The transactional microphysics rejects eighteen surreptitious postulates, accepts ten new ones.

Jacques Lavau

February 9, 2019

207 avenue Jean Jaurès, 69150 Décines. France. jacques.lavau@free.fr

Abstract

Several physicists independently discovered the transactional laws of microphysics, as this discovery was unavoidable for 1930. The most known of us is John G. Cramer. It seems that all of us are heirs of the absorber theory of the electron, by Wheeler and Feynman in 1945, and of P.A.M. Dirac for his 1938 paper: *Classical Theory of Radiating Electrons*. But none of them made explicit the postulates they choose, nor the implicit ones they discard. Here are listed eighteen surreptitious postulates we reject, opposed to the ten postulates founding the transactional microphysics.

Plusieurs physiciens ont indépendamment découvert les lois de la microphysique transactionnelle : une découverte inéluctable depuis 1930. Le plus connu de tous est John G.Cramer. Il semble que tous nous sommes héritiers de la théorie de l'électron absorbeur, par Wheeler et Feynman en 1945, et de Dirac par sa théorie de l'électron radiant en 1938. Mais aucun n'avait encore explicité les postulats implicites que nous rejetons, ni les postulats que nous adoptons. Ici sont listés les dix-huit postulats que nous rejetons, et les dix qui fondent la microphysique transactionnelle.

1 Ten transactional postulates.

1.1 The absorbers exist. No *corpuscle* exists. No "*corpuscular aspects*" exist.

But the properties of the absorbers exist; some of these properties are quantic.

## 1.2 Planck and phase postulate.

The unit of phase or angle comes back in the dimensional monomial. The Maupertuisian action is not action-per-unit-of-phase, and Planck's constant is action-per-unit-of-phase: $\mathbf{h} = 6.6260755 \cdot 10^{-34}$ joule.second/cycle $= \hbar = 1.05457266 \cdot 10^{-34}$ joule.second/radian.

1.3 De Broglie-Dirac-Schrödinger postulate.

As soon as a "*particle*" has an intrinsic mass, its intrinsic frequencies $\mathbf{mc^2/h}$ and $\mathbf{2mc^2/h}$ play each one their role. The Broglian $\mathbf{mc^2/h}$ for each interference of a quantic entity with itself. The Dirac-Schrödinger $\mathbf{2mc^2/h}$ for all electromagnetic interactions, such as the Compton scattering.

1.4 Fermat-Fresnel Postulate.

All the real journeys come in phase, eventually at an integer number of periods. Hence the geometry of the Fermat's spindle between emitter and absorber. Out of the Fermat spindle(s), the transmitted power is null, for each photon or any other "*particle*".
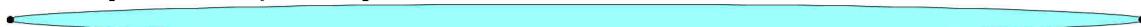
In the case of an interference experiment, like the Aharonov-Bohm experiment, with two separate Fermat's paths:

1.5   Every photon has an absorber.

A photon is a successful **transaction** between three partners: an emitter, an absorber, and the space or optical devices between them. This transaction transfers by electromagnetic means, a quantum of looping **h**, and an energy-momentum that depends on the respective frames of the emitter and the absorber, and of their recoils. In the case where the boundary conditions are quantic (when at least one of the ends, the emitter or the absorber beats from an initial stationary state to a final stationary state), the transferred momentum is $h\nu/c$ in the frame where the frequency ν is considered.

The limits of this definition:

One cannot quantize the acceleration of an electron in a magnetic or an electric field. So the acceleration of an electron in a vacuum tube, in a cathodic ray tube or in an electronic microscope, or in a particle accelerator, the synchrotron radiation, the *Bremsstrahlung* (braking radiation) all that escape to the quantic sub-domain: no stationary states with defined frequencies before and after.

1.6   The properties of a crowd of individual waves flow from the properties of the individual waves, and not the inverse.

We distinguish between:
1 – Waves in a collectivity (of atoms or molecules). So are the gravity waves between two fluids, and acoustic waves, seismic too. And in microphysics, the spin waves in a ferromagnetic material, the phonons, the plasmons, and polaritons.
2 – The collectives of waves, such as light, or a beam of electrons, ions or neutrons. These collectives comprise many individual emitters and many more potential absorbers.
3 – The individual waves, for each quantic "*particle*", photon or neutrino for instance. In the quantic sub-domain, each one of these individual waves converges onto one individual absorber.

