

Advanced Waves, Syntropy and Parapsychology

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Abstract

The rejection and hostility which parapsychology has registered in the academic world can be traced back to the difficulty that this discipline has faced in the production of plausible explanations and theories of the paranormal phenomena. The aim of this paper is that of underlying how important the widening of parapsychology to the solution of advanced waves can be in the explanation of paranormal phenomena. Widening parapsychology to advanced waves could help this discipline to find a place in *mainstream science*. Klein-Gordon's relativistically invariant wave equation has two solutions, one which describes waves, energy and matter which propagate from the past to the future (retarded waves) and one which describes waves, energy and matter which propagate from the future to the past (advanced waves). This last solution was rejected in the 1930s, as it was considered impossible, a mathematical trick. In 1941 the mathematician Luigi Fantappiè, working on the mathematical properties of the advanced solutions discovered that they coincide with the qualities of living systems (concentration of energy, differentiation, structures and order) arriving in this way at the conclusion that life, more than being effected by causes placed in the past (retarded waves) is attracted by causes placed in the future (advanced waves). According to the model developed by Fantappiè vital processes feed on advanced waves. Therefore the parameters of the autonomic nervous system, which supports vital processes, should show anticipated reactions to future stimuli. This effect has been observed in several independent studies. This paper describes how advanced waves can offer a scientific model which can accommodate many of the phenomena which are described in the field of parapsychology. The properties of advanced waves justify, from a scientific point of view, the existence of a wide range of anomalous phenomena, typical of parapsychology, such as precognition, telepathy, concentration of high levels of energy, etc.

Causality or supercausality?

The central mystery of quantum mechanics (QM) is the duality wave/particle. The Copenhagen Interpretation of QM (1927), inspired by the works of Niels Bohr and Werner Heisenberg explains this duality stating that particles propagate as a waves and when the wave is measured (observed) it collapses into a particle. This interpretation considers the act of observation and act of creation of

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reality, since it makes the wave collapse into a particle.

It is important to note that in the Copenhagen Interpretation, the collapse of the wave function (the collapse of the wave into a particle) happens in the same instant in all the points of the wave. This requires an instantaneous propagation of information, which violates the limit of the speed of light which Einstein had discovered has the maximum speed in the propagation of information. Analyzing this paradox Schrödinger arrived at the conclusion that the problem resides in the way time is used in the Copenhagen Interpretation (Schrödinger, 1944). In this interpretation Schrödinger's wave function (Ψ), which is at the center of a large part of the discussion, is not relativistically invariant, since it treats time in a classical way, with a well defined first and after the collapse of the wave into a particle. The relativistically invariant version of Schrödinger's wave equation (Ψ) was developed by Klein and Gordon in 1926, by introducing the energy/momentum/mass relation of Einstein's special relativity:

$$E^2 = m^2c^4 + p^2c^2$$

where E is the Energy of the object, m the mass and p the momentum.

obtaining the equation:

$$E\psi = \sqrt{p^2 + m^2}\psi$$

Klein and Gordon's equation depends on a square root which produces always two solutions: one positive, which describes waves and matter which propagate from the past to the future (retarded waves/causality) and one negative which describes waves and matter which diverge from the future to the past (advanced waves / retrocausality).

When QM phenomena are interpreted using Klein-Gordon's equation the following conclusions are reached:

- at the subatomic level time is unitary: past, present and future coexist;
- causality is symmetrical, there are as many causes coming from the past than from the future;
- the dual manifestation of matter (wave and particle) is a consequence of the dual causality (future/past).

According to this interpretation the wave manifestation of matter coincides with causes which act from the future, the outcome of which is not yet determined, and therefore takes the form of a wave, whereas particles would coincide with causes coming from the past, the outcome of which has been determined and therefore takes the form of a particle. The duality wave/particle would support the existence of the dual causality past/future and of the coexistence of past, present and future.

