

Tunneling speed of matter is the result of the volume of information that the given space contains

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Abstract:

Space is a three-dimensional extent; matter also has three spatial dimensions. Time is the result of the action-reaction of space and matter.

Space is what matter uses as space. Space is not dependent on its texture; it can be made out of matter or non-matter. Time is one characteristic of the given space used by a given matter. Using this new approach called space-matter theory, we can find that there are different spaces in the tunneling, where the same matter has different velocities. These velocities can be greater than c ; their value depends on the amount of information that the given space contains.

Keywords:

space-matter theory, more than one space, fast wave, faster-than-light wave, information, Planck constant of wave with velocity other than c , information of space, information of matter

Information of Matter and Space

This paper is the fourth part of my studies^{1 2 3}. I am supposing that the Reader has a knowledge of the earlier papers. I don't think, this paper can be understood without have been reading the earlier ones.

I use the space-matter theory I have worked out. In the space-matter model there is no space-time. Time is the result of the action-reaction of space and matter. Space has three spatial dimensions. Matter has three spatial dimensions. These definitions allow us to discover new contexts.

I use here the following notations:

- Space This is *the* space we know as space, made out of space.
- Space_{act} This is the space, where the object travels.
- Space_m This is a space made out of mass that another matter uses as space.
- Space_{Light} This is a space made out of Light that another matter uses as space.

A short summary of the earlier studies: In my earlier papers I showed that in the tunneling^{4 5} a particle with or without mass (eg. electron, phonon) is able to use different spaces. Particles with velocity $v_{\text{light}} \leq c$ (here both particles and waves are called particles which are not faster than light) are able to make metamorphoses; they disappear as a particle and reborn as a faster-than-light phenomenon, as a fast wave. And vice versa.

For example the "normal light" with c velocity ($v_{\text{light}}=c$) can be transformed into fast light^{6 7} travelling on another light using it as space ($\text{Space}_{\text{act}}=\text{Space}_{\text{Light}}$) while its E energy remains the same.

An important example of the metamorphose is the tunneling; here the particle uses the barrier (a "normal matter") as space. $\text{Space}_{\text{act}}=\text{Space}_{\text{m}}$ For more details see Ref. 3.

These examples show that space is what matter uses as space. Space is not dependent on its texture; it can be made out of matter or non-matter. Time is one characteristic of the given space used by a given matter. Using this new approach called space-matter theory, we can find different spaces that exist in reality, but we have never considered these as spaces. In many spaces, the faster-than-light phenomena (fast waves) are reality.

In different $\text{Spaces}_{\text{act}}$ the particle (or matter wave) travels with different speed. This speed can be greater than the speed of light c —the speed depends on $\text{Space}_{\text{act}}$. A fast wave comes into being if $\text{Space}_{\text{act}} \neq \text{Space}$. The fast wave can be made out of "normal" electrons or "normal photons", they change their formats into fast waves. The "Planck constant" of fast waves is not in our physics books. It is different from the Planck constant of particles. The Planck constant^{8 9} is originally and commonly understood as the element of the Planck function

$$E = h \times f, \quad (1)$$

where E is the energy and f is the frequency of the photon (particle). In this function h is constant, of course, since its name is "constant". On the other hand, in Eq. (1) is a hidden supposition: the velocity of the particle is c .

In Ref. 1-3 I showed that particles can be faster than light. In this case their "Planck constant" will change. The bigger the velocity, the smaller the value of the Planck constant.

Studying the tunneling raises a question: If the Planck constant of the normal light ($v=c$) is the information package of the light, and the light turns into fast light, and

$$h_{\text{particle (wave)}} > h_{\text{fast wave}}, \quad (2)$$

how can the fast wave turn into a normal particle (wave), if it leaves the barrier?

According to Eq.(1) light has just one information package, and this is h .

The fast light (and generally the fast wave) has a smaller information package. This is shown in Eq.(2). (More in Ref 1-3.) How can a big information package be built from a small one?

This riddle cannot be answered without knowing $\text{Space}_{\text{act}}$. The fast wave can exist in a $\text{Spaces}_{\text{act}}$, where

$$h_{\text{SPACE of particle (wave)}} < h_{\text{SPACE of fast wave}}. \quad (3)$$

It seems that the information is divided. A piece of information contains the h of $\text{Space}_{\text{act}}$ and an other piece of information is stored in the h of the particle or fast wave.

The Eq.(4) is my conjecture:

$$a_1(h_{\text{particle (wave)}} \times h_{\text{SPACE of particle (wave)}}) = a_2(h_{\text{fast wave}} \times h_{\text{SPACE of fast wave}}), \quad (4)$$

where a_i comes from the characteristics of particles, fast waves and spaces. Eq. (4) controls the metamorphoses.

What does it mean? It means that the matter and space together hold the information that describes the given matter (particle, fast wave). In other words, the "DNA" of the particles, fast waves are stored in two different stores: in the particle and in space. The particle contains only that kind of information that the given space doesn't. If we are able to find a $\text{Space}_{\text{act}}$ that has more information—whose h is greater than the h of "our old Space", we can send information faster than light.

This logic says that the information that $\text{Space}_{\text{act}}$ contains must exist in the entire $\text{Space}_{\text{act}}$. $\text{Space}_{\text{act}}$ can be made out of matter, $\text{Space}_{\text{act}}=\text{Space}_{\text{m}}$, so the information must exist in the entire matter.

$\text{Space}_{\text{act}}=\text{Space}_{\text{m}}$ shows that matter as space doesn't have all of the information, since there can be another matter that uses it as space. From this comes: there is no space and no matter that contains every piece of information. In this meaning, the velocity of matter is the result of the information that $\text{Space}_{\text{act}}$ contains.

The "spooky action at a distance" is a faster-than-light phenomenon, but it has no metamorphose we know of. It has its own $\text{Space}_{\text{act}}$ created by photons¹⁰, so its $\text{Space}_{\text{act}}\neq\text{Space}$. (Ref. 1-3, 8.)

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