed hole surface simultaneously creates absolute isolation and send a body outside of universe.

The third step for time travel: we must forbid teleportation in space in order to allow teleportation in time. Usually at hole teleportation object appears in another place, it is teleportation in space (if such place exist); Thus we must create conditions in order to exclude all places where object can reappear. Therefore, if an object cannot appear in space, it will travel in time. Because object cannot reappear on its start position (because inside of hole sphere cannot exist matter). And object cannot reappear neither in the start place (hole sphere) nor in any another place. In this way, we exclude teleportation in space and enable teleportation in time. To do this, we must notice: After the disappearance of body, it would reappear in a place that did not violate the energy conservation law. The potential of the force fields must be the same at the both points otherwise we would have a "perpetuum mobile" that would be have energy arising from nothing. For example, body disappears from the surface of Earth and reappears at altitude of 100 m above the Earth. Then when body falls and work has occurred then all of the processes are repeated. Therefore body could only appear in a place where such a processes was not possible. Thus, the transmitter and receiver of matter must have the same parameters of force fields, for teleportation in space.

All things considered, for time travel I propose to create around a body a very complicate digital electric or magnetic fields. For example, we create around object the picture "In the Woods» by electric or magnetic fields. In this way, we create the unique place with unique force fields in the Universe. Therefore, if we send an object outside of Universe, it cannot appear in other place with similar force fields because such place does not exist in the Universe. And object cannot reappear in the start place because matter cannot exist inside of hole sphere (outside of the universe). Since object cannot appear in space, it will travel in time. Notice that our force fields must be **unique** in universe and **weak**. Because Sun's electric and magnetic fields are very strong. Therefore, the probability that inside of green sphere 1 - 100 parsec exist another place with the same force fields (electric or magnetic "picture") is equal to zero.

The main difference between past and future is the rate of cosmological expansion. The spacetime metric changes over time in such a way that the spatial dimensions appear to grow or stretch as the universe gets older. At cosmological metric expansion, the distances between every two points on Earth increase. It is imperceptible in our everyday life but it is the cumulative effect due to during a long time the objects and force fields changes. Here I want to underline that local observer cannot measure this effect because its body and measuring devices changes in the same proportion. The difference between object's size in the past and future appears at time travel only. Therefore the same body may have different sizes in the past and future. We can use this effect in order to travel in the past or future. In this way, if the object cannot appear in space today, it may appear in the past or future because the force characteristics of destination place changes in time due to cosmological expansion, solar storms and vacuum fluctuations. Besides, during the journey Earth move near other stars and galaxies, this may change all the force fields in the destination place.

The direction of time travel (in the past or the future) depends on the start conditions at hole teleportation. If we want to travel in past we must find ways to contract all distances on start place (including a object and teleporter) before teleportation because in the past cosmological expansion was slower and all objects has the smaller sizes. To do this, we must create the generator of holes, because

holes able to contract distances. In contrast, for time travel in the future we must expand a body because universe is expanding at an accelerating rate.

Thus, by selecting the start conditions we may travel in the past or future using hole teleportation. For travel in a very deep future, over one million years, we must increase the velocity of traveler because he traverses the cosmologically big distances and must account the cosmological expansion.

3. Hole Teleportation successfully avoids the most part of paradoxes at time travel

In order to travel in time we must find the technological methods free of paradoxes, without violation of the laws of nature. The hole teleportation successfully avoids the most part of paradoxes arising at time travel.

3.1 Let's begin with energy conservation laws. Imagine that a human was teleported through a time interval equal to one year, in the past. Thus, we have the two copies of one human at the same time that is violation of conservation laws. Hole teleportation successfully avoids that problem because it use **inversion** [1, 2].



Figure 1 show teletransportational inversion. At hole teleportation appears a number of closed hole surfaces which exchange the matter between them.

According to theory [1, 2], at hole teleportation appears simultaneously a number of closed hole surfaces which exchange matter between them. For example inside of sphere A is a human (70 kg), and inside of sphere D is a rock (70 kg). At inversion, human and rock exchange its position due to human appears in sphere D and rock appear in sphere A. It is necessary to underline that according to theory, hole surfaces may appear suddenly and grasp a matter without any “permission”. It is spontaneous natural teleportation. Hole surface effectively “cuts” instantly a volume of space and carry away all inside bodies. At the same moment the vacant place occupies another closed hole surface with other matter inside. Therefore, the conservation laws survives if one closed hole surface send a human from present to past, and another closed hole surface appears in past, cuts a volume with equivalent matter and send one to present time. In result, the conservation laws remain intact at time travel, because hole spheres send, for example 70 kg of mater from present to past, and 70 kg matter from past to present.

