

# Maxwell's Aether: A Solution to Entanglement

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This paper argues that the solution to the problem of entanglement lies in viewing entanglement in the context of the medium of aether as conceived by James Clerk Maxwell, rather than as a phenomenon of quantum mechanics. It is argued that the apparent correlation of 'spin up' and 'spin down' photons that is said to constitute entanglement, is in fact a phenomenon caused by polarization of the medium of aether, not by travelling photons as envisaged by quantum mechanics.

**Keywords:** Entanglement, Aether, Maxwell's Aether, Quantum Mechanics

## 1. Introduction

Entanglement is said to occur where there is correlation between spin-up photons and spin-down photons that are propelled from a common source in opposite directions. The correlation is that if the photons travelling in one direction from the source are spin up, the photons travelling in the opposite direction from the source will be spin down, or visa-versa. Many experiments have been carried out to prove correlation and to establish a rational explanation for the correlation. The correlation has been well proven, but the experiments have not provided an explanation that makes sense. This has led to speculation that there must be instantaneous communication between the receptors of the photons that triggers the correlation. This explanation does not sit well with most scientists because they believe that communication between separated points must take some measurable time.

From the writer's reading on this subject, it has become apparent that all the experiments and investigations into this phenomenon are based upon the quantum mechanics theory. It is a fundamental cornerstone of quantum mechanics that photons physically travel from source to destination. This proposition is in conflict with the aether theory, which says that space and matter are permeated with a sub-atomic substance called aether, and that electromagnetic radiation occurs by way of waves through the medium of aether, like sound waves through the medium of our atmosphere.

This paper argues that basing the entanglement experiments on the quantum mechanics theory is a fundamental error. This error has inevitably led to the incorrect speculation of instantaneous action-at-a-distance between the receptors. This paper further argues that, if entanglement is considered in the setting of Maxwell's aether theory, it leads to a rational explanation and eliminates the need of communication between the receptors (instantaneous or otherwise).

## 2. Aether Versus Quantum Mechanics

In 1865, James Clerk Maxwell published his seminal treatise, *The Dynamical Theory of the Electromagnetic Field* [1]. In his treatise, Maxwell rejected the concept of instantaneous action-at-a-distance. [2] He posited that there must be a substance through which electromagnetic phenomena occur. [2] He called this substance 'ether'. He described it as consisting of 'parts and connections' that have the property of elasticity and the capacity to propagate waves. [3] Further, he described polarization as a 'forced' state of aether that is placed under stress by electromotive force. [4]

Maxwell's aether theory has since fallen into disuse, largely as a result of the Michelson-Morley experiments that many scientists say disprove the existence of aether, and partially because Einstein, in his *Special Relativity* paper, *On The electrodynamics of Moving Bodies*, opined that if his theory is accepted, there would be no need for aether.

The present author, in an article entitled *Reconsidering Maxwell's Aether*, published in 2014 [5], argues that Maxwell was on the right track with his aether theory, and that it should be reconsidered. The article sets out fundamental problems with quantum mechanics as raised by various prominent physicists, including David Griffiths, J. D. Jackson, Richard Feynman, Alastair Rae, Bryan Cox and Jeff Forshaw, George Greenstein and Arthur Zajonc, and Patrick Cornille.[6]

In 1935, Albert Einstein, D. Podolsky and N. Rosen, in their 'EPR' paper, *Can Quantum-Mechanical Description of Physical Reality be Considered Complete?* [7], concluded that the description of physical reality posed by quantum mechanics is incomplete.

The *Reconsidering Maxwell's Aether* article points out that acceptance of Maxwell's aether opens up potential explanations of numerous problem areas of electromagnetism. [8] One of those areas is entanglement. The

present paper considers how entanglement may be explained in the context of Maxwell's aether.

