

ESSAY

The Paranormal is not Excluded from Physics

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Abstract — A major change in the paradigm of physics is suggested by using: (1) the Einsteinian concept of existence as extended in time-and-space; (2) the Bayesian reversal of conditional probabilities, as used for time-like distance events; (3) information negentropy equivalence binding the subjective and objective sides of reality; and (4) quantum non-separability. Aristotle's concepts of dual-faced reality and efficient-final cause symmetry are formalized. Psychokinesis is legitimized as the reciprocal to the gain in knowledge. Precognition, telepathy, psychokinesis and teleporting are allowed.

Keywords: symmetry laws in physics — paranormal effects

1. Prologue

Changes in paradigms are necessarily irrational; they function beyond the previously accepted limits of the rational, and beyond even more primitive axioms and postulates. A paradigm can be evaluated only in terms of its internal consistency, its economy, and its utility.

Einstein (1949), tongue in cheek it seems, likened the “paradoxical” EPR (Einstein *et al.*, 1949) to telepathy. I submit that a largely overlooked formal consideration of today's physics allows for the existence of the so-called “paranormal” phenomena of telepathy, precognition, and psychokinesis.

The argument is that any operational mathematical formalism should fit the data in “taylor style.” Was this not, for example, exactly what Maxwell did in predicting the existence of electromagnetic waves, and de Broglie in that of matter-waves?

2. Time Extendedness of Matter and the Concept of Existence

When the man in the street says that something exists, he means exists *now*. If the thing is distant, questions are raised. As seen now, the moon “existed” 1.25 seconds ago; what is the meaning of the moon existing now?

Such thoughts were agitating at the turn of this century, when the gestation of the theory of relativity from kinematical optics was coming to full term. It then dawned upon us that light is the privileged carrier of information, that Maxwell's electromagnetism is the proper framework for conducting

measurements of interval in space and time, and that “ c ,” the velocity of light, is the *universal constant* connecting them.

Michelson’s experiment in 1887, culminating years of labor initiated by Arago in 1818, proved that for velocities of masses approaching c , the intuitive law of addition of velocities is wrong: *paradoxically*, the velocity of light is measured the same in all directions, whatever the velocity of the measuring apparatus. An unexpected consequence, with far-reaching implications resulted: matter is extended in time no less than in space: it dwells in a four-dimensional space-time.

Galileo had made it clear that relative motion transforms time into space: as anyone can experience by walking inside a moving train. Einstein proved that relative motion also transforms space into time: a truth veiled until then by the enormity of the velocity of light, as measured in the “practical” units of day-to-day experience.

Inasmuch as matter exists at all, its past and its future exist no less than its “over-there.” Existing no longer means existing in the moment. We have now learned to be at home in a universe of four-dimensional space-time.

Events are experienced in point-instants. The Poincare-Minkowski light cone trisects space-time in the past (down there), the future (up there) and elsewhere (outside). In practical units the cone is pictured as wide open; in the limit $c \rightarrow \infty$ the “elsewhere” is expelled, so that Newton’s severance of past and future by an “existing now” is recovered. Space-like vectors point outside, time-like ones point inside, light-like ones of null space-time distance lie along the cone.

If past, present, and future of matter *coexist* (not now, of course, which would be self-contradicting), why not those of the subconscious mind immersed in Jung’s “collective unconscious?” Retro- and pre-cognitive flashes could then cross the border line of consciousness. The whole concept of “non-locality” in contemporary physics requires this possibility.

3. Reciprocities in Cause-Effect and in Action-Reaction

Bayes’ Principle, fundamental in probability theory, states: The *joint probability* of two correlated chance events A and B equals the *conditional probability* of B if A times the *prior (a priori)* probability of A, or *inversely* the conditional probability of A if B times the prior probability of B. The linguistic A & B symmetry is respected.

In physics correlation means interaction. The Bayesian reversibility then implies action-reaction reciprocity for space-distant events, and cause-effect reciprocity for time distant ones. The latter can be interpreted as Aristotle’s symmetry of efficient and final cause.

