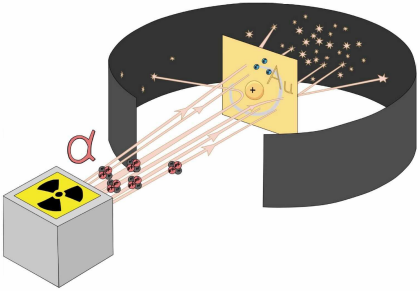


CONCEPT: RUTHERFORD GOLD FOIL EXPERIMENT

- In 1911, Ernest Rutherford's Gold Foil Experiment led to the discovery of the positively charged nucleus within an atom.
 - Assisted by fellow chemists Hans Geiger and Ernest Marsden.

Experimental Setup

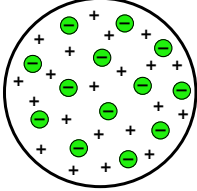
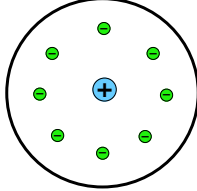
- A thin sheet of **gold foil** is bombarded with **alpha particles** emitting from a radioactive element.
 - **Alpha Particle**: Radioactive particle consisting of ___ protons and ___ neutrons. (___ or ___)
 - The radioactive element is usually _____ and is encased in a lead container with an opening in it.
 - Around the gold foil is a _____ with a small slit for the **alpha particles** to enter.

The Experiment	Rutherford's Postulates
	1. The protons and neutrons located in the nucleus, which lies at the center of the atom. 2. Although incredibly small, the nucleus comprises _____ of the mass of the atom. 3. Surrounding the dense, positively charged nucleus is a cloud of _____.

EXAMPLE: The gold foil Rutherford used in his experiment had a thickness of approximately 6.0×10^{-3} mm. If a single gold atom has a diameter of 2.9×10^{-8} cm, how many atoms thick was Rutherford's foil?

Nuclear Model

- Helped to disprove **Thomson's Plum Pudding Model**, which was considered the accepted atomic model.
 - If Thomson's Model were right then all the **alpha particles** would have passed through with little to no deflection.

Plum Pudding Model	Nuclear Model
	

EXAMPLE: Rutherford's experiment with alpha particle scattering by gold foil established that:

- a) Electrons are positively charged subatomic particles.
- b) Atoms are comprised of protons, neutrons and electrons.
- c) Protons are not evenly distributed throughout an atom.
- d) Protons are about 1000 times lighter than electrons.