

Really, Is Einstein Wrong? – An Opinion

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Abstract— Recently, a paper appeared about the biggest quantum communication experiment in 2018 saying that Einstein is wrong [1]. The opinion of the author is opposite. Instead, it is suggested saying that quantum entanglement is beyond the limits of validity in which Einstein worked.

Keywords— quantum entanglement; photon; degrees of freedom; limits of validity

I. INTRODUCTION

Goal of this paper is to point out that the word “error” should be replaced by a more precise expression when limits of validity are considered.

We start with a paper that concludes as Einstein is wrong [1]. The paper describes the biggest quantum communication experiment in 2018. The experiment is a Bell test on photons. Entangled particles are generated, separated and sent to different places. Then they are measured, and the match between measurements is investigated. If there is a match, that means entanglement exists, and it is against the locality principle. Conclusion of the experiment is “The observed correlations strongly contradict local realism” [3].

Einstein’s phrase was “Spooky action at a distance” [2]. That means he never accepted non-local interactions. His explanation is that an effect should spread gradually in spacetime. As entanglement is not such, one can think he is not right. But please look at that problem more closely.

II. DISCUSSION

This latter thought leads to the possibility: Instead of saying that negative opinion about spooky action at a distance, an explanation may exist if degrees of freedom are investigated more closely.

For exploiting this possibility, two papers are mentioned [5,6].

In the first one [5], the authors state that entanglement can be explained if we assume more spatial dimensions in addition to the three observables. If two things are far from each other in three spatial dimensions, they can be near to each other in higher dimensions. Thus, within this new perspective, words “local” and “global” are meaningless. This approach completely removes the accuse of fault and replaces that with broader limits of validity.

In the second paper [6] the statement is even stronger, that is, entanglement is independent of space

and time. That means entanglement is observable in 3 spatial and 1 time dimensions, but its essence is beyond that.

Finally, to show that the mentioned papers are not isolated ones, we add five more papers dealing with the same problem [7-11].

III. CONCLUSIONS

Quantum entanglement exceeds the 3 spatial and 1 time dimensional World. Therefore, we cannot say Einstein is wrong, who worked all his time in 3 spatial and 1 time dimensions. In addition, recently such papers appear that enumerate his assumed faults. The opinion of the author is that instead, we must appreciate even more that he contributed to physics. For those who still like finding errors in other’s work, the author suggests that ancient Latin says: Errare humanum est.

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