

some imp stuff related quantum physics:

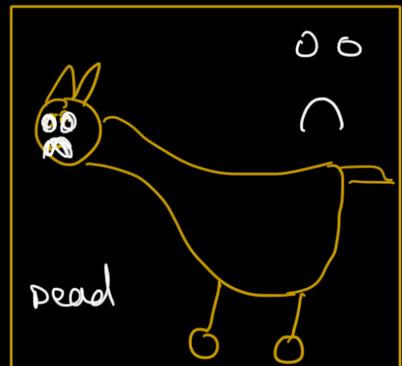
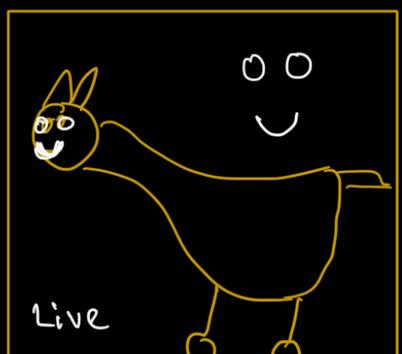
Now lets get the fundamentals of quantum quantum straight :-

① Schrodinger's CAT Experiment :-
quantum particles can exist one or more places, physics is divided into 3 parts :-

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

quantum particles can exist at more than one places at some 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 of 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 obscured !, when you observe the wave function gets collapsed, further we get a single result ✓

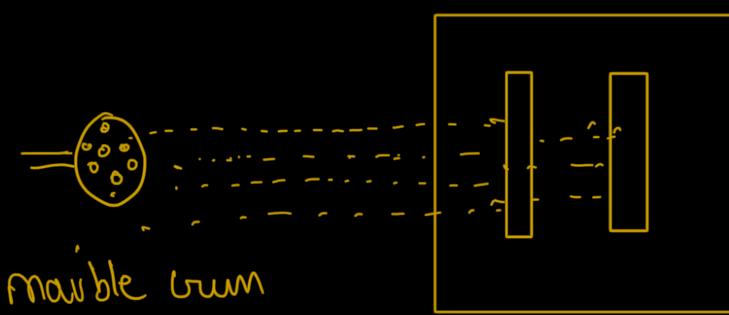
II

Delayed choice Quantum Eraser :

