

It is well known that the *objectification problem* is crucial in the quantum theory of measurement. According to Busch, Lahti and Mittelstaedt [1] this problem arises whenever an interpretation of the mathematical apparatus of standard (Hilbert space) quantum mechanics (QM) is adopted which is *realistic* (in the sense that it assumes that QM deals with individual objects and their properties) and *complete* (in the sense that it assumes that all elements of physical reality are described by QM).

If one wants to trace the origins of the objectification problem it is expedient to introduce the notion of *objectivity*. To be precise, we say that in a physical theory \mathcal{T} which is realistic in the sense explained above a property E of a physical system Ω is objective for a given state S of Ω if, for every individual example x of Ω (*physical object*) in the state S , E is either possessed or not possessed by x , independently of any measurement that may be performed on x ;¹ furthermore, we say that \mathcal{T} is an objective theory if all physical properties are objective in it for every state S of Ω , nonobjective otherwise. Then, there exist some celebrated “no-hidden-variables” theorems (in particular, the Bell–Kochen–Specker, or Bell–KS, and the Bell theorems [2, 3, 4]) which according to most scholars show that QM is a *contextual*, hence nonobjective, theory. In particular, if a pure state S is given, a physical property E is nonobjective in S if and only if one has probability different from 1 or 0 of finding the property E when performing a measurement on a physical object x in the state S . If one then maintains that QM is a complete theory, one cannot explain how physical properties that are not objective may become objective (and conversely) when a measurement is performed, which is just the objectification problem.