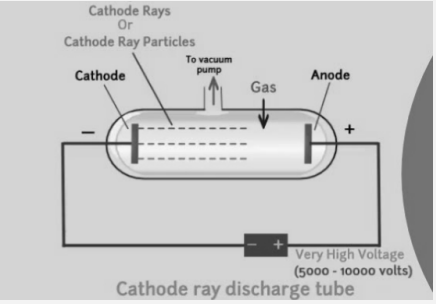
DISOVERY OF SUB ATOMIC PARTICLES



Cathode ray discharge tube

DISCOVERY OF ELECTRON

Michael Faraday in **1850s** used **Cathode Ray discharge tube** to study electrical discharge

Between electrodes **voltage** applied **-10000V**

Pressure reduced- 10^{-4}atm/(0.01mm)

Phosphorescent Material like **zinc sulphide** used on glass wall behind anode to observe the emitted rays from cathode

when a perforated anode is used glow between electrode disappears but current continues to flow a **faint greenish** glow is observed on the glass wall due to the rays **emitted by cathode** which **pass through the holes of anode**.

these rays are called **Cathode rays** due to their origin.

Characteristics of Cathode Rays

they travel in a straight line

they consist of material particles as they show mechanical effects

they consist of electrons

they show heating effect

they produce x rays

they cause ionization of gas through which they pass

they affect the photographic plates

Characteristics of Cathode Rays (cont)

they posses penetrating effect

These characteristics were concluded as a result of various experiments performed by**JJ Thomson(1897)** and others.

CHARGE AND MASS OF ELECTRON

CHARGE TO MASS RATIO	**CHARGE ON THE ELECTRON: Milikan's Oil Drop Exp.**	**MASS OF THE ELECTRON**
By measuring the amount of deflections the **electric field strength** or **magnetic field strength Thomson** calculated the value of the ratio	https://imag-es.app.go-o.gl/4ZMy-ZPJaNW-aDpHgn6	Mass can be calculated from the values of e/m_e and e
e/m_e=1.758-820x10^{11}Ckg^{-1}	Using an atomiser small drops of oil are allowed to fall between 2 electrically charged plates	m_e=e/e/m_e=1.6022x 10^{-19}C/1.758820X 10^{11}C kg^{-1}
	Milikan observed the rate of their fall as to measure mass of these droplets	**m_e=9.1094x 10^{-31}kg**

CHARGE AND MASS OF ELECTRON (cont)

Using x-ray he ionised the gas inside the chamber	the mass 9.11x 10^{-28} g is nearly 1/1837^{th} of the hydrogen atom

because of the collisions with gaseous ions their droplets now had electrical charge on them.

By observing the effects of electrical field strength on the motion of oil droplets milk and concluded that **the magnitude of electrical charge q, on the droplets is always an integral multiple of the electrical charge, e.**

I.e. **q=ne** where n= integer sub as 1,2,3...

CHARGE AND MASS OF ELECTRON (cont)

the value of this charge is **-1.6022×10^{-19}** or **4.8×10^{-10} esu**

esu is the smallest measurable quantity of charge and is called one unit.

By **Purvanshee** (purvanshee)

cheatography.com/purvanshee/

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