### 3. Entanglement Experiments

In *The Quantum Challenge: Modern Research on the Foundations of Quantum Mechanics*, Second Edition [9], George Greenstein and Arthur Zajonc describe numerous experiments that have investigated entanglement. The experiments range from those of Clauser, Horne, Shimony and Holt in the 1960s, Freedman and Clauser, Kasday, Ulman and Wu, and Laméhi-rachti and Mittig in the 1970s, Aspect, Grangier and Roger, Aspect, Dalibard and Roger, and Ghosh and Mandel in the 1980s, Greenberger, Horne and Zeilinger, and Greenberger, Horne, Shimony and Zeilinger in the 1990s, and Bouwmeester, Pan, Daniell, Weinfurter and Zeilinger in the year 2000. [10]

One common element of all the experiments stands out. They were all based on the assumption that the particles that were being tested (generally photons) were considered as having travelled from the source of the transmissions to the receptors. None of the experiments were analyzed on the assumption that the emissions were waves through the medium of aether. The experiments assumed the correctness of quantum mechanics and ignored the possibility of the so-called 'arriving' particles being in fact aether cells located at the receptors and being activated by waves travelling through the medium of aether. None of the experiments considered the possibility that Maxwell's aether might provide an explanation for the correlation of the data recorded by the receptors and a solution to the evident absurdity of the action-at-a-distance concern.

This paper questions the premise of applying quantum mechanics to entanglement and suggests that what is in fact occurring is the transmission of waves through a medium, that medium being Maxwell's Aether.

### 4. The Aether Approach

Maxwell considered aether as being made up of individual parts. He said: [11]

'Thus, then, we are led to the conception of a complicated mechanism capable of a vast variety of motion, but at the same time so connected that the motion of one part depends, according to definite relations, on the motion of other parts, these motions being communicated by forces arising from the relative displacement of the connected parts, in virtue of their elasticity.'

Maxwell's parts (the present author calls them aether cells) do not travel from source to destination. Rather, they form a medium through which vibrations of electromotive force are transmitted as waves. When the waves arrive at the destination, they activate the aether cells in the medium at that location. The activation of these aether cells gives the impression (albeit a false impression) of the arrival of 'photons'.

The distinction between photons and aether cells is important in regard to the phenomenon of polarization. As noted earlier, Maxwell considered polarization as the forced state of a medium caused by the application of electromotive force.

In contrast, in the quantum mechanics approach to entanglement, polarization is viewed as the state of photons that are travelling from source to destination, such as spin-up and spin-down.

With this distinction in mind, visualize space as being permeated by the medium of aether. Make the assumption that aether can be polarized by electromotive force. Picture polarization forcing aether to collectively form into three-dimensional patterns, with these patterns providing planes of polarization through which electromagnetic waves travel. The planes of polarization can rotate [12], and when they do, this causes rotation of the electromagnetic waves. [12] [13]

The next step is critical. Visualize a central source sending out electromotive energy in opposite directions. If the aether theory is applicable, the electromotive force will polarize the aether medium in both directions. Assuming that this in fact occurs, it stands to reason that the patterns of polarization in both directions will be correlated. The correlation is caused by the polarization resulting from the common source of electromotive force being applied to the common surrounding medium.

Because the electromotive force that causes the polarization emanates from a central source and is directed outwards in opposite directions, it follows that the pattern of the polarized aether in one direction will be the mirror image of the pattern of the polarized aether in the opposite direction. Thus, the recording of the nature of the waves arriving at the receptors should give opposite readings. Further, while the readings at the receptors may be characterized as spin-up and spin-down, but the receptors are actually receiving rotating waves, then it seems reasonable to assume that the readings are being mischaracterized and are in fact of rotations of the electromagnetic waves.

In this picture of events, no instant communication between the receptors is needed. Indeed, no communication at all is necessary. This is because entanglement is the result of polarization of the aether medium, and the polarization is set by the electromotive force that emanates from a common source. Thus, apart from the receptors being recording devices, they play no role in entanglement.

### 5. Conclusion

Maxwell's aether provides a rational explanation of entanglement.

Quantum mechanics does not.

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