Topic 3

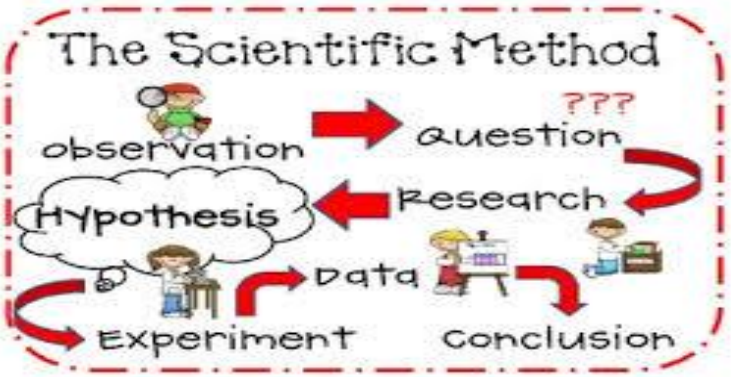
Elements

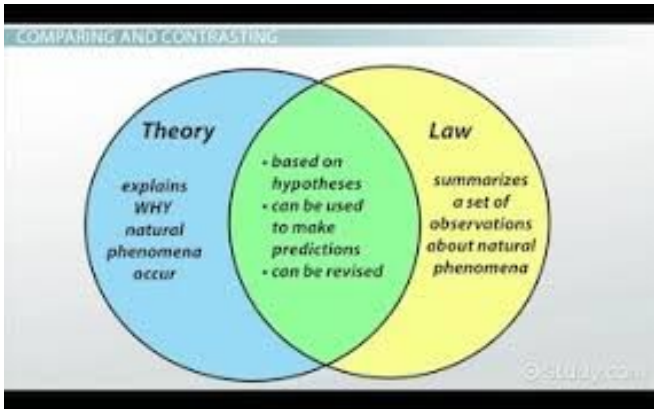
The Roots

- Chemistry was started through alchemy, where alchemists tried to turn ordinary metals into gold
- The original elements were earth, wind, fire and water - these made up all matter

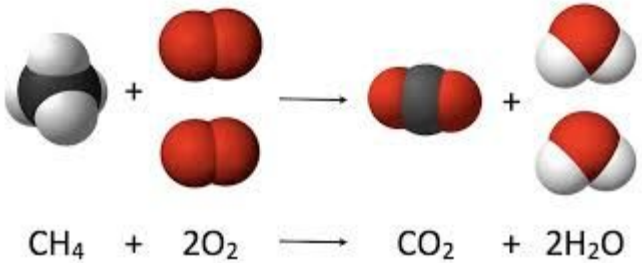
Taking Matter Apart

- Scientists started to argue that evidence should be the building blocks of science
- Scientists started to burn, mix, and cool matter to break it into pure substances

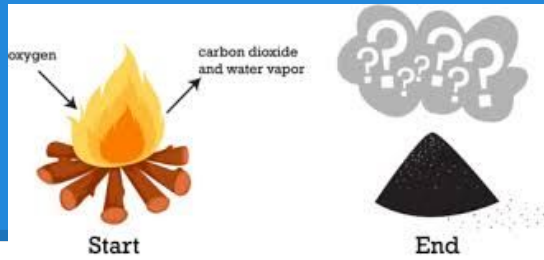




- Scientists found that matter couldn’t be broken down past a certain point, what we now identify as elements
- Matter cannot be created or destroyed



Law of Conservation of Mass

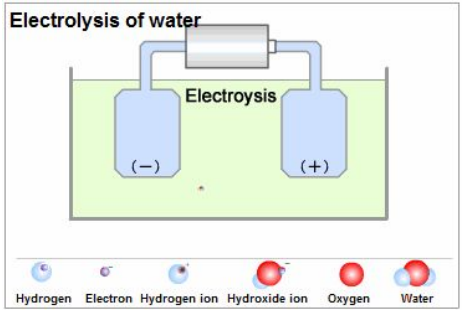


- The law of conservation of mass states:

In a chemical change, the total mass of the new substance is always the same as the mass of the original substances

OR - The mass of your products will be the same as the mass of your reactants

- Once scientists knew that all mass was conserved, they started to break apart as many compounds as they could
- Electrolysis is a way to break apart a compound by passing electricity through it



Law of Definite Composition

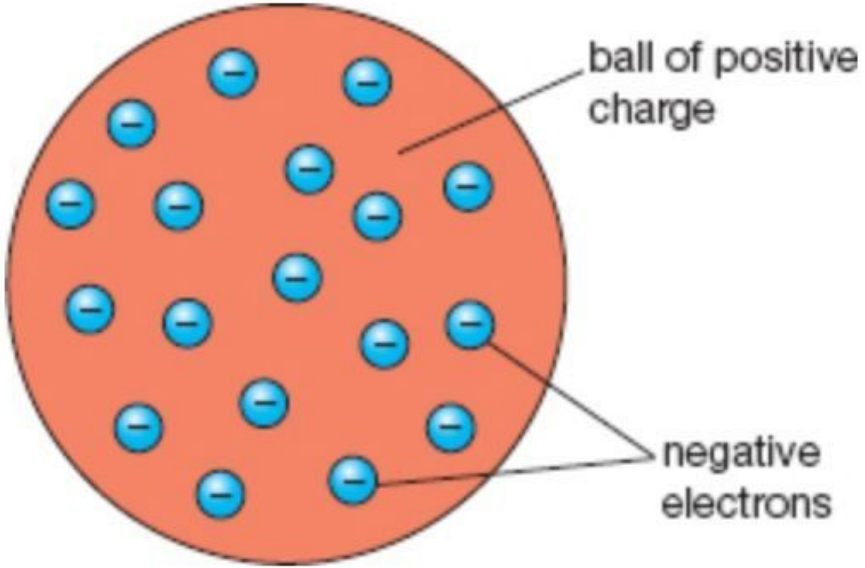
- As more and more compounds were decomposed, scientists found that any compound always occurred in the same ratios every time - The law of definite composition
- Ex. Water is always 2 hydrogens and one oxygen, salt is always one sodium and one chlorine

Atomic Theory

- All matter is made of small particles called atoms
- Atoms can not be created, destroyed or divided into smaller particles
- All atoms of the same element are identical
- Compounds are created when atoms of different elements link together

- An element is a pure substance made up of one type of particle
- A compound is a pure substance that is made up of two or more elements combined together