1.7   Macro-time $\neq$ micro-times.

The god of Isaac Newton, in charge of all seeing simultaneously, does not exist. The time of Isaac Newton, a supposed universal and ubiquitous parameter, does not exist either. We distinguish the macro-time of macro-systems such as the laboratory, from the micro-times where dwell all the gropings of broglian waves from which emerge the successful transactions. The macro-time is a statistical emergence, and it flows the same way as the entropy, a statistical emergence too. It has no causal power in microphysics. No nucleus ages.
Corollary: We cease to presuppose that the causal irreversibility proved in macrophysics for the macro-time could be extrapolated to the micro-times the transactions emerge from. This irreversibility is a crowd effect. We cease to disdain and censure the two retrochronous components resulting from the Dirac equation for the electron, or any fermion.

1.8   Kirchhoff's Principle of retrosymmetry.

For the 17th century, it is known that in our low gravity, far from a Schwarzschild horizon, every real optical path is reversible. In 1859, Gustav Kirchhoff has proved that the Fraunhofer dark spectral lines from a cold gas or vapor correspond to bright spectral lines of the same elements in a hotter gas. So the spectral emission of a photon is exactly the same physical phenomenon as the absorption. Generalization: the retrosymmetry applies to the low energies of all the atomic physics, the molecular spectroscopy, and all the solid state physics.
Limitations: But the exception of the Mössbauer effect, no experimental proof of retrosymmetry exists in the domain of nuclear physics, nor in the nucleosynthesis in the implosion of a supernova, nor in high energies. Where a neutrino is emitted, no retrosymmetrical experiment is feasible.

1.9   No, it is impossible to isolate a quantic system.

No, it is impossible to isolate a quantic system as we isolate its equations at the blackboard: No mean exist to shield the Dirac-de-Broglie noise. It is impossible to predict which transaction will emerge, nor when. Only the admittances may be computed and predicted. The implied de Broglie frequencies are inaccessible from our human scale, and the theorem of the requisite variety, from William Ross Ashby, is here to ruin all our fantasies of panoptical omniscience. Moreover, the innumerable involved micro-times are bi-directional: orthochronous and retrochronous.

1.10 Moral principle: Hiding so many experimental facts from the students is wrong, and it violates the scientific deontology.

When a theory is, at last, correct, it does not have exceptions.

Many experimental results embarrass the hegemonic Göttingen-copenhaguists: All the spectral absorptions (they are frequential, while their theory is anti-frequential), all the interferences such as all the radio-crystallography, the anti-reflective coatings, the quarter-wave plates, the interferential colors, the Goos-Hänchen effect in plane polarization, Imbert-Fedorov in circular polarization, all proofs of the non-negligible width and notable length of each photon. A very long list! They hid from you the transparency effect Ramsauer-Townsend (1921), which is strictly undulatory. As an electron is strictly undulatory, no more means to impress the naive public, by the mystic "*wave-corpuscle dualism*". Many other everyday experimental results are incompatible with the corpuscular ideation of the Göttingen-Københavnists, for instance the whole radiocrystallography, the whole interferential astronomy, so on.

2 Eighteen surreptitious postulates.

2.1 Anti-relativistic postulate

For them, the time remains the Isaac Newton's one, where his god could simultaneously see all. According to the formalism they teach, their time is a universal and ubiquitous parameter. However, any photon violates their postulate, as its proper time is null. The creation and annihilation reactions are simultaneous in the photon's time. However, its coherence length and duration are not null: interferences exist!

2.2 Corpuscularist postulate

Or anti-optical postulate, as any quantitative law of optics is incompatible with the corpuscularist ideation. All the spectrography, the interferences (photonic, electronic, or neutronic), the radiocrystallography, the antennas and their directivity, the anti-reflective coatings, the interferential colors, the quarter-wave plates, the Ramsauer-Townsend transparency effect, many fine effects in polarized light, all these facts are incompatible with the myths of the corpuscularism. For an erroneous half-sentence by Albert Einstein in 1905, they were all convinced that the resurrection by Einstein of the Newtonian corpuscle, was right. However, this concept is internal to macrophysics, very far from the atomic limit, and never any extrapolation to microphysics has been validated by any experiment.

