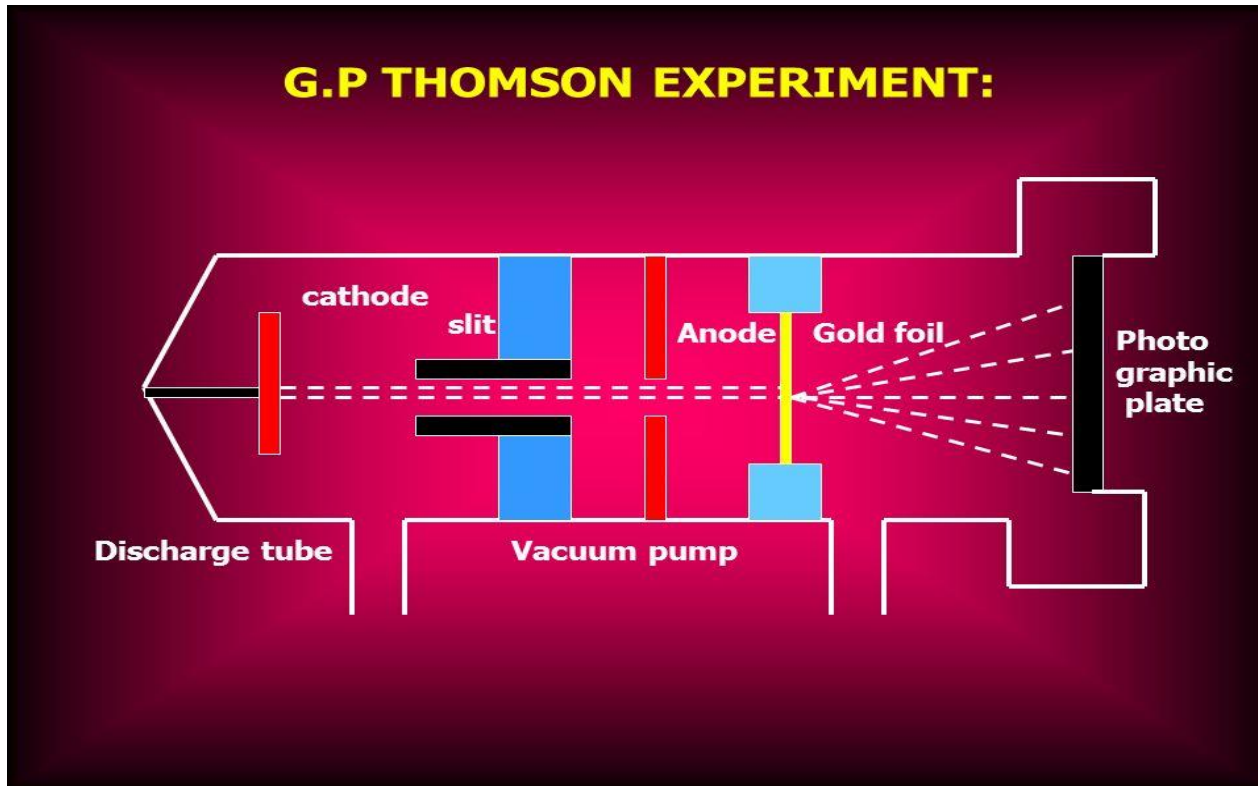


G.P. Thomson's experiment

Confirmation of matter waves

G.P. Thomson experiment



Experimental arrangement:

A beam of cathode ray is produced in a discharge tube by means of induction coil.

Electrons passing through a fine hole (slit) are incident on a thin gold foil

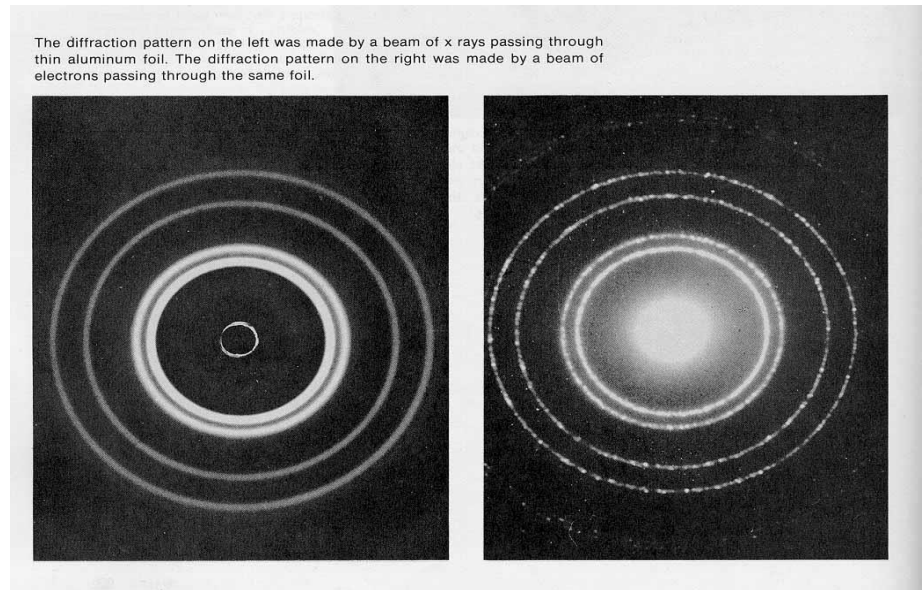
The emergent beam of electrons is received on a photographic plate P

The visual examination of pattern is made possible by fluorescent screen

A very high vacuum is maintained in a camera part while air is allowed to leak into the discharge tube.

PROCEDURE:

- A beam of electron of known velocity is made to fall on the photographic plate, after traversing the thin gold foil.
- When plate is developed a symmetric pattern consisting of concentric rings about a centre spot is obtained.



Procedure cont...

- It is similar to produced by X rays in powdered crystal method.
- When cathode rays are deflected by magnetic field, pattern also shift correspondingly
- If foil is removed pattern disappear
- **Demonstration:**
- **This experiment demonstrate that electron beam behaves as wave since diffraction pattern is produced only by waves**
- Formula:
$$\lambda = 12.27/\sqrt{V}$$

V is accelerating voltage
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