Thomson's Plum Pudding Model



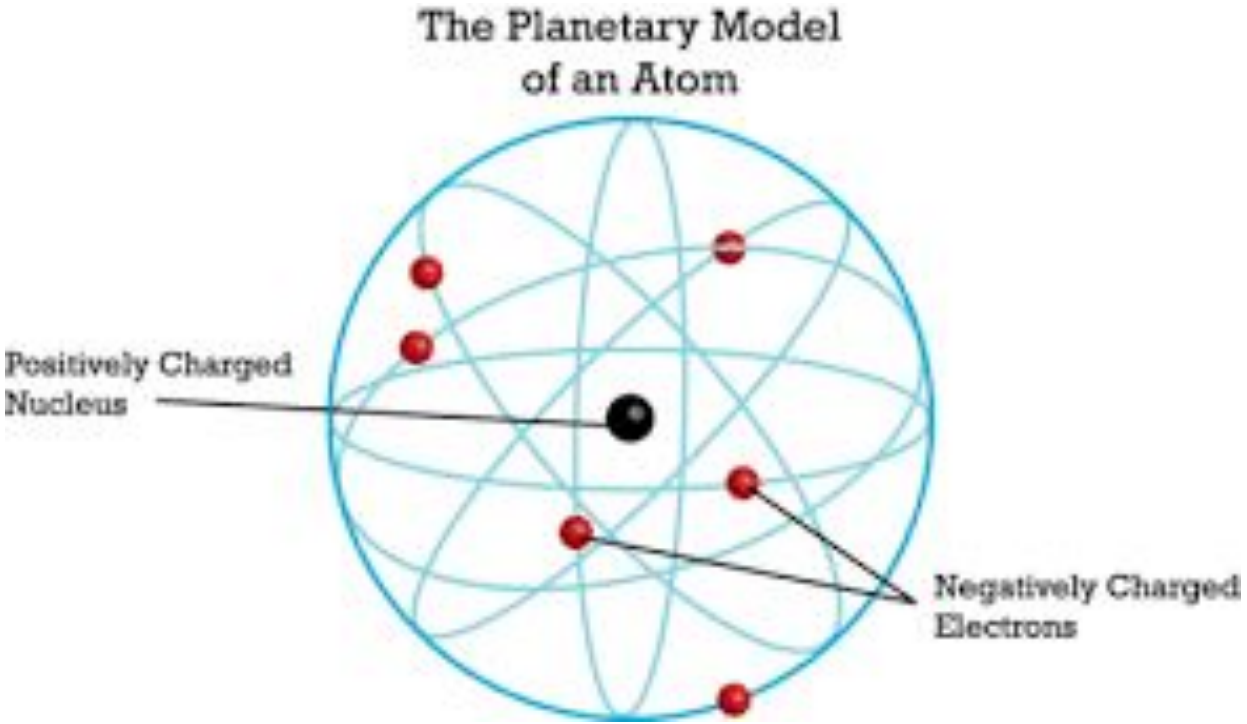
Thomson's 'plum-pudding' model of the atom

Plum Pudding Model

J.J. Thomson's "plum pudding model"