Quantum models of consciousness and parapsychology

Parapsychology and consciousness often try to explain their field using the properties of QM. A review of QM models of consciousness conducted by Antonella Vannini shows that these models can be divided into four main categories (Vannini, 2009):

1. models which assume that consciousness creates reality and that consciousness is an immanent property of reality;
2. models which link consciousness to the probabilistic properties of QM;
3. models which attribute consciousness to a principle of order of QM;
4. models which integrate QM with special relativity and focus on the properties of advanced waves.

Analyzing QM models of consciousness which belong to the first category, a tendency towards mysticism can be observed. All these models start from the Copenhagen Interpretation of QM and assume that consciousness itself determines reality. These models try to describe the creation of reality as a consequence of panpsychism, and assume that consciousness is an immanent property which precedes the formation of reality. The concept of panpsychism is explicitly used by most of the authors of this category. These assumptions cannot be falsified or tested in an experiment.

Also in the case of the second category, it is impossible to falsify the QM models of consciousness since they consider consciousness to originate in a realm which cannot be observed by modern science, as for example that under Planck’s constant.

Analyzing the third group of QM models of consciousness, which attribute consciousness to principles of order which have been already discovered and used for physical applications (laser, superconductors, etc.), it is possible to imagine experimental tests which could falsify them. It is, however, important to note that many of these models require conditions which are not compatible with the characteristics of biological systems. The order principles on which most of these models are based require extreme physical conditions such as, for example, absolute zero (-273 C°) temperatures.

| 1) Consciousness creates reality | 2) Probability | 3) Order principle | 4) Special relativity + QM |
|--|---|---|----------------------------------|
| 1930 - Bohr 1987 - Herbert 1989 - Penrose Hameroff 1993 - Stapp 2004 - Järvilehto 2007 - Mender | 1925 - Lotka 1963 - Culbertson 1970 - Walker 1980 - Bohm 1989 - Lockwood 1990 - Pitkänen 1992 - Kaivarainen 1998 – Bondi | 1967 - Umezawa Ricciardi 1968 - Fröhlich 1971 - Pribram 1986 - Eccles 1989 - Marshall 1995 - Yasue 1995 - Vitiello 2003 - Flanagan 2003 - Pereira 2005 - Hu 2005 - Baaquie and Martine 2008 - Hari | 1941 - Fantappiè 1989 - King |

Table 1: classification of quantum models of consciousness

The fourth group includes only models of consciousness which originate from the generalization of Schrödinger's wave equation (QM) with special relativity into a relativistically invariant wave equation (Klein-Gordon's equation). These models, developed by the mathematicians Luigi Fantappiè and Chris King, are not pure quantum mechanical models as they include also special relativity.

This review leads to the conclusion that all the models which originate from QM cannot be translated into experiments, either because they are incompatible with the characteristics of biological systems or because they cannot be falsified. The only two models which seem to lead to experiments are those which integrate QM with special relativity.

Copenhagen Interpretation falsified

Analyzing the paradoxes of the Copenhagen Interpretation, Erwin Schrödinger arrived at the conclusion that the problem could be traced back to the way in which time was used in this interpretation with a clear "before" and "after" the collapse of the wave function. In other words, this interpretation uses time in a classical way, according to which time flows only from the past to the future (Schrödinger, 1944).

This statement allows to develop experiments which can falsify the Copenhagen Interpretation. Experiments which should show that effects can precede causes would automatically falsify the Copenhagen Interpretation and all the explanations which have been developed starting from this interpretation.

In order to decide on which of the two equations, Schrödinger (classical time) or Klein-Gordon's (symmetric time) wave equation, is correct it is sufficient to see if there are experiments which show effects before causes. Until now it has been impossible to develop experiments of this kind in physics: "*Nature, in a very subtle way, may be engaging in backwards-in-time handshaking. But the use of this mechanism is not available to experimental investigators even at the microscopic level. The completed transaction erases all advanced effects, so that no advanced wave signalling is possible. The future can affect the past only very indirectly, by offering possibilities for transactions*" (Cramer, 1986).

