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Quanta Measurements are Indirect only

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The report presents results of the Heisenberg Cut study in the theory of quantum measurement. The solution to the problem was obtained thanks to perception of the impossibility of direct quanta measurement. An indirect test requires a deepening of the random variable definition via the Kolmogorov triad by the Frechet representation of a random element.

Measurement in general is a purposeful activity aimed at obtaining or at least deepening information about the measured object, therefore, the theory of measurement contains, along with a description of physical processes, a description of the process of converting the characteristics of the object into information.

The term "Measurement" as applied to quanta has three different interpretations. The simplest one means the act of interaction of a quantum with a measuring device, which ends in obtaining a certain value of the observable and a certain state of the quantum.
Another interpretation is a series of tests of a quantum in the same state using a single instrument. The uncertainty in the measurement results of a non-degenerate observable is inversely proportional to the square root of the number of tests.
Another interpretation of the term "Measurement" is a set of such series with different incompatible devices, such a measurement allows determining the state of a quantum if the number of incompatible devices is greater than the number of independent degrees of freedom of the quantum.

The specificity of indirect measurement is the division of the measuring device into a meter and a register. The meter directly interacts with the object of measurement, the register messures change of the meter state to one that corresponds to a certain measurement result. The Heisenberg cut is located between the meter and the register.

A sign of the classical nature of measurement here is the incompleteness of the determination of the quantum state of the meter due to the use of degenerate observables, when the relative decrease in the von Neumann entropy of the meter state in the process of state recognition is small, but the information obtained is sufficient to distinguish the results of the quantum measurement.

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