

Assessing Consequences of Overextended Secret Reviewing

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We learn too much and understand too little,
Yet understanding comes from learning
So strive using the latter to enhance the first

What motivates the majority of scientists to accept the Copenhagen doctrine of quantum mechanics, when superior alternatives have existed since de Rham and before? This paper assesses what's really going on.

The King of Science's Identity Crisis as Revealed by the Queen of Science

To those not familiar with the informal hierarchy of faculties in academia, let it be known that Mathematics is known as the Queen of science, whereas Physics, or Natural Philosophy as Newton called it, became the King of science. Probing back into our early school-day exposure to these matters one may not have escaped an impression how in the course of time Mathematics acquired a position that made it a prerequisite for professionally indulging oneself in the realm of Physics.

Newton was one of those rare practitioners who created his own Mathematics for what he needed in the Physics he developed. Euler was another who was a master at the two disciplines. Gradually, however, a division of specialties became unavoidable. The upshot was from time to time the King was asking the Queen for favors and at times the Queen scolded the King of poor mathematical habits. If her complaints had no effect the Queen would play hard to get, yet as fundraiser the King was in a position to respond by tightening the purse strings. Gradually, and almost imperceptibly, a joint interest in a constructive cooperation between Mathematics and Physics became subject to a game of politics and legal maneuvering. In the end more funding went into political, legal and financial services, it was called *overhead*. Further along the road rendering service to the King and Queen of the sciences all by itself became an object of science. Our institutes of higher learning then began adding *political science* as object of learning. In time they issued degrees in *specialized law* and *finance, imaginative bookkeeping and administration*. Ever since poor citizens have been wondering why deficits and prospect of ever-bigger deficits are now topics of never ending discussion.

However, we started out with predicaments of the King and the Queen. It was their interaction with an outer world of funding that had created problems. So getting back to Physics and Mathematics there was an awareness that from time to time the two were going hand in hand. Fortunately that happened, because despite occasional discord both fields have been progressing well. Major causes of inner and mutual discords were the events of quantization in Physics; initiated by Planck in 1900. In 1931 de Rham initiated a comparable phenomenon in Mathematics named *periods* earlier known as *residues*.

Planck's amazing discovery made *action* discreteness, *i.e.*, quantization, a necessary condition to produce a finite theory of heat management in the universe. The ensuing universal con-

stant h was five years later shown by Einstein to have a crucial role in single events with a quantitatively correct description of the photoelectric effect.

Formally speaking though Faraday's discovery of electric charge discreteness e^\pm preceded the Planck action discreteness, yet action discreteness had struck man as more abstract until particle spin evened out the score. The charge versus spin-action battle of abstractness so reduced itself as mostly in the eye of the beholder.

Now a comparison with what happened in mathematics some three decades later. Swiss mathematician de Rham discovered that certain structure features in otherwise continuous fields could make themselves known as discrete domain-related features called *periods*; *e.g.*, discrete values of cyclic integrals. Cauchy had earlier used the latter as integral residues at poles in complex function theory. De Rham extended this into a method of probing the existence of general topological structure in manifolds of higher dimension. It is now known as de Rham theory or de Rham Cohomology. It makes assertions about the *existence* of a possible discreteness without calling for specifics.

Physics also, but without calling on the just cited de Rham perspectives, had come up with two integrals that fit the pattern of period integration. They are the (Ampère)-Gauss' integral of electrostatics counting net electric charge $|e|$ inside a two-dimensional cycle; it goes back to early in the 19th century. The other is a one-dimensional cyclic integral of the vector-potential linking flux. Aharonov and Bohm gave it a space-time form in 1959. Two years later the seminal experiments by Doll *et al* and Fairbank *at al* identified the existence of its periods having magnitudes equal to multiples of $h/2e$.*

Readers though should be aware that the Ampère-Gauss integral is well accepted; yet the current status of the AB integral is one of indecision, because it does not jibe with Copenhagen Doctrine that instead elevates Schroedinger's equation to the level of a primary quantizer. Physics has now lived with this compromise for half a century. An inspection of major textbooks on this score sadly confirms this prodigious state of affairs for the King of science. Even so the AB integral has now unofficially assumed the role of a major tool of modern physics that no longer can be denied or ignored.