On the contrary, as a consequence of the fact that vital processes should feed on advanced waves, it should be easy to verify the presence of retrocausal effects in living systems. According to this statement, parameters of the autonomic nervous system, which supports the vital functions of the organism, should show anticipated reaction to future stimuli. Several experiments conducted by independent researchers show that the neurophysiologic parameters of the autonomic nervous system anticipate future stimuli, and that this anticipation exists also when future stimuli are unpredictable. Among these experiments:

- *Anticipatory reaction of skin conductance.* In 2003 Spottiswoode and May of the Cognitive Science Laboratory replicated Bierman and Radin (1997) experiments which show an increase in skin conductance 2-3 seconds before emotional stimuli are presented. Spottiswoode and May replicated these results obtaining a statistical significance of $p=0.0005$, and performed controls in order to exclude all possible artifacts and alternative explanations. These results support the hypothesis that the autonomic nervous system reacts in advance of stimuli (Spottiswoode and May, 2003).

- *Electrophysiological responses.* McCarty, Atkinson and Bradely in “*Electrophysiological Evidence of Intuition*” (2004) show the existence of strong anticipatory reactions of the electrophysiological parameters of the heart.
- *Pre-stimuli heart rate differences.* In his article “*Heart Rate Differences between Targets and Non Targets in Intuitive Tasks*”, Tressoldi and coll. report results of two experiments aimed at investigating pre-stimuli heart rate changes. Results support the hypothesis that heart rate changes before stimuli are applied (Tressoldi 2005).

The results of these experiments are incompatible with the Copenhagen Interpretation and, consequently, this interpretation is falsified.

Possible explanations of paranormal phenomena using the paradigm of the advanced waves

The properties of the advanced waves justify, from a scientific point of view, the existence of a wide range of anomalous phenomena typical of parapsychology, such as precognition, telepathy, concentration of high levels of energy, etc.

- Influence of the future on the past

In the Copenhagen Interpretation of QM and in the classical vision of time, according to which causes can only precede effects and time can only flow forward, once an event has been determined it cannot be modified, as a consequence of the fact that the wave has collapsed into a particle. Once a wave collapses, the event is irreversible. On the contrary, the vision of the world which originates from the dual solution of the Klein-Gordon equation suggests that some events can be reversible and that information, especially in the form of emotions, can flow backwards in time.

For example, in a study conducted by W.E. Cox (1956), on the use of commuter trains in the United States, Cox discovered a lower presence of commuters on trains which had accidents. Comparing the number of passengers who boarded trains which had accidents with the number of passengers who boarded the same train, at the same time and day of previous weeks, Cox discovered that the number of passengers on trains which had accidents was significantly inferior to what would have been expected, and that this reduction could not be explained as a consequence of chance.

The model of supercausality developed by Chris King (1989) and of syntropy developed by Luigi Fantappiè (1942) state that because of the properties of advanced waves, feelings associated to the autonomic nervous system (emotions) radiate backwards in time. It is therefore plausible that feelings of pain and distress are sent backwards in time and can be felt in the past in the form of premonitions and hunch feelings, which may lead, in this case, to a decision not to travel. This backwards in time effect of emotions would therefore change the future. In other words, a negative event happens in the future and informs us, through emotions. According to this theory, listening to our emotions can help us to decide differently and avoid pain and distress in our future.

In short, when we undergo strong emotions these flow backwards in time and can lead us, in the past, to operate different choices changing in this way our present situation. If we listen to our emotions the

future changes and it changes in an advantageous way. This interpretation suggests that it is possible to retroact on the past, thanks to emotions, changing in this way the present situation. According to this statement the present is not totally determined, no collapse of the wave function takes place, and it is therefore possible to modify the present sending emotions in the past. NLP (neurolinguistic programming) and the Ericksonian psychotherapy, supported by hypnosis and trance, continuously use techniques which send emotions backwards into the past of the patient, in order to modify its present state. People, who use these techniques, usually think that results are the outcome of imagination and do not really think that it is possible to modify the past of the patient and consequently the present.

