Perspectival ontology + McTaggart = an AdS/CFT?

The modest ambition of this short note is to point out a plausible route from a *perspectival ontology* and McTaggart's *AB-spacetime* to an AdS/CFT correspondence. There are several minor arguments that would need to be filled in for this route to succeed.

McTaggart [2] distinguished between two series that characterize time. There is the A-series, which is the future/present/past spectrum. This can be coordinatized by a real variable τ, which has units of *e*s (*e* is just a name for the unit of 'becoming' and not the electric charge, here) [1], such that $\tau > 0$ indicates an event is in a system's future, $\tau = 0$ indicates the event is in that system's present, and $\tau < 0$ indicates the event is in that system's past. The spectrum can be generalized by a 'presentism function' $p(\tau)$, a complication not dealt with in this note, [1]. And there is the B-series, which is the later-than (or, equivalently, earlier-than) spectrum, parameterized by the usual real time variable *t*, which has units of seconds. One may vary either variable while keeping the other one constant, and in many cases this is plausible, so these *cannot* be the same temporal variable/parameter. *Any* fundamental theory that aspires to completeness must account for *both* series in some way.

Since relativity we know there is no universal notion of simultaneity. So each τ is considered *ontologically private*, for each physical system, which index the *ontological perspectives* in our perspectival ontology. This is in exact analogy to (or indeed equal to) the role of qualia in Dualism. Planes of simultaneity and so forth are supposed to affect the B-series (plural) only, for each perspective.

Let 'Alice' denote an ontological perspective. In what might be called 'AB-spacetime' (for A-series and B-series spacetime), Alice's spacetime (i.e. the spacetime of a given perspective) is parameterized by the *five* variables (τ, t, x^a). These are the location of an event in Alice's future/present/past spectrum τ, the location of the event in Alice's later-than spectrum t, and the location of the event in Alice's three space coordinates x^a. AB-spacetime for each perspective is 5-dimensional.

Let 'Alice' and 'Bob' name two different systems. Since Alice and Bob are two different perspectives there is no one perspective (until quantum mechanical observation, or collapse of the state-function) that contains both, since the variables τ and τ'' (see below) are ontologically private. Instead there are, in obvious notation, while disregarding constants,

(1) Alice's AB-spacetime, (τ, t, x^a), from Alice's perspective, and Bob's AB-spacetime, (τ', t', x'^a), also from Alice's perspective, and

(2) Bob's AB-spacetime, (τ'', t'', x''^a), from Bob's perspective, and Alice's AB-spacetime, (τ''', t''', x'''^a), also from Bob's perspective.

The interface of (1) and (2) is taken to be quantum mechanical. This is how the Schrodinger's Cat paradox was resolved in [1]. We may write, for the 'complete time' of Alice, $T = T(\tau, t)$.

The outcome of an experiment is revealed to Alice in her present, given by $\tau = 0$. Also the outcome must be Lorentz-invariant, thus in Minkowski space (for the 'flat' case…), thus one has

(3) $T(0, t) = it$,

where i is the imaginary unit, where (3) is constrained by the Minkowski space signature (- + + +) for the variables (t, x^a).

If it can be argued that the general metric of Alice's AB-spacetime, from Alice's perspective, is given, in obvious notation, by

(4) $d\tau^2 - dt^2 + (dx^a)^2$

then the space is AdS_5, if I understand it, though I do not claim to be an expert in these correspondences. Now, *if* it can be argued that Bob's AB-spacetime *from Alice's perspective* is given by

(5) $d\tau'^2 + dt'^2 + (dx'^a)^2$

then one has AdS_5 x S^5 for Alice and Bob's AB-spacetime, both *from Alice's perspective*. One must argue that

(6) $-dt^2$ gives $+dt'^2$

for some reason, both from Alice's perspective.

This is more and more plausible the more one thinks about it… it means that the (quantum) observation is in the future of both Alice and Bob (assuming the observation has not happened yet, i.e. $\tau, \tau' > 0$), but to the extent that the observation will be a temporal distance *later than* for Alice, it will be that temporal distance *earlier than* for Bob (from Alice's perspective), so the squares of the B-series distances t^2 and t'^2 should have opposite signs (this is backwards in [1]).

Then we would have it that Alice has an AdS_5 x S^5 from her perspective and, analogously, Bob has an AdS_5 x S^5 from his perspective, and their interface is quantum mechanical, which strongly suggests the boundaries of these AB-spacetimes are quantum mechanical. Moreover, an outcome for Alice is constrained, at $\tau = 0$, by the *four* variables of Minkowski spacetime. It is *intuitively* plausible that the boundary is a QFT and, as the geometry from Alice's perspective cannot be completely unrelated to the geometry from Bob's perspective, but nevertheless cannot be in the same AB-spacetime, is indeed a CFT.

References

[1] Merriam/Horne (2020). "A new theory of time 2 29 2020", draft, https://philarchive.org/rec/MERANT-3

[2] J. M. E. McTaggart (1908). "The Unreality of Time". *Mind* 17: 457–73.