

On the interpretation of quantum mechanics

Abstract

The work of Einstein and Bell showed Copenhagen interpretation to be wrong.

From the first days of the existence of quantum mechanics (QM), almost a century by now, the interpretation of it was uncertain. The difficulties arise from the probabilities that occur in QM. These probabilities are considered to be the reason why QM can not attach definite values to the quantities of quanta, quantities like: position, impulse or spin, for example.

The uncertainty principle of Heisenberg aggravates the problem because it causes even more confusion. However, the uncertainty principle has nothing to do with the question whether quanta have definite quantities or not. The principle just gives a relation between position quantities and energy quantities for one particle at one moment.

It is stated by Bohr and Copenhagen interpretation that it makes no sense of speaking of quantities of quanta because they can not be calculated. And this is where the problems begin.

Based on the phenomenon of entanglement Einstein showed that quanta must have definite quantities (EPR article, 1935). Bell's theorem seemed to show Einstein to be wrong. But then again Bell's inequalities are violated. His correlation (in Bell-test experiments) has not the values QM predict. The experiments showed QM's correlation and not Bell's correlation.

At the internet one can find an article, 'Model and method to explain correlation in Bell-test experiments', in which it is explained in a clear way why Bell's inequalities are violated. It is because Bell based his calculations on Bohr's view that quanta 'choose' the values of their quantities randomly while being measured.

Based on Einstein's view that quanta have definite quantities the QM correlation is clearly explained by the model. This is no proof of course, but if one sees it this way there is no way of seeing it any other way. The discovery described in the article is comparable with the discovery of Copernicus that planets orbit around the sun. It can not be proved but the trajectories of the planets make no sense until you see they orbit around the sun. The same is the case with quanta: their behaviour makes no sense until you recognize that they have definite quantities.

So it is finally demonstrated that Einstein also was right in his conviction how to interpret quantum mechanics.

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