Space-time geometry thus considers that final cause operates from “up-there,” somewhat as in hydrodynamics a sink does by suction from downstream. Efficient cause operates from “down-there,” like a hydrodynamic

source by pressure from upstream. The old common sense objection: “How on Earth could something not yet existing do anything?” is discarded.

And how does final cause operate? By tampering with the final priors.

Boltzmann and Gibbs, each in his own way, had made clear that, as Mehlberg (1961) puts it, physical *irreversibility is fact-like*, not law-like, while *reversibility is law-like*. This contention goes back to the thermodynamic one between the First and the Second Law.

The normal use of statistics is predictive, the recipe being pre-selection by equating the final priors. Mehlberg calls it blind prediction, implying causation and the tendency to disorder. This is the situation for inert matter.

Inversely, blind retrodiction or post-selection *via* equating the initial priors, expresses finality — retro-causation, as physicists put it. This describes the organizing tendency present in Nature: Given the eohippus can one predict the horse? Of course not. But blind retrodiction says the eohippus came from a “primitive soup” — the accepted view.

So contrary to widespread belief, the laws of chance *per se* do not explain irreversibility: they formalize it, if used forward, by equating the final priors (Van der Waals, 1911).

Believing in operationality of the final cause excludes that the psyche be a byproduct of evolving matter. Quite the contrary, it implies that matter is under the control of some universal psyche. We physicists may be misled by our practice of hand-adjusting experimental setups, then “letting things go” *via* forward causation. Excluding from the picture all the thinking behind the preparation of an experiment, and all the manual activity producing the setup, restrains us from asking if the universe may not be more like a space-time-extended idea than a running machine.

This has academic grandeur, but let us not brush aside difficulties which might later crop up. Looking down at the elementary level is mandatory.

Final cause, the idea turned into reality, is psychokinesis (Hoekzema, 1992).

Theoretical physics, a representation of matter, has by definition an objective and a subjective pillar. Probability is the keystone of the ogival arch.

4. Information-Negentropy, Law-Like Reversibility and Fact-Like Irreversibility

Bergson (1907) the philosopher and Shafroth (1960) the physicist, each in his own way, state that disorder is order different from the one expected. In a similar vein Lewis (1930) writes that “gain in entropy means loss of information, nothing more.” Poincaré (1908) however asserts that “chance is not just the name we give to our ignorance.”

The question at stake is the objectivity-subjectivity dilemma. To Aristotle, information was a twin-faced concept: gain in knowledge on one side, organizing power on the other. This cybernetics has rediscovered: “decoding” is extracting knowledge from a negentropy previously in the machine as “coding” some thinking. Previously Boltzmann (1964), not spelling the word, had

likened physical entropy to missing information, to *incomplete knowledge-and-control* at the microlevel.

The information-negentropy physical equivalence, $I \leftrightarrow N$, is expressed by Boltzmann's constant $k \ln 2$, the conversion rate between a bit and a thermal entropy unit: $N=k(\ln 2)I$; k has an exceedingly small value $\approx 10^{-16}$, explaining why advertisements go so easily to the wastebasket and why the price of an object mainly expresses the difficulty to get or produce it.

Understanding the deep meaning of Boltzmann's constant, discovering the subjective side of entropy, is the cybernetic revolution. Very much as the largeness of c had long hidden the relativity of time, so the smallness of k did hide both the negentropy cost of information and the very possibility of psychokinesis. Requiring from consciousness-the-spectator to pay a very cheap ticket, cybernetics grants to consciousness-the-actor exorbitant wages. So, the $N \leftrightarrow I$ transition is easy or "normal" forward, hard or "paranormal" backward. *Thanks to k it is not forbidden backward.*

Internal psychokinesis is advocated by Eccles (1986) as explaining voluntary motion. Descartes (1971-1974) had anticipated this: in a letter to Arnauld he writes that "the means by which our soul moves our body differs radically from that by which a body moves another body." (Let it be recalled that he had taken part in the investigation of the conservation laws of mechanics.)