extended version of Double slit experiment

Particle Theory

fig 1

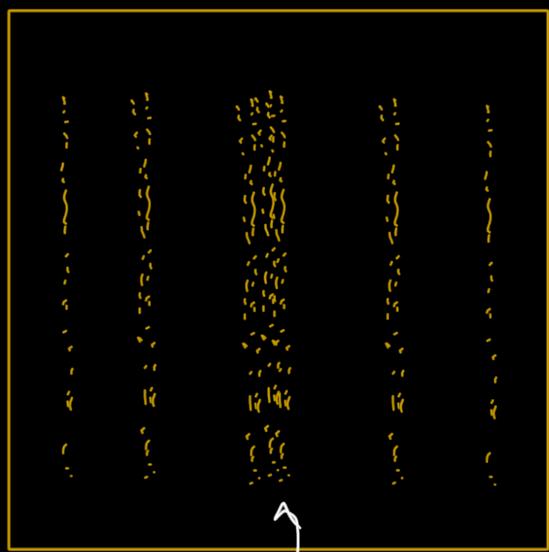


marble gun



wave theory : water waves

fig 2



The same interference pattern was shown when electrons were shoted

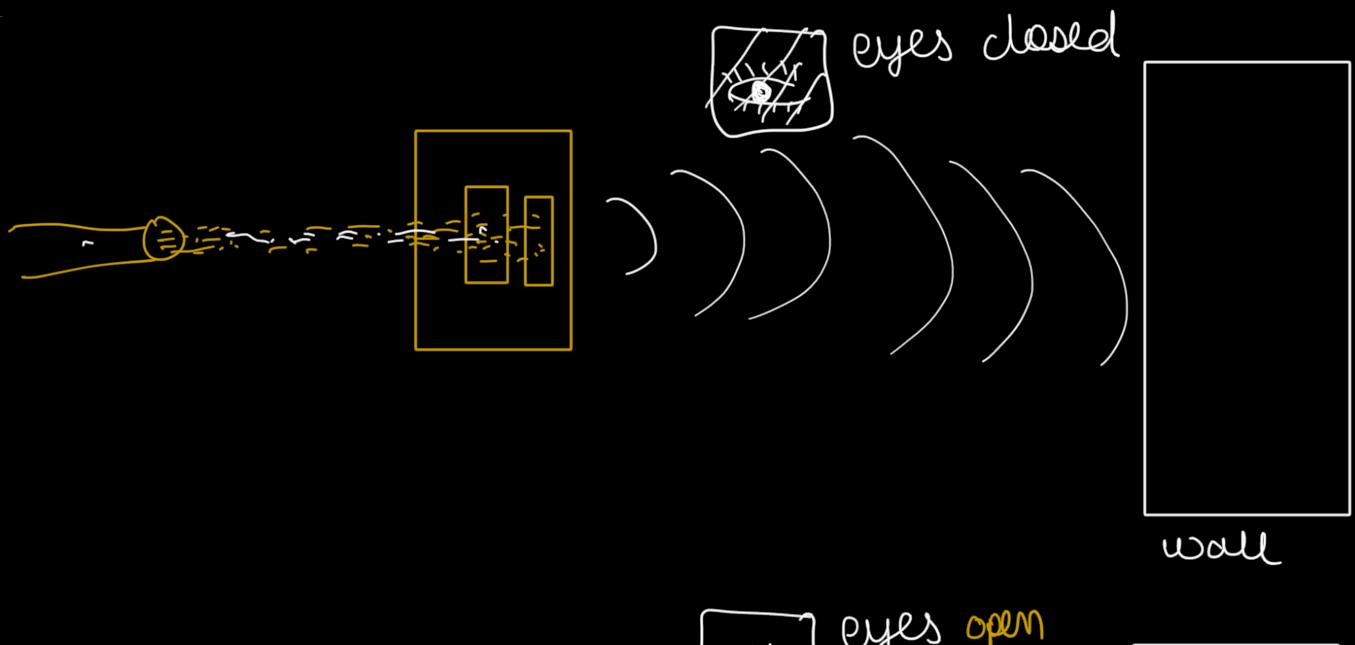
Brillouin multiple

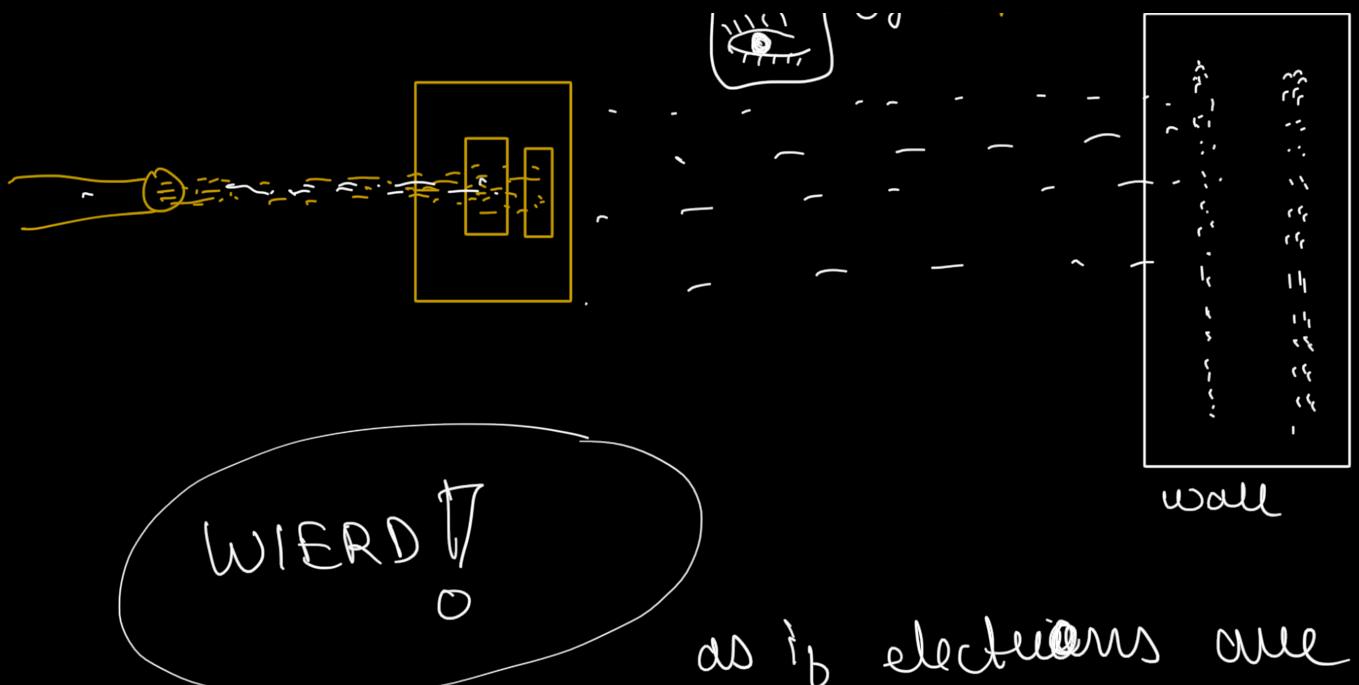
during the experiment. The expected outcome for the electron gun to pass the slit was particle nature, but they showed wave nature.

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 taken out, that unless observed, the electrons acts as wave and make multiple lines, But when we place observer, it acts like particle and make only 2 lines (refer fig ① and ②)

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





WIERD!!

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

The cassegrain experiment describes that when we pass source to the slit, we place mirrors to reflect source such that particles pass mirror first before getting on detector/wall.

Random selection of either detector from both paths prevents determination of which path information.

