

Is there an objectification at a distance?

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The ascription of properties to individual quantum systems has been essential for the semantics of quantum logic from its very beginning. But for multipartite quantum systems in entangled states on a Minkowski space-time there is no universally accepted picture of the significance of propositions about the total system even today. As is clear from the EPR paradox and the empirical evidence of quantum correlations, either the locality or the reality assumption of classical physics (or both) have to be weakened in quantum theory.

Taken for granted the objectification of a quantum property at one part of a bipartite quantum system, one might claim an instantaneous “objectification at a distance” for the other part, the validity region of the proposition under study being the complement of the backward light cone of the objectifying event in space-time. This has been elaborated by Mittelstaedt and Stachow already in 1982/83 under the notion of *relativistic quantum logic*.

In contrast to this approach, we argue for a *Neo-Copenhagen view* in which objectification comes always from a classical apparatus and the quantum state is updated only locally, i.e. on the forward light cone of the objectifying event. Regarding “objectification at a distance” as a purely metaphysical concept, we show how to weaken the realistic interpretation and the semantics of quantum properties.

In the resulting consistent Copenhagen picture, the common term “quantum nonlocality” loses much of its appeal. This is interesting in its own right, but may also be useful in facing the Bohmian challenge of quantum interpretation.

Time proposal: 20 min. talk + 10 min. discussion, or 25 min. talk + 5 min. discussion, as you like.