3.2 The open tunnel paradox

The open tunnel paradox appears in the most time travel theories because they allow interaction with environment. Let's analyze time travel by wormholes [3]: “Keep one of the mouths stationary. Move the other mouth -- at speeds approaching that of light -- away from the stationary mouth for a distance of a few light years. Then return it to the vicinity of the stationary mouth. Anyone who now enters the stationary mouth will be transported years into the future. Those entering the other mouth will find themselves transported years into the past. For shorter time jumps, shorten the journey of the traveling mouth.”

If a human beings can repeatedly travel unharmed in a short time through such wormhole, such shortcut will be also transparent for fundamental fields as gravity. Imagine that a distant star from past

interacts gravitationally with our Sun through wormhole. It will destabilize the orbits of planets and change the Sun's trajectory. Moreover wormholes change the structure of all galaxy. It violates conservation laws and Einstein's principle of locality, because stars and galaxies able to interact quickly with distant objects and with its own copy.

Imagine that one mouth of wormhole appear near Sun (point A) and another near Pluto (point B). Since points A and B coincides or are very close through wormhole, the Sun's gravitational potential in the points A and B is the same. It means that near Pluto appeared another star – another Sun. The Sun begin gravitational interaction with its our copy - another Sun, that is violation of conservation laws. How can the Sun change its speed or momentum by interacting with itself?

This paradox is not possible in hole teleportation because the start and finish volumes have an absolute hole isolation one from another. Fundamental fields as gravitation cannot propagate through a region where extension and time properties tend to zero due to hole surface able to shield even gravitation. Closed hole surface cuts all object's causal and physical interactions with environment. Other time travel methods cannot create such absolute isolation from environment; therefore hole teleportation is the main method both for teleportation and time travel.

3.3 About causality violation at time travel

The causality principle states that a cause must always precede its effects in every reference frame, it is one of the most fundamental laws of physics. But causality violation appears at the travel in past only, but not at travel in the future. Therefore time travel by hole teleportation is possible, at least for travel in the future. It may be important for sick people, which look for a future medicine or for the computers fans to receive a computer from the future. Stephen W. Hawking proposed the chronology protection conjecture, stating that physical laws do not permit the appearance of closed timelike curves. He reasoned, why have we not been visited by voyagers from the future? But he was forced to conclude that there is actually nothing in the laws of physics that prevents moving in time.

The travel in the past is possible if the multiverse concept is true only. In this case, a time traveler appears in its own past. In other words, the time traveler in the past creates another universe, similar to our universe. And he cannot return to our universe because these universes are isolated one from another. It answers the Hawking question: Why have we not been visited by voyagers from the future? Because voyagers from the future appear in the separate universes. Therefore, the voyagers in time cannot change our future and universe. If the time traveler will try to get back in future, it appears in its own future (universe). If multiverse theory is true, the time traveler in the past disappears for us forever.

3.4 The problems with motion in space at time travel

The Time travel is a travel in space too. Because Earth revolves around Sun, and Solar system revolves around a galaxy center. The Solar system's appears to be moving at 627 ± 22 km/s relative to the reference frame of the cosmic microwave background. In order to travel in time, we must consider the position in space of Earth in the start and finish moment. Otherwise, time traveler can appear in interstellar vacuum because Earth at this time has another position in space. It is desirable to appear on Earth only, because time traveler can die in a vacuum, without spacecraft. Another problem is that time traveler must find Earth in space. If the distance to Earth will be over 1 Mpc, the modern manned spacecrafts are not able to pass such cosmological distances due to time traveler will die.

Since Earth move by inertia around Sun, the solution is to use hole teleportation because it is a super analogue of uniform rectilinear motion. Since near the Sun space-time is curved, non-Euclidean geometry must be used. If in a flat spacetime the trajectory of motion by inertia is uniform rectilinear, but in the non-Euclidean geometry this trajectory change. Since Earth moves by inertia around the Sun there is probability that at time travel the observer may appears on Earth only, using hole teleportation.

