Review of: "Quantum Entities and the Nature of Time"

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I am supportive of the “Qeios” model of publication; it may offer a welcome relief from the stranglehold of “conventional wisdom” that regrettably infects so much of academia and the scientific publishing community. This paper offers an interesting conjecture as to how complex time might be incorporated into quantum mechanics. However, in my view the paper requires further work in a number of areas:

1. In the historical context of the “first point”; originally the “new quantum theory” was not seen as a theory at all but rather a mathematical or mechanical recipe for getting the right answer—it was called “Quantum Mechanics” and has continued to produces the right answer for the last 100 years or so notwithstanding endless philosophical discussion on the nature of the wave function, Hidden Variables, Bell’s Inequality etc. etc. Much of the bewilderment and confusion arises from the difficulty of translating mathematical results into language and the everyday meaning and connotation of words. It was for this reason that Dirac famously refused to discuss the meaning of equations; in Cambridge there was a joke where the unit of conversation was defined as the Dirac—or one word per minute. Dirac was trained (B.Sc) as an electrical engineer at the Uk’s University of Bristol and was well versed in the theory of Fourier/Laplace transforms to express an intensity-time signal as a power spectrum. There is nothing theoretical or hypothetical or mysterious about this and it is used in numerous applications in signal processing etc. But when the variables are translated into position and momentum, both easily understood, the same mathematical technique produces the Heisenberg uncertainty principal which is accorded some mysterious or miraculous attributes. When we start into imaginary time and the interpretation of the wave function the depths of philosophical speculation approach, perhaps asymptotically, infinity. When a new conjecture is proposed in a well-researched area it is essential to produce and report evidence that the new approach rationalizes a previously inexplicable observation or predicts a new effect that can be tested by experiment. I did not see evidence of any new physics.

2. As regards the “second point” regarding quantum entities and space, I was looking forward to a discussion that might advance the field. Prof. Carl Bender has investigated this area in detail using new asymptotic perturbation theory incorporating, for example, iX^4 terms in the Lagrangian. This led to the examination of non-Hermitian operators and the discovery of PT symmetry. This was all rather beautiful mathematical physics but the important point is that it predicted a number of new physical phenomena that have now been confirmed experimentally; indeed, some of which may well prove to have applications in medical physics. Curiously, I saw no reference to Bender and this paper would be improved considerably by discussing the current approach within the context of Bender’s modern work.

I do not recommend this this paper for publication in its present form.

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