2.3 Tribal postulate anti-Broglie, anti-Schrödinger, so anti-frequential.

The obligation to negate any frequential phenomenon, except those electromagnetic and massless. Negate the intrinsic frequencies of any particles with mass (spinorial frequency of Louis de Broglie **mc^2/h**, and electromagnetic frequency of Dirac-Schrödinger, **$2mc^2/h$**). Negate the two retrochonous components of the electron wave, brought by Dirac equation in 1928. Negate the *Zitterbewegung*. Hide the Ramsauer-Townsend transparency, 1921, because it proves that the electron IS its broglian wave.

2.4 Postulate of macroscopic geometry

The copenhaguists postulate auto-similitude of time and space at any scale, with unlimited extrapolations. Furthermore, they extrapolate to microphysics the statistical irreversibility of the macroscopic time, and the topology with unlimited fineness, inherited from the mathematicians of the 19th century, up to under the atomic limit where it is no more valid at all.

2.5 Geometrical corollary n° 1: "*Something very small*".

Postulate that you always can find a smaller something, enabling you to assert that something, says an electron, is "*small*", corpuscular, even "*punctual*". Bad luck: this smaller something does not exist.

2.6 Geometrical corollary n° 2, anti-absorbers.

"*There are no absorbers in microphysics. Only artillery of corpuscles, exactly as in macrophysics*".

2.7 Positivist and opportunist postulate.

Systematically put a macroscopic "*observer*" - a big animal with slow perceptions - in the middle of the picture, to rule the microphysical realities, instead of analyzing which may be the proper size of mesh for analysis, they deny realities, and set above all the territorial comfort of the leaders.

2.8 Anthropocentrist and positivist postulate.

"*The physical laws are made for the satisfaction of the copenhaguist physicist, to furnish him information*". If the copenhaguist physicist can not more know for sure the position of the submarine, then the submarine is in a superposed state between three miles further north and three miles further south (and west and east). Banesh Hoffmann *scribit...* Daring to distinguish the microphysical realities from the knowledge we have on them, is said to be a heresy and relapse crime. We came about fifteen milliards years too late to dictate that the physical laws should be made for us, but they do not even notice this discrepancy.

2.9 Anti-Fourier corollary.

As the properties of the Fourier transform were established one century earlier, and as Joseph Fourier was a frenchman, and considering the emotional feelings in Germany against France in 1925, Werner Heisenberg was perfectly right to relabel these properties into "*Principle of Cruel Uncertainty* of the Immortal Prophet". Only a conspiracy of nature could hide from Heisenberg the exact position of the supposed *corpuscle...*

2.10 Wigner-Neumann animist postulate

"*Me, Myself and I, as a big macrophysical animal, self-claimed as "the observer", I am so almighty that I have the power to delay forever the absorption reactions and the consecutive decoherence, just by not observing!*"
In opposition, Erwin Schrödinger published in 1935 the humorous apologue of the *dead-alive* cat, remaining in the *dead-alive superposed state* as long as a copenhaguist physicist does not lean his august attention on the results of the experience. Overtly, Schrödinger mocked the animist postulate that the Göttingen-copenhaguists admitted; but they remain so arrogant, that eighty-three years later they still do not perceive the sarcasm.
All the marketing hype promising marvelous "*quantic computers*" is founded on the Wigner-Neumann animist postulate.

2.11 Postulate of separability and delimitablity (or postulate of triumphal laziness).

As we can only write a limited system, and as anyway, we are impatient to alleviate already heavy formulas, therefore a quantic system is naturally delimited, naturally separated and independent of the remaining of the world. Alas, this postulate is heavily wrong.

2.12 Magic and supernatural postulate.

Or if you prefer: goblinic and poltergeist: postulate that each quantum particle (electron, photon, neutron, proton...) is individually exempted from any physical law, but magically, in great numbers, its statistic rejoins some statistical physical laws, just as this collectivity blurs the corpuscular properties they were postulated to have. Never the copenhaguists detail the physical miracle by which the individual no-laws is transmuted into a collective law.

2.13 Anti-undulatory postulate.

Though the chemists use it with success, the copenhaguists postulate that any wave under the Schrödinger equation must be fictitious, without any physical meaning, and its only use is to be elevated at hermitian square to obtain the probability of apparition of the magical and supernatural corpuscle. This goblinic and poltergeist corpuscle is allowed to explore "*beyond the planet Jupiter*" during its travel from the electrons cannon to the cathodic screen or the microchip to engrave. Feynman and Hawking have written it, so it must be true...

