Precision of Indeterminacy Principle

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Abstract

This paper seeks to propose certain experiments which can be performed to find the reality of indeterminacy principle (IP) or commonly known as uncertainty principle. We argue that the IP is a very fragile limitation of what one can measure which can be violated with highly precise techniques and modern ideas.

Professor Werner Heisenberg in 1927 [1] proposed his celebrated indeterminacy principle which is argued to be the fundamental principle of quantum mechanics. This principle states that it is impossible to determine position and momentum (and consequently velocity) of a particle simultaneously and exactly means high precision, in other words this principle formulates the limit of our measurements of a physical properties of a particle which says that one can never measure two parameters (position and velocity) with high degree of precision simultaneously, let's say that at given instant t if one measures the position of a quantum particle with high accuracy then one will lose all the information about the velocity, the more one measures its first parameter the less one measures the second parameter at a given instant (simultaneously). This statement can be reflected mathematically by

$$\Delta x \, \Delta v \geq \frac{\hbar}{2}$$

x is position and v is the velocity

We therefore wish to argue that the principle of uncertainty is fragile and can be evaded using highly precise measurements and here we propose an experiment to obtain precise measurements of both parameters at a same instant. The idea of experiment can be explained as follows: In general there must be two super precise computers say C1 and C2 connected with precise detectors, now extremely sophisticated programs must be needed to get it all going. Now the next purpose is to equipped computers with programs as follows, say the computer 1 is superbly programmed for precise measurement of velocity or momentum of a particle and computer 2 is superbly programmed for precise measurement of position in space, but the fundamental task is to program "same time" ("given time" therefore the "given time" will be same and common in two programs. "given time" is the time when the parameters will be measured)

to both the computers say time t so as its consequence at same time each computer will independently measure each properties (one is position and the other is velocity) to its extreme level of precision and thus obtaining highly exact measurement of both parameters simultaneously. But there are several problems experimenter needs to study in which questions like, how to build such super precise computer with modern techniques or it will take more improved technology to built, how to make programs with high accuracy for these machines discussed above, to what order of precision the experiment can be carried out and how to synchronize the computers to act. These questions are of fundamental importance and the answer lies off course in the brilliance of human mind and its products in the form of technology. If all goes as proposed then one can be able to reach the grand quest means the violation of fragile indeterminacy principle, it seems that possible that certain principles can be violated using newest technical advancements.

References

Heisenberg, W. (1927), "Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik", *Zeitschrift für Physik* (in German), **43** (3–4): 172–198.