* About the difference keep in mind the Doll-Fairbank experiments are static, whereas the dynamics of the Schroedinger equation calls on joint time- and space-loops for the corresponding AB integral.

Those who wonder how the above cited de Rham perspective affects the state of affairs in Physics; the answer is that it becomes a tragic confirmation of the inadequacies of Copenhagen's Doctrine. A statement injected on p194 of *Foundations of Physics* 12/2,169(1982) painfully supports this Copenhagen inadequacy. It showed how a precise empirical joint formula of integer and fractional quantum Hall effect jointly and simply describes the Hall impedance Z_H as a ratio of the Ampère-Gauss- and the Aharonov-Bohm integrals *i.e.*, for the plateau states of quantized flux over quantized charge:

$$Z_H = \frac{n}{s} \cdot \frac{h}{e^2}; \quad n \text{ and } s \text{ integers}$$

*The fact that plateau states became identified by integers n and s is living testimony that for those states both integrals meet conditions of de Rham's **existence** theorem with an exactness reflected in ensuing improved measurements of the constants e and h .*

The one and only reason why that vast majority used instead a statistic Copenhagen-based Schrödinger approach on this non-statistic Quantum Hall effect had been dictated by Copenhagen Doctrine holding Schroedinger's equation to be a primary quantizer. Now after thirty years of trying it still ends up in a dichotomy between integer and fractional effects. Instead of common sense non-statistic tools, the vast majority opted for the statistic tool (Schroedinger) on a perfectly non-statistic order. Hardly elegance of procedure had tempted this majority.

Misguided perspectives for fractional charge could have been a factor, when that option faded away along with others propositions there was the composite fermion. Since a Cooper pair is a fermion composite why not acknowledge the existence of a unified treatment right away honoring its empiric and experimentally well-confirmed formula with some help of simple and fair theory? Mentioning Cooper pairing raises questions of induced superconductivity in the plateau states. It would seem a 2-dimensional interaction space between adjacent layers provides Coulomb conditions for a BCS exchange of positive repulsive energy into negative energy of neighbor attraction.

Downright suspicious though has been a total absence of any acknowledging responses from that vast majority when during the Eighties and Nineties AB followup options for the quantum Hall effect were published in Canada and Europe. This strange omission raises questions of ethics of unduly protecting over time a convoluted quantum Hall dichotomy. APS publications have never done anything such as mentioning an AB option as a

conceivable key to the quantum Hall effects. Hence that cover a vast majority of *thousands* of authors! During this time the AB option generated one US commentary in *Physics Today* (April 1987 p.122) by R.M. Kiehn.

The just delineated history of publication evolved under auspices of the celebrated US (*secret*) peer-review system. For those who have believed in an evenhandedness of this system of evaluation the just given confrontation with reality could hardly be more condemning. It is just hard to understand how a self-congratulatory review system managed to promote for so long a majority pursuit of dichotomy over a palatably unified processing of charge injection s for integer and flux injection n for fractional effects.

For thirty years that majority was successful in pursuing money more than an unbiased pursuit of physical truth. Hard to tell what majority part took that course of action in good faith and what part was aware how truly viable alternatives held a danger to continued funding. It is suspicious indeed how exactly that vast majority tried so hard maintaining a perfectly arrogant isolation. Of course the AB option, by contrast requires abandoning Copenhagen Doctrine, therefore, let it be known that a Schrödinger reinterpretation have been discussed in BPS181 monograph entitled *Quantum Reprogramming*. Reference specifics made in this write-up can be identified in that text.

It would seem these verifiable matters now need to be confronted in open forum, because an overriding use of secret peer reviewing must be held responsible for this intolerable over-extension of one-sided pursuit as here reported. The fact is despite independently verified flux and charge quantization, and Z_H defined as a ratio of the two since 1982, US officialdom, such as mainly represented in the APS publications, has been presenting its members and the public at large a crippled quantum Hall dichotomy. It sounds utterly unbelievable, yet the facts are there to prove it. One may now ask what led them into that trap? Was it a naïve blind-sided belief in Copenhagen Doctrine or were they hoping for a career in Industry, or perhaps both? Surely, the American King went overboard protecting Industry and in doing so 'he' became a victim himself; more attention to his spouse had been indicated. The moral of this story is that in business an ulterior-motivated hiding of critical information is mostly considered as cautious and smart, in science the same move may be counterproductive or stupid, in some cases even criminal.