The representation of facts in physical theories

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Abstract

The purpose of this contribution is to call attention to a problem which has not received the interest which, in my opinion, it deserves: the problem of representation of facts in physical theories. The crucial point is, that within the framework of fundamental physical theories, the representation of facts requires a breaking of the time-reversal symmetry and nonanticipative measuring instruments. These conditions are satisfied only when the apparatus is described as a system with infinitely many degrees of freedom. In the framework of algebraic quantum theory generalized K-systems can represent facts at least in an asymptotic sense. Such a representation removes the main stumbling block which stands in the way of a fundamental theory of measurement in quantum theory.

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