4. Classical and quantum explanation of Time Travel, using hole teleportation theory

If universe is finite in volume, we can travel in time or teleport matter by sending it outside of universe. Since matter cannot exist outside of universe, an object reappears in the real universe in a random point of space, if the destination place exists. If the destination place does not exist, object will travel in time. Since an object disappears in the start position and reappears in another without traveling through intervening space, the process satisfies to the definition of teleportation. If an object disappears in one time and reappears in another, without existence in the time interval between the disappearance and appearance events, it is time travel or teleportation in time.

Outside of universe is nothing in general – no space, no time, no matter; this “nothing” or absolute void is called hole in space-time or a vacuum hole. In modern physics, a vacuum is a volume of space that is essentially empty of matter, such that its gaseous pressure is much less than atmospheric pressure. In contrast, a vacuum hole is an absolute void without space, time and matter. Thus, in order to send a body outside of universe, we must envelop it by closed hole surface, consisting of vacuum holes [4]. Then we'll ask, where was the body during time it was enveloped by hole surface? Since inside of hole sphere one can not exist as outside of universe not exist the extension and time properties, consequently body had been existing all the time in another point of universe already. If we destroy the hole surface around body, we destroy in this way the channel that connect this two points and body will remain in another place. Thus body was successfully teleported from start point to a random point without traveling through intervening space.

The vacuum holes also can be directly deduced from a quantum vacuum theory. Let's analyze the implications of quantized space-time — space being granular, not continuous, at its smallest scales. Suppose that space-time is composed of a fluctuating space cells or space atoms (elementary volumes dv). Such particles are invisible and Lorenz invariant because they are virtual particles that appear and disappear continuously. If a space cell disappears, in the same place appears a hole in space-time or a vacant place. Then particles of surrounding medium (space cells and elementary particles) fill a hole.

5. Time travel and teleportation of matter using Bohr's complementarity principle

Let's quote the definitions of time travel and teleportation:

Time travel is a disappearance of object in one time and reappearance in another, without existence in the time interval between these events.

Teleportation is the disappearance of objects or elementary particles in one place and reappearance in another, without existence in intervening space.

Both these definitions show the Time travel /teleportation procedure begins with **disappearance** of object for observer. Therefore, for teleportation of matter in space or time we should find a suitable phenomenon or physical law able to force an object to disappear. For this purpose, we can use the Bohr's complementarity principle or wave-particle duality. Say we want to teleport a human being weighing 70 kilograms. The observer observes such macroscopic object because it is a particle-like object localized in space. Therefore if we transform one into a long wave, the object must disappear for observer. Because Bohr's complementarity principle forbids simultaneous observation of object as point-like particle and wave. Thus for teleportation of matter we can use wave-particle duality, that object can be particle-like or wave-like. Paper proves that such transformation particle – wave – particle is teleportation because it satisfies to definition of teleportation.

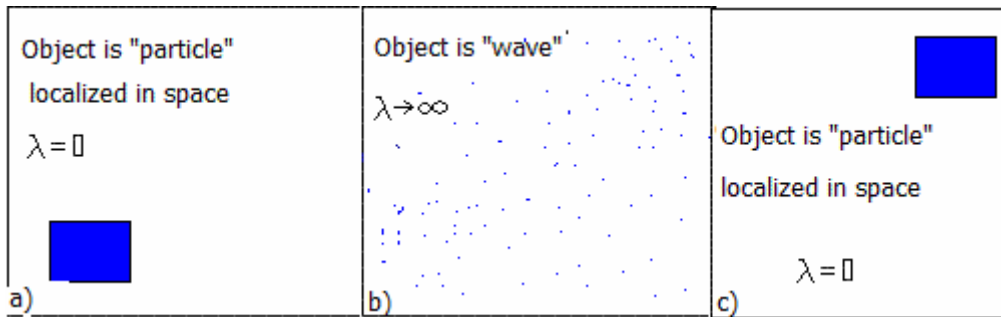


Figure 2. Teleportation of matter using wave-particle duality and consecutive transformation “particle – wave – particle”, which leads to disappearance of object in one place and reappearance in another [5].