Another example. The article "*In Battle, Hunches Prove to be Valuable*", published on the main page of the New York Times on July 28, 2009, describes that gut feelings associated with hunches and premonitions have helped soldiers to foil attacks: "*My body suddenly got cooler; you know, that danger feeling, and I said no – no!*" According to the interpretations based on advanced waves the attack happens, the soldier experiences fear and death and sends backwards in time strong emotions of fear and death (which are associated with cold feelings in the thorax region due to absence of converging waves). The soldier in the past feels these feelings of death and fear as a hunch, a gut feeling, and in this way he is pushed to make a different choice avoiding the attack and death. According to the New York Times' article these hunch feelings have proved much more effective than the technology and billions of dollars spent in intelligence hardware by the United States military.

If emotions can really move backwards in time, all a new range of techniques could be developed and experimented. These techniques would be based on sending into the past of people emotions which can lead to modify the choices which were taken. Modifying past choices the present changes instantaneously.

It is important to underline that, according to this model, the past can be modified only advantageously. For example, in 1993 the United States cancelled the construction of the accelerator which would have allowed to study Higgs' boson, even though several billion of dollars had already been spent on this project. This choice was in part motivated by the consideration that Higgs' boson required extreme conditions which could be so dangerous and destructive that its effects would radiate also backwards in time, destroying the accelerator which caused them and forbidding in this way that the destructive event could take place.

- *Nonlocality*

Nonlocality is among the mathematical properties of advanced waves. Nonlocality means that instantaneous correlations, which link points which are distant in space and time, can occur. This is due to the fact that advanced waves, in order to move backwards in time, must necessarily move at speeds faster than light.

Advanced waves would be, according to Luigi Fantappiè, at the basis of the properties of life. It is therefore plausible that instantaneous nonlocal correlations characterize the functions of life. For example, memory could establish nonlocal links with past events. The brain would not store information, but would operate as an antenna which could be oriented, thanks to emotions, towards

points of the space-time, which according to Klein-Gordon's equation are still present. Information would be retrieved directly from the source and the uncertainty of information would depend on the difficulties which we face tuning our antenna, our brain.

If this hypothesis is correct, several techniques could increment memories or allow to acquire information which the person did not acquire in the first place. For example, using hypnosis it is possible to make memories become more precise and vivid and retrieve information which the subject did not have the possibility to acquire in the past experience.

For classical science information can be acquired only through the 5 senses of perception, that is to say sight, hearing, touch, smell and taste, whereas when we consider also advanced waves, perceptions can be based on nonlocality and on emotions, felt in the thorax area. Consequently it is possible to imagine not only techniques which augment memories, but also techniques which use the autonomic nervous system as a sensory channel.

- Synchronicity

One of the main characteristics of advanced waves is that of being finalized, generated by final causes; consequently they tend to synchronize different events on the final causes. The finalistic structure of life leads events to converge and to synchronize the behavior of different individuals. When we accept the finalistic structure of life, final causes start cooperating with us. Respecting each one's individuality, not consciously and apparently in a mysterious way, we start cooperating for the wellbeing of individuals and life; on the contrary when the finalistic structure of life and reality is rejected we diverge and chaos and entropy prevail.

- Concentration of energy

One other property of advanced waves is that of concentrating energy. The advanced waves model allows to devise experiments which study phenomena of energy concentration. In this way parapsychology could help to place manifestations which at the moment seem to defy any scientific explanation, within the other natural phenomena.

- Levels which transcend the physical and biological plane

The finalistic structure of advanced waves suggests that individual consciousness is the reflection of a transcendental Self in planes which transcend the biological, psychological and physical levels. "People who have experienced this transcendental level say that it is much more real, lasting and essential than the physical reality which we face in our everyday life. It is the real essence and root of life and consciousness" (Assagioli, 1988). The perception of these transcendental planes can open possibilities and faculties which are yet out of the reach of science.

Conclusions

The aim of this paper is that of underlying how important the widening of parapsychology to the solution of advanced waves can be in the explanation of paranormal phenomena.

The rejection and hostility which parapsychology has registered in the academic world can be traced back to the difficulty that this discipline has faced in the production of plausible explanations and theories of the paranormal phenomena.

Widening parapsychology to advanced waves could help this discipline to find a place in *mainstream science*.

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