The hypothesis about the essence of nonlocality in string theory

Poutenikhin P.V.
m55@mail.ru

PACS 11.25. -w; 03.65.Ud; 11.90.+t; 12.90.+b

Abstract
String theorists delete forcibly any mention of tachyons from the equations of string theory. It is believed that the tachyon in string theory - wrong decision, the strings can not move faster than light. However, quantum mechanics for describe the phenomenon of entanglement requires a essence (particle), which moves faster than the speed of light. A tachyon (and a graviton) arose in string theory consistently, against the wishes of the researchers, as a mathematical consequence. The tachyon suggested a possible description of the mechanism of quantum correlations. Theory of Everything cannot escape the description of nonlocality.

Non-locality - it is a quantum phenomenon, consisting in the fact that two quantum object, such as photons, after the interaction and remove from each other continue to be a single quantum-mechanical system. If one of the objects subjected to the measurement, leading to the collapse of the wave function of the system, then the second object at once, instantly and goes into a certain state. If it is the photons about referred to earlier, then after measurement one of the them, as a result of the measurement he gets a definite polarization. Second photon immediately, instantly and at any distance is also gaining a definite polarization. This state of the photons when they as seemed to feel each other at a distance, has the name entanglement.

Synchronous, correlated behavior of entangled quantum particles at first sight contrary to the general theory of relativity. There is a apparent dependence of the quantum state of a second photon from the quantum state of the first photon. However, the data, signal transmission between the photons is not fixed. Therefore, not to say that observed "superluminal communication" between entangled quantum particles is equal the transfer of the information signal.

However, this compromise does not eliminate the direct question: one of the particles measured here, the second is strictly according to the first dimension gets its own state instantly and at any distance from the first. In 1935 at the paradoxical nature of this phenomenon to note Einstein and his colleagues [1], resulting in the phenomenon became known as the EPR paradox, the main essence of which was the statement of the incompleteness of quantum mechanics. The paradox laid the foundation the so-called "local realism" Einstein's, which is not allowed superluminal communication between whatever the system. 30 years later (1965), John Bell, strictly mathematically refuted the arguments of Einstein, showing that the observed relationship between entangled particles can not be a statistical (probabilistic) [3]. At present, the arguments by John Bell is known as "Bell's inequalities". In the early 1980s, experimental physicist Alain Aspect has confirmed the arguments by John Bell's in the strict physical experiment [2].

So, there is a system of two objects that behave as if between them is an information exchange with superluminal speed [5]. The name of the phenomenon as "nonlocality" does not explain what is happening in this process. Simply is postulated "instantaneous correlation" of objects, which does not contradict the theory of relativity just because the information signal is not detected between them. But "not detected" does not mean "no". For the first time in rigorous mathematical expressions in the new theory - string theory was obtained solution describing a possible carrier of superluminal information - the tachyon. This was the initial version of string theory, which is based on work of Veneziano end of the 1960s. A tachyon in the theory is arose against the will of string-theorists, and he must move faster than light. Their appearance in the theory was seen as a problem that leads to instability of the theory and how it was thought to violate causality. String theory began to be modified, to appear more and more of its version, which managed to get rid of the tachyon. But was it necessary? In a strict quantum-mechanical experiment recorded superluminal correlations of entangled particles. At the same rigorous mathematical initial calculations is found a solution that admits superluminal transfer of information tachyon. Although it was assumed that tachyons can not transmit the information because of a possible violation of the principle of causality and Lorentz-invariances, but it is not too convincing objection. A simple analysis of the nature of the transfer of information shows that if there is a dependence between

the objects, then it is necessarily connected with the transfer of material substance [4]. Consequently, the nonlocality must be based on the carrier of quantum information. As such a carrier, can choose "quantino" which the first time, apparently referred to Veinik [4]. On the other hand in string theory as a logical phenomenon can be recognize the appearance of a tachyon. That is, quantino and tachyon are both the strictly logically justified substances, which is probably just two names to one the same entity.

Thus, we have two apparent interrelated process. First, the phenomenon of nonlocality, which requires the carrier of the superluminal quantum information. Second, theoretical studies, which obtain a logical solution for the superluminal particle. Both processes are strictly objective and not dependent on the will of the researchers. Due to the use of a strictly scientific, universally accepted theoretical and experimental methods is obtained two complementary results: superluminal correlation, link - nonlocality and superluminal substance particle - tachyon (quantino). The aspiration artificial, deliberate to remove from the string theory this particle, is apparently erroneous. Hide the clearly experimentally observed correlation between entangled particles behind the concept mystical nonlocality is not necessary - the carrier of superluminal quantum information can be tachyon (quantino).

References

1. A.Einstein, B.Podolsky, N.Rosen: "Can quantum-mechanical description of physical reality be considered complete?", Phys. Rev. 47 (1935), S. 777 - 780
2. Aspect A. "Bell's theorem: the naive view of an experimentalist", 2001, http://quantum3000.narod.ru/papers/edu/aspect_bell.zip (accessed on 08.02.2013)
3. Bell J.S., "On the Einstein Podolsky Rosen paradox", Physics Vol.1, No.3, pp.198-200, 1964
4. Putenikhin P.V., "Faster than light - quantino" (rus), 2012, http://econf.rae.ru/article/6630 (accessed on 08.02.2013) http://samlib.ru/editors/p/putenihin_p_w/light.shtml (accessed on 08.02.2013)
5. Putenikhin P.V., "How disentangled the quantum entanglement" (rus), 2011, http://econf.rae.ru/article/6327 (accessed on 08.02.2013) http://samlib.ru/editors/p/putenihin_p_w/entang.shtml (accessed on 08.02.2013)
6. Putenikhin P.V., The hypothesis about the essence of nonlocality in string theory, URL: http://samlib.ru/p/putenihin_p_w/essence.shtml (accessed on 08.02.2013) http://samlib.ru/p/putenihin_p_w/esserus.shtml (rus) (accessed on 08.02.2013)

19.05.2012 - 08.02.2013