External psychokinesis, paradoxical as it may seem, is implied in the various forms of law-like reversibility, including that of the field equations of physics, those of the universal information transmitting telegraph. Thus Wigner (1967) concludes from his own symmetry arguments that "reciprocal" to the action of matter upon mind, there must exist a "direct action of mind upon matter."

Rediscovery of the hidden face of information implies that a chance event is not just a mechanical accident — or rather that it is such insofar as the subjective side of nature, Jung's "collective unconscious," is dormant.

Reciprocal to the normal $N \rightarrow I$ transition there is the paranormal $I \rightarrow N$ one.

5. Wave-Particle Dualism and Quantal Non-Separability

Wave-particle dualism, the mismanaged but fruitful union of discrete and continuous arranged by Einstein and de Broglie, was in need of legalization. Probability was the predestined minister.

Born, stating that the wave's intensity expresses the probability of manifestation of the particle, set aside without much fanfare, the recipe of adding partial probabilities. Partial amplitudes, not intensities, must be added. Jordan, following in the same track, multiplied independent amplitudes. Dirac (1947) systematized the whole matter in a bra $|A\rangle$ and ket $\langle B|$ symbolism of transition amplitudes $\langle A | B \rangle$ from prepared to retro-prepared representations of a system. To these Feynman (1949) conferred Lorentz-invariance and Luders (1952) CPT-invariance (C , particle-antiparticle exchange).

Hermitian symmetry of a complex amplitude *corresponds* to the real symmetry of probability, as used for instance in the Boltzmann equation. However, there is an important difference. Since phase relations are lost in the transition, there can be no real “hidden states” such as would lead to the equivalence of preparation and retro-preparation. Alexander, it is said, by cutting the Gordian knot was allowed to conquer Asia up to the Indus — where he met gymnosophists holding as illusory the perceived world. Wheeler (Miller & Wheeler, 1984) comments on this in his “smoky dragon” metaphor.

This is all paradoxical. In probability terms, a Young-Fresnel interference is quite puzzling: one can neither retrodict, nor even test, from which aperture came any one of the detected photons.

Instead of paired converging photons one can use diverging ones. Such an “EPR correlation” leads to the so-called EPR paradox, which says that two correlated measured results obtained on the diverging beams cannot have pre-existed in the source. Is this not retrocausation *by definition* (Costa de Beauregard, 1983)?

6. Psychokinesis As Wave Retrocollapse

Pictured *à la* Feynman, a transition is a reversible toss between a prepared set of diverging, and a retro-prepared set of converging waves (Cramer, 1986).

The normal use of quantum mechanics is *via* diverging waves, or forward causation. Preselection is the recipe. This is the quantal $N \rightarrow I$ transition. Postselection, the reversed recipe, formalizes the paranormal phenomenon of psychokinesis, retro-causation *via* converging waves. This is the quantum $I \rightarrow N$ transition.

Telegraphing faster than light is normally forbidden, but paranormally allowed (Costa de Beauregard, 1997) by associating psychokinesis with an EPR correlation. A most simple setup could include a low-intensity laser, a semi-transparent mirror, an agent on one beam, a photo-detector on the other. The agent, biasing by will (either up or down) the normal arrival rate of photons on his beam, retroacting at the plate would bias (either down or up) the detection rate on the other beam. The assumption is of course that the laser’s intensity is unchanged (which can be tested).

7. Conclusion

Algebraic in its expression, the wave-like non-separability pervades all space-time with no damping.

Indissolubly objective-and-subjective, it ties together *representations* physicists have in mind when preparing or retro-preparing their systems (including “teleparing” two distant correlated ones, in which case they are subjectively connected).

It also ties together unprofessional representations by people in general,

animals, and why not, plants (in as much as, according to Bergson, "sensitivity is more dormant in them than absent").

So, *via* the relativistic and quantal telegraph, some sort of universal telepathy-and-telekinesis must be going on at a very low energetic level, expressing the subjective face of nature.

Anyhow, so many low level (occasionally high level) paranormal events are reported that it would be unwise to flatly deny them.

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