Contribution ID: **58** Type: **Poster**

# Pragmatic View on the Measurement of Quanta

*Tuesday, 22 September 2026 16:10 (5 minutes)*

Measuring a quantum, as a purposeful activity of the Observer, consists in obtaining and supplementing information about the quantum or simply checking the property of the quantum for compliance with the expectation.
Here, a mathematically meaningful representation of the Observer is proposed, which is a set of devices capable of achieving the specified goal, and the algorithm for the operation of these devices.

The observer uses a personal mathematical model of the quantum and the measurement process. The completeness of the mathematical tools depends on the purpose of the measurement.
The description of a quantum can be limited to the notion of a wave function and operators of observables, or use the notion of state vectors and matrices of observables, and even be complicated to density matrices.
Similarly, the statistical representation of probability, when it is necessary to emphasize the difference between a random variable and its value, can use the Kolmogorov triad or even, in the analysis of indirect measurements, be complicated to the Fr?chet representation of the random element.

The components of the Observer are the Source, the Measurer, the Registar, and the Controller. The Source produces the desired state of the Quantum, the Measurer interacts with the Quantum, the Registar performs the classical measurement of the state of the Measurer, and the Controller controls the process and records the result.

A classical measurement of a quantum system is considered to be a measurement of a degenerate observable that produces information in an amount small compared to the von Neumann entropy and is performed with an uncertainty that significantly exceeds the quantum limit.

he constructed mathematical model of the Observer determines the location of the Heisenberg cut and sheds light on some paradoxes of quantum theory, such as the Wigner's friend paradox.

**Primary author:** USENKO, Constantin (BITP)

**Presenter:** USENKO, Constantin (BITP)

**Session Classification:** Poster Session

**Track Classification:** STATISTICAL PHYSICS AND SOFT MATTER