



avantgarde

## Paradox of measurement

Can measurement be scientifically investigated at all? Let me explain.

In physics, resp. in exact sciences, in general, measurements are made, and once they have been made, the results of these measurements are considered to be settled with certainty, i.e. at least in principle the measured data can be kept intact forever and practically everybody looking at the data will agree on what it is—not necessarily on what it means or implies, but on what it immediately is. Hence the terms “facts” and “reality”. Of course, that this is always the case is fundamentally an assumption, but as long as no confirmed exceptions are found, that remains *de facto* a *fact* and *reality*.

A bit more abstractly speaking, measurement turns the world into numbers, “gödelizes” it, or, if you prefer, transforms it into a sequence of bits. Scientific hypotheses usually also make use of concepts that cannot be measured directly, but in the end only hypotheses that reproduce the numbers of measured data become theories in physics, or in exact sciences, in general.

Now, since before measurement, there are by definition no measured numbers, yet, the methods of exact science cannot be applied to how the process of measurement works, simply—repeating the first part of this sentence in other words—because there are by definition no numbers that can be measured during measurement, since during measurement is by definition before measurement.

It would thus not be possible to analyze and model measurement with scientific methods, since those require by definition measurement first.

This might, by the way, explain at bit why the measurement process in quantum mechanics is so hard to understand, and why there are still so many contenders. It hints maybe also at some secrets of nature that might maybe not be so easy to access. A key assumption in science is usually that nature is “more stupid” than the experimenters, that it would stoically repeat the same answers to the same questions. Jung suggested in his article about “synchronicity” that nature might answer differently when not forced to answer with “yes” or “no”, as the case in many scientific experiments, but instead given more freedom, naming oracles like the Chinese I Ching as an alternative. Put differently, measurement appears to be a bit like the “Veil of Isis”—not so easy to lift.