- Contains negatively charged electrons stuck in a positively charged mass

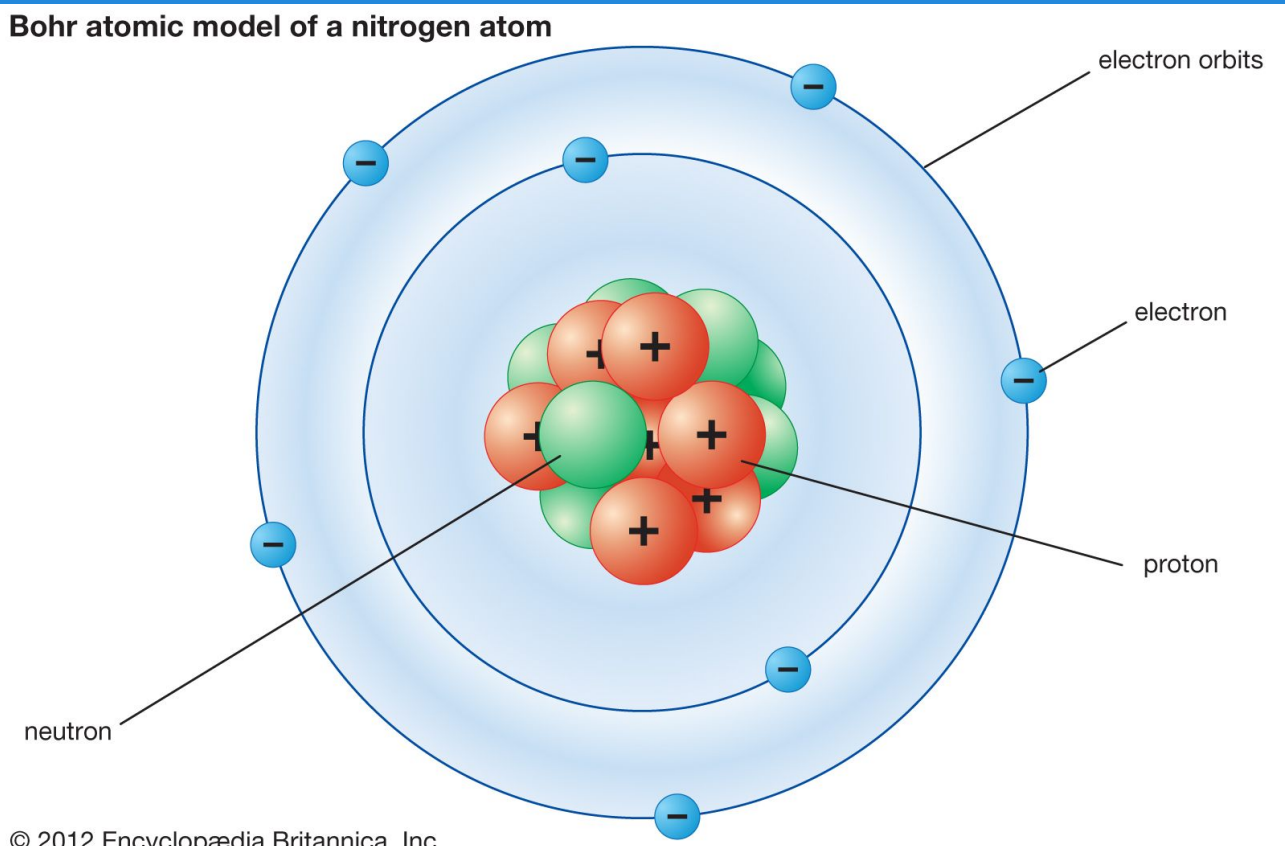
Rutherford's Planetary Model



Planetary Model

- Almost all the mass of the atom is in the nucleus
- Nucleus contains protons and possibly one other type of particle
- Electrons randomly “orbit” the nucleus