2.14 Confusionist postulate.

To deny the atomic limit in undulatory, prescribe to confuse all kind of "waves", each individual wave (quantic wave) with any collective of waves, and these collectives with gravity waves or elastic waves in a collectivity of matter, then mathematically unify all these kinds: the individual waves (quantic ones), the collective, and the collectivity waves. The Born-Heisenberg copenhaguism is founded on this trick, and it is so for ninety-one

years. A hegemonic swindle. Tip: an individual wave has only one emitter and only one absorber, and usually at least one is on the microphysical scale.

2.15 Anti-Dirac and anti-Schrödinger censure.

Hide from the students that among the four components of the wave equation of the electron, two of them are retrochronous.

2.16 Tactical postulate.

In each controversy, agglomerate the formalism and the Göttingen-København semantics, and teach they may not be separated. Then you deny any meaning to the word "semantics".

2.17 Göttingen postulate.

Only "*states*" exist, please forget the transitions. Because the durations and the properties of the transitions, such as the length of coherence of photons, proved by interferences by Thomas Young in 1801, are not compatible with the corpuscularist postulate.

2.18 Superiority-of-the-pack postulate.

*We are the modern forever. The vile objectors and non-believers are just dimwitted, brain-damaged, and retired colonels of cavalry, who try to return to **classical** physics.*
And after me, there will be no more prophets, as the new physics is complete!
All the sects and most of the packs sell prostheses of narcissism to their adherents.

3 Original results.

The simplified approximation of the geometry of the Fermat spindles should be improved. However, the approximation by constant curvature works not so bad in far fields, as seen in astronomical optics. For instance we can predict a relation between the minimum drop of rain, and the distance from the eye or camera to still observe a rainbow, by the half-angle of the tangent cone (or *Fermat angle*): $\alpha = \sqrt{\frac{3\lambda}{4a}}$ where where λ is the wavelength, and **a** is half the distance between the emitter and the absorber, in the vacuum.
Owing to the geometry of the Fermat's spindle, we have dimensioned the pretended experiment which is pretended to validate the contrafactuality of Elitzur and Vaidman. It has been proved that the "*quaking mirror*" that could reveal the corpuscle-photon, will be anyway too heavy by seven or eight magnitudes. http://www.agoravox.fr/culture-loisirs/culture/article/contrafactualite-penrose-elitzur-155565 (2014).
In other domains of astronomy, even interferential, and of physical optics, and fine polarization effects, we have not yet brought new results, only proved that our theoretical results are fully coherent with all known experimental facts – including those many which are carefully hidden from the students in quantics. For instance in radiocrystallography, or in physical methods of analytical chemistry, or in solid state physics.
Everyday experiments like the convergence of any photon on the cis-retinal in our opsins in the retina in spite of defects of vergence prove that the transaction of the photon, emitter-optical_space-absorber, adapts the angles of arriving at the cornea, to obtain the convergence entirely on an opsin. Anyone can verify: adding defects of vergence, such as astigmatism, does not affect the perception of the colors, nor the illumination. So is the transactional retrosymmetry. https://www.agoravox.fr/culture-loisirs/culture/article/une-preuve-definitive-par-l-205808 (2018).

4 Bibliography:

Augustin Fresnel (1815). *Premier mémoire sur la diffraction de la lumière.*
http://www.bibnum.education.fr/physique/optique/premier-memoire-sur-la-diffraction-de-la-lumiere
Augustin Fresnel (1819). *Mémoire sur la diffraction de la lumière.* Primé par l'Académie des Sciences. Mém. Acad. Sci. 5 (1821-1822).
Gustav Kirchhoff (1859) "*Ueber die Fraunhofer'schen Linien*" (On Fraunhofer's lines), Monatsbericht der Königlichen Preussische Akademie der Wissenschaften zu Berlin (Monthly report of the Royal Prussian Academy of Sciences in Berlin), 662–665.
Gustav Kirchhoff (1859) "*Ueber das Sonnenspektrum*" (On the sun's spectrum), Verhandlungen des naturhistorisch-medizinischen Vereins zu Heidelberg (Proceedings of the Natural History / Medical Association in Heidelberg), 1 (7) : 251–255.

James Clerk Maxwell (1873). *A treatise on electricity and magnetism.* Reprinted by Dover.

Laue, Max von (1913). "*Röntgenstrahlinterferenzen*". Physikalische Zeitschrift. 14 (22/23): 1075–1079.

William Henry Bragg, William Lawrence Bragg, "*X Rays and Crystal Structure*", G. Bell & Son, London, 1915.

