

# **“The Observations Obtained under the Specified Circumstances:” What quantum measurement is, and what it is not.**

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This paper reconsiders the concept of quantum measurement, following Bohr, leading him to his concept of “phenomena,” as applicable in quantum physics, defined as “the observation obtained under the specified circumstances.” This concept makes the terms “observation” and “measurement,” as conventionally understood, inapplicable in considering quantum phenomena. These terms are remnants of classical physics or still earlier history, from which classical physics inherited it, beginning with the ancient Greek thinking and the rise of geometry there. As understood here, a quantum measurement does not measure any property of the ultimate constitution of the reality responsible for quantum phenomena, which this constitution would be assumed to possess before the act of observation. Hence, the concept of observation requires a different understanding as well. An act of observation in quantum physics establishes quantum phenomena by an interaction between the instrument and the quantum object, or in the present view the ultimate constitution of the reality responsible for quantum phenomena and, at the time of measurement, also quantum objects (with are RWR-type entities as well). I qualify because in the view, advanced in this paper, in contrast to that of Bohr, quantum objects are assumed to exist only at the time of measurement and not independently. Then what is so observed as the data or information can be measured classically, in classical bits, just as one measures what is observed in classical physics, where, however, what is so measured could be associated with the object itself considered for all practical purposes. As far as the observed data or information is concerned a quantum measurement is not a measurement of anything but a number or bit generator, something akin to a quantum computer created by our interaction with nature. The paper will also consider a quantum measurement as an entanglement between the quantum object considered and the measurement instruments, and implication of this aspect of quantum measurement for the question of quantum nonlocality.