McTaggart's Time, the Schrodinger equation, Minkowski space, and Qualia 3 30 2023

1. Schrodinger Equation, fragmentalism, total time T, Euclidean space
2. Does the A-series have the properties of qualia?

1. A few notes on the A-series in quantum mechanics.

1.1 In the Presentist Fragmentalist interpretation of quantum mechanics the Schrodinger Equation

(1) $$i\hbar\frac{\partial|\psi(t)\rangle}{\partial t}=\hat{H}|\psi(t)\rangle$$

can be written

(2) $$i\hbar\frac{\partial|\psi(t)\rangle}{\partial t}=\hat{H}(\tau)|\psi(t)\rangle$$

where the time *t* is a B-series in each case and the time *τ* is an A-series.[1] This difference between the B-series and the A-series is the point of the Schrodinger Equation.

1.2 How can we characterize fragmentation? If *v* is a variable in fragment 1 that has a value (or certain range of values), then, *in cases where the A-series is involved*, the corresponding variable *v´* in fragment 2 does not have a definite value (or has a certain range of values). And *vice versa*. This gives uncertainty relations.

1.3 The condition for the 'total time' T

(3) $$T(\tau,t)=j\tau+ikt$$

for constants j, k, is interesting, might explain the complex numbers in the Schrodinger Equation[2], and gives

(4) $dt/d\tau = ik/j$

This is 'how fast time is going by'.

1.4 For a 'Euclidean' metric (with 1 spatial dimension) we can get

(5) $S^2 = T^2 + x^2$

and from (3) we get

1 There are several reasons movement along the A-series should be given by an operator [refs…] independently of its utility in interpreting the Schrodinger Equation.

2 One wonders if one can write the (complex) Schrodinger Equation, that is in terms of a real time variable *t* as a (real) diffusion equation in terms of the complex time (3). If so, we will have been returned to a classical ontology.

(6) $S^2 = j^2\tau^2 - k^2t^2 + x^2 + 2ijk\tau t$

The point is the minus sign. In the case of 3 spatial dimensions (6) gives a 5-d AdS space. Surely the last term is not 0 only when mass is involved. The only time an experimental outcome is (ever) obtained is in the (or a) present. Being in the present is the condition $\tau = 0$ in which case (6) gives Minkowski space, as it should.[3] Evidently k = the speed of light c.

Apparently, condition (3) on McTaggartian time is relevant both the Schrodinger Equation and Minkowski space.

2. Does the A-series have the properties of qualia?

Where does the A-series stand with respect to the qualities or properties that qualia could have?

One list of these properties is 1. intrinsic, 2. ineffable, 3. immeaditley apprehensible, 4. non-physical, 5. private, 6. unity, 7. perspectival, 8. intentionality, 9. qualitative character, 10. ineffability, 11. subjectivity, 12. directness, 13. reliability, 14. atomicity [Lormand 1994, de Leon 1997, ChatGPT 2023].

In the Calculus of Qualia [Merriam 2022a] it is argued that qualia are also 15. necessary, 16. names of themselves, and in fact every theorem of the calculus should be seen as a property.

Does the A-series have these properties [McTaggart 1908]? I think so (except for intentionality; the experience of intending something would seem to be *another* quale added on to a quale itself). The upshot would be that the A-series can be treated as a quale(-ia). In the case of panpsychism properties (5) and (10), privacy and ineffability, would go all the way down to A-series privacy and ineffability for *each* quantum system. That yields the Presentist Fragmentalist interpretation of quantum mechanics [Merriam 2022b].

References

ChatGPT, 3/4/2023, "What are the properties of qualia?", https://chat.openai.com/chat

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Lormand, E., 1994, "Qualia! (Now Showing at a Theater near You)", *Philosophical Topics*, 22: 127-156, http://www-personal.umich.edu/~lormand/phil/cons/qualia.htm

MacTaggart, J. M. E., 1908, "The Unreality of Time", *Mind*, Vol. 17, No. 68, pp. 457-474, http://www.dif.unige.it/epilog/McTaggart.pdf

Merriam, P., 2022a, "A Calculus of Qualia 9 30 2022", *Philpapers*, https://philpapers.org/rec/MERACO-7

3 It is possible to have an ontologically thick present, whereby ‘the present’ is given by some non-trivial function on the A-series generally centered at the point $\tau = 0$.

Merriam, P., 2022b, "Presentist Fragementalism and Quantum Mechanics", *Foundations of Physics*, 52, article number 91, https://doi.org/10.1007/s10701-022-00606-5