Einstein, Albert *(1916). Strahlungs-Emission und Absorption nach der Quantentheorie.* Verhandlungen der Deutschen Physikalischen Gesellschaft. 18: 318–323. Bibcode:1916DPhyG..18..318E

Einstein, Albert (1916, 1917). Quantentheorie der Strahlung (On the Quantum Theory of Radiation) Mitteilungen der Physikalischen Gesellschaft, Zürich, 16, 47–62.

P. Scherrer (1918), *"Bestimmung der Grösse und der inneren Struktur von Kolloidteilchen mittels Röntgenstrahlen,"* Nachr. Ges. Wiss. Göttingen 26 (1918) pp 98–100.

Carl Ramsauer (1921). *Über den Wirkungsquerschnitt der Gasmoleküle gegenüber langsamen Elektronen.* Annalen der Physik, vol 369, n° 6,1921 p. 513-540. (DOI 10.1002/andp.19213690603)

J.S. Townsend and V.A. Bailey (1921). *The motion of electrons in gases.* Philosophical Magazine, vol S.6. n° 42, 1921, p. 873-891.

de Broglie, Louis (1924). *Recherches sur la théorie des Quanta.*
https://tel.archives-ouvertes.fr/tel-00006807/document

Schrödinger, Erwin (1926). *An Undulatory Theory of the Mechanics of Atoms and Molecules.* Physical Review 28 (1926), 1049-70, on p. 1070.

Dirac, P.A.M. (1928). *The quantum theory of the electron.* 01 February 1928.
https://royalsocietypublishing.org/doi/pdf/10.1098/rspa.1928.0023

Schrödinger, Erwin (1930). *Über die Kräftefreie Bewegung in der relativischen Quantenmechanik.* Siztung der phys.-math. Klasse von 31, Juli 1930. - Mitteilung vom 17,Juli.

Dirac, P.A.M. (1933). Nobel lecture.

Dirac, P.A.M. (1938). *Classical theory of the radiating electron.*
http://rspa.royalsocietypublishing.org/content/167/929/148.full.pdf+html?sid=6beab19c-67b9-4307-a637-1975aeb64ebf

Wheeler, John Archibald, Feynman, Richard Philips (1941, 1945). *Interaction with the Absorber as the Mechanism of Radiation.* Reviews of Modern Physics. Volume 17, number 2 and 3, April-July 1945.
https://authors.library.caltech.edu/11095/1/WHErmp45.pdf

Henderson, Giles, Rittenhouse, Robert C., Wright, John C., Holmes, Jon L. (1979). *How a Photon Is Created or Absorbed.* Journal of Chemical Education :
http://jchemed.chem.wisc.edu/JCEWWW/Articles/DynaPub/DynaPub.html

Craig F. Bohren, "*How can a particle absorb more than the light incident on it?*", Am J Phys, 51 #4, pp323 Apr 1983.

H. Paul and R. Fisher (1983). *Light absorption by a dipole.* Sov. Phys. Usp. 26 (10), Nauk 141, 375-381Oct 1983.

M. Gouanère, M. Spighel, N. Cue, M.J. Gaillard, R. Genre, R. Kirsch, J.C. Poizat, J. Remillieux, P. Catillon, L. Roussel. *Experimental observation compatible with the particle internal clock.*
http://aflb.ensmp.fr/AFLB-331/aflb331m625.pdf

Shahriar S. Afshar (2001, 2003). V*iolation of Bohr's complementarity: one slit or both?* AIP Conference Proceedings, 2006 v. 810, 294–299.

John G. Cramer (2006), *"A Transactional Analysis of Interaction Free Measurements"*, Foundations of Physics Letters 19, 63-73 (2006); arXiv:quant-ph/0508102.

John G. Cramer. *The Transactional Interpretation of Quantum Mechanics and Quantum Nonlocality.*
http://arxiv.org/abs/arXiv:1503.00039

Complete handbook for popularization, where the complete external references are developed.
In french: **Microphysique quantique transactionnelle, Principes et applications**.
http://www.lulu.com/shop/jacques-lavau/microphysique-quantique-transactionnelle-principes-et-applications/paperback/product-23362834.html
In english: **Transactional Quantum Microphysics, Principles and Applications**.
http://www.lulu.com/shop/jacques-lavau/transactional-quantum-microphysics-principles-and-applications/paperback/product-23656620.html

5   Aknowledgements