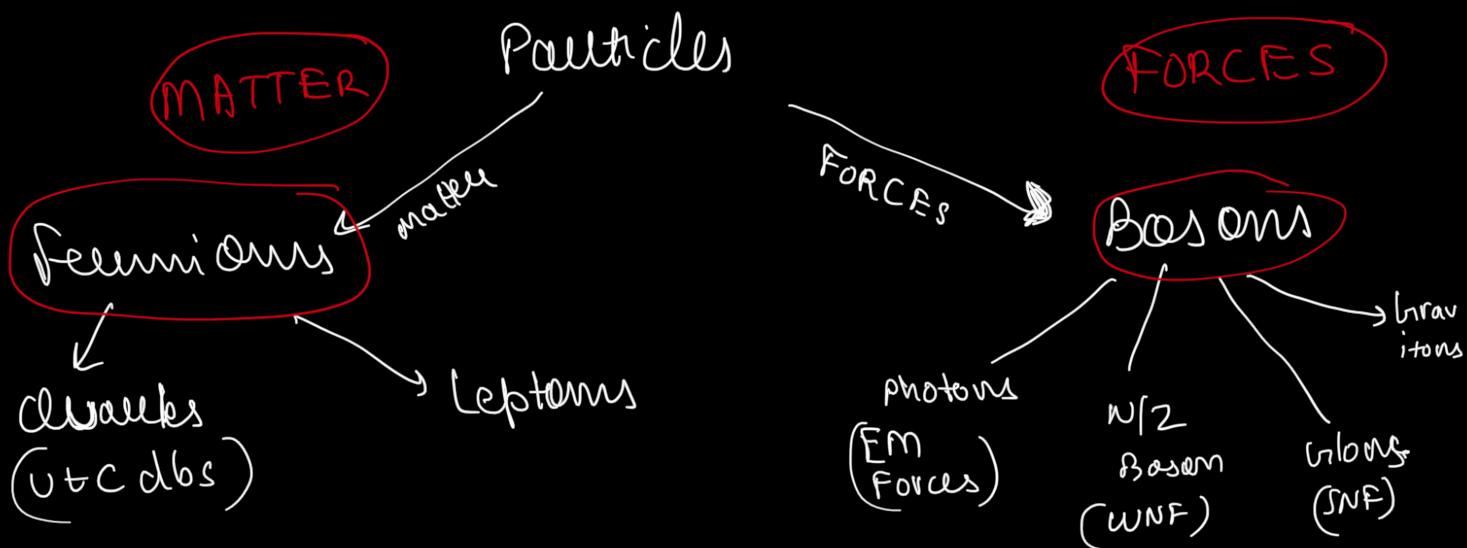
When used a quantum eraser, where it's not possible to detect the nature of electrons, they showed wave nature.

Seems like the entangled partner sharing information to show wave interference nature.

III

Quantum field theory and standard model of elementary particles.

QFT is the most suitable theory which suits the real world phenomena with less assumptions. When studied :-



Heisenberg Uncertainty Principle

$$\Delta x \Delta p \geq \frac{\hbar}{2}$$

$$\Delta x \times \Delta p$$

Wave functions :-

contains all measurable information about the

particle, allows energy calculations via Schrödinger equation. Permits effective average expectation value of a variable for a free particle in sine wave, implying precisely determined momentum and totally uncertain position ($\Delta x \Delta p \geq \frac{\hbar}{2}$)

REALITY EXIST IN WAVE FUNCTION

QFT — for a particle —

they interchange regularly to change into different states, the field layers are aligned such that,

gluon
quark

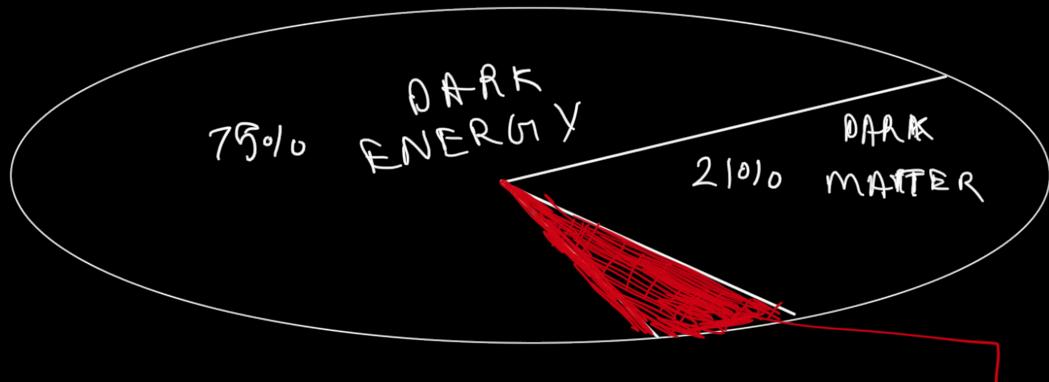
miggs

electron

gravitational

electric

magnetic



(Observable
universe matter) ↓
Normal
matter

satyendra Nath Bose — BOSON

