ISAQC

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Problem:

> The superposition principal states that a state function can be expressed as a linear combination of it's normalized eigenstates. When a measurement is performed, the statefunction collapses to one of these eigenstates

The measurement performed above is a quantum measurement, however, humans can only observe classical information. How would you "see/observe" the result of the above collapse?

Hypothesis:

I believe this problem is similar to the measurement problem and there have been various attempts to solve the measurement problem that has been futile

Reasoning:

The Schrodinger equation is as follows:

$$i\hbar\frac{\partial}{\partial t}\Psi(\mathbf{r},t) = \hat{H}\Psi(\mathbf{r},t)$$

One of the most important properties of Schrodinger equation is that it is linear, that is if the there are two solutions A,B to a wave function then any linear combination of these two is also a solution.

> The Born rule is another key postulate of quantum mechanics which states that the probability density of finding a system in a given state, when measured is proportional to the square of the amplitude of the wave function.

Hence it is obvious that after we measure some quantity like momentum or velocity, the probability of the measured event becomes one. But this can’t be shown by the Schrodinger equation as it doesn’t take into account that a measurement is taken or not. Hence the wave function needs to be updated and this is where the problem starts.

> The part where the wave function gets updated to one for a certain event i.e when a collapse happens after a measurement is taken. But simply updating the Schrodinger equation may not be good enough as the linearity of the Schrodinger should be followed and even if it is possible we are making the assumption that the behaviour of microscopic particles is distinct from that of normal particles since measurement isn’t deterministic in them

Conclusion: