Now lets get the fundamentals of Quantum Mechanics straight :-

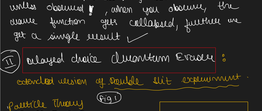
I) Schrodinger's CAT Experiment :-

quantum particles can exist in more one places, Physics is divided into 3 parts :-

1. classical physics → ordinary physics
2. modern physics →
3. quantum physics → $e^-, p^+, e^+ \ldots$

quantum particles can exist at more than one places at same time

Schrodinger's Cat Experiment tells that, all the quantum particles exist in Superposition state, unless measured. unless you measure any particle, it can exist in all its states possible. when we observe it, the wave function gets collapsed. as the particles when we get result using any observation tool, the wave function of the particles gets collapsed.

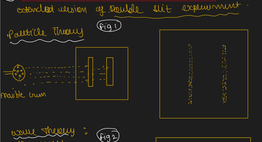


there can be a possibility of both of these states unless observed, when you observe, the wave function gets collapsed, further we get a single result

II) delayed choice quantum Eraser :-

extended version of double slit experiment

Particle Theory (fig 1)



wave theory : (fig 2)

water waves

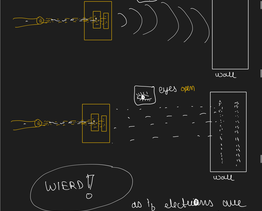
The same interference pattern was shown when electrons were shooted during the experiment. The expected outcom for the electron gun to pass the slit was particle nature, but they showed wave nature.

It seemed like electrons were getting splitted before passing the slit and interfered. But when observed closely the electron showed particle nature and didn't split, by passing only one slit hole.

Conclusion was then out, that unless observed the electrons acts as wave and make multiple lines, but when we place observers, it acts like particle and make only 2 lines (refer fig 1 and 2)

straight line multiple

The delayed choice experiment setup was placing the observer between slit and wall



WIERD !

as if electrons are observing us and changes their behaviour according to our observations.

The eraser experiment discovered that when we pass source to the slit, we place measures to reflect source with that particles pass measures first before getting an answer/wall.

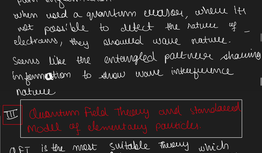
Random selection of either detectors from both path provides determination of which path experimentation.

when used a quantum eraser, where it not possible to detect the nature of electrons, they showed wave nature.

Seems like the entangled particles showing information to show wave interference nature

III) Quantum Field Theory and standard Model of elementary particle

QFT is the most suitable theory which with the real world phenomenons, with less assumptions when studied :-



Heisenberg Uncertainty Principle

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

$$\Delta x \Delta P$$

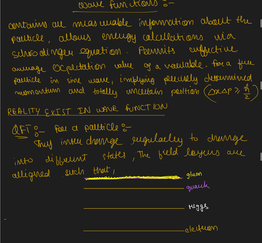
some fun facts :-

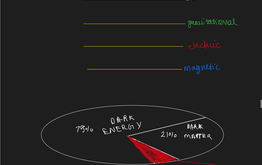
contains all mass visible information about the particle, allows energy calculations via Schrodinger equation. Fermions influence average expectation value of a variable for a free particle in the wave, involving actually experienced momentum and easily calculation position (exp $\geq \frac{\hbar}{2}$)

REALITY EXIST IN WAVE FUNCTION

QFT :- has a particle :-

they never change singularly to change into different states, the field layers are affected each that.





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