- a) – Before teleportation the macroscopic object is observed in laboratory as an corpuscular object, with wavelength close to zero, due to object is localized in space.
- b) Then follow transformation of corpuscular object into wave (delocalization). The object’s wavelength aspires to infinity due to one ceases to be observable (object is smeared out over large region of Universe).

c) Transformation of wave into “particle” (localization) due to object appear in a random point. It may happen, for example, if the object is “detected” by observer. Here (Figure 1) an object behaves classically on start (a) and finish (c) position and quantum mechanically in (b). In other words an object is “smeared out” over a large region of space after that follow its localization in a random point of space or time, depending of start conditions. If the places of disappearance and reappearance of object do not coincide, such process can be named teleportation, because it satisfies the definition of teleportation. (Since object was moved from one place to another, without traveling through intervening space). Such process is similar to quantum tunneling in which a particle violates principles of classical mechanics by penetrating or passing through a potential barrier or impedance higher than the kinetic energy of the particle.

For time travel we must transform a object into wave and create a unique force field simultaneously.

6. The description of the real experiment for Time Travel/teleportation

For time travel we must perform following procedures:

1. We must create the closed hole surface around object in order to send one outside of the universe;
2. We must create unique force field in a start volume in order to forbid teleportation in space and allow teleportation in time. Since object cannot reappear in space, it will travel in time.

The following processes create holes in space-time:

1. Annihilation of pairs particle-antiparticle;
2. Radioactive decay of particles;
3. Inelastic scattering
4. Holes appear at motion of massive body with acceleration;
5. Gravitating bodies emits holes;
6. Holes also continuously appear in vacuum as virtual particles, after that holes decay and create the pairs particle-antiparticle;

The real experiment with time travel of nucleus:

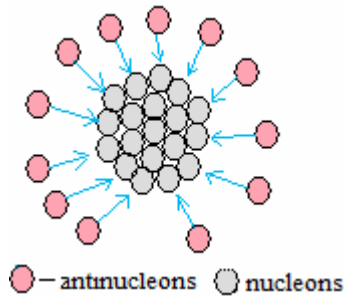


Figure 3. Shooting the antinucleons simultaneously into an iron nucleus. Here grey spheres are nucleons and red spheres – antinucleons.

Imagine we shoot the antinucleons simultaneously into an iron nucleus. There is a probability that all external layer of nucleons of nucleus may annihilate simultaneously with creation of closed hole surface. Therefore, the rest of nucleus will be unconditional teleportation. The unique force field creates surrounding electrodes. We may register the event of teleportation/Time travel by counting the number of annihilations. If all external nucleons of nucleus annihilate simultaneously and the rest of nucleus disappears, it is the true proof that the rest of nucleus was teleported in space or time. At teleportation in space the nucleus may appear up to distance $R(Mpc) = \frac{V}{H} + Rg\sqrt{1 - \frac{v^2}{c^2}}$, where v is the speed of nucleus, H – the Hubble constant, c – the speed of light, Rg – the radius of green sphere. At teleportation in time, the direction of time travel (in the past or future) depends on the parameters of unique force field. Nevertheless, the size of passed time interval cannot exceed 3 millions of years because for deep time travel we must accelerate the object and expand or contract its sizes.

In order to teleport / time travel the ordinary macroscopic bodies we must create a large hole surface. For this purpose we need a technology able to create holes on the surface of solid films. The hole producing surface must be controlled and powered by an electricity. Then we envelop a spacecraft with this solid film able to produce simultaneously a large number of holes on its active surface. In this way a solid film creates a closed hole surface for Time travel or teleportation of macroscopic objects, including humans. I have some ideas in the field and I look for supporters.

References

- [1] C. Z. Leshan, The appearance and inversion of bodies at hole teleportation, Hole physics teleportation and levitation, № 3, 2005.
- [2] C. Z. Leshan, Constantin Leshan about appearance and inversion of bodies at hole teleportation, Membrana, <http://www.membrana.ru/articles/readers/2005/03/04/204800.html>
- [3] Enrico Rodrigo, Questions and Answers about Wormholes, 2005, <http://webfiles.uci.edu/erodrigo/www/>
- [4] C. Z. Leshan, Teleportation in hole vacuum, Journal of Theoretics, 1999, <http://www.journaloftheoretics.com/Articles/1-5/leshan%20teleport%20final.htm>
- [5] C. Z. Leshan, Heisenberg compensator, teleportation as manifestation of wave-particle duality, Quantum magic, 2008. <http://quantmagic.narod.ru/volumes/VOL522008/p2132.html>