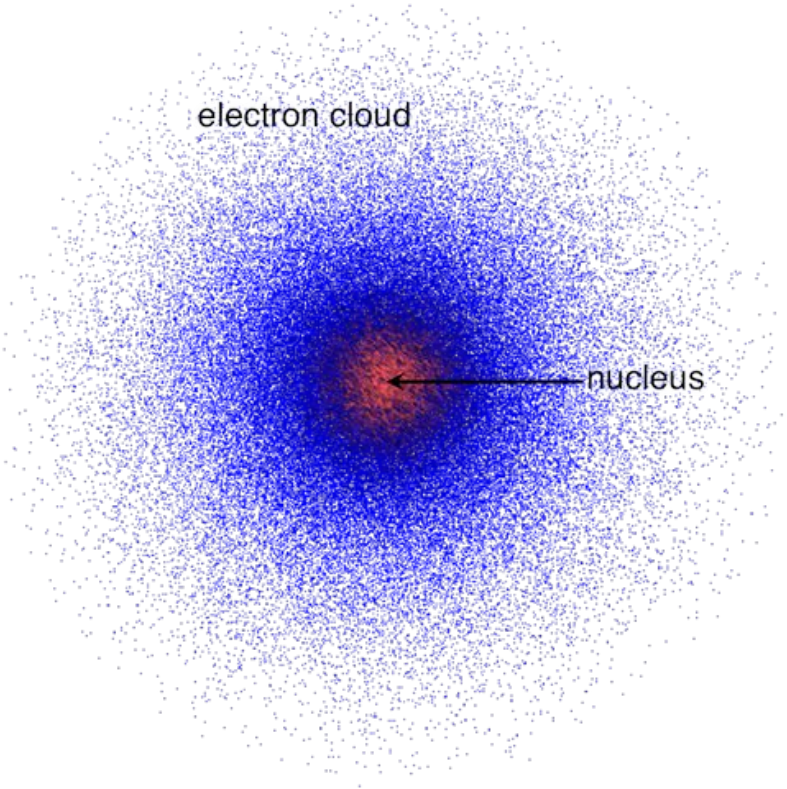
Bohr's Atomic Model



Bohr’s Model

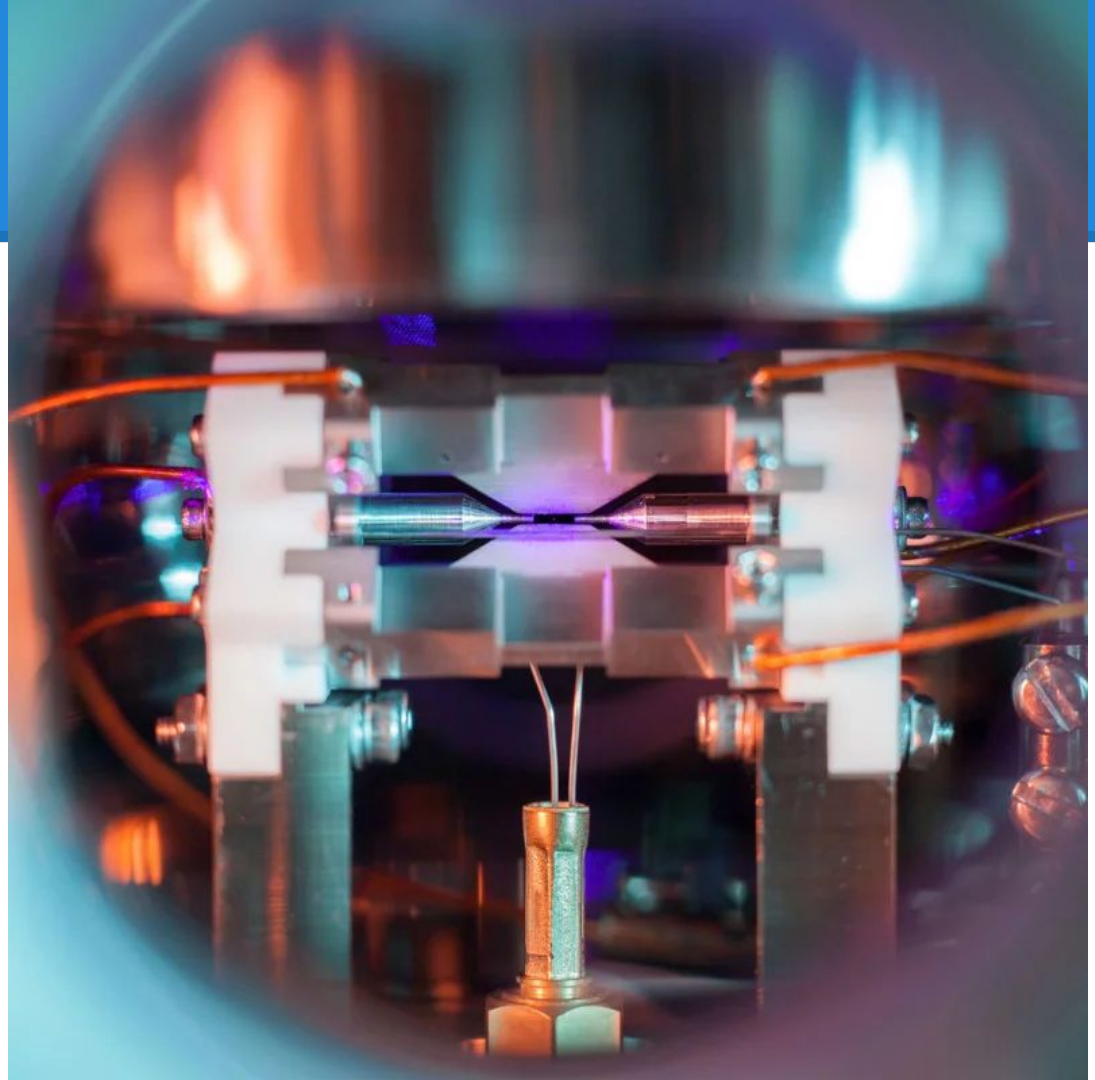
- Similar to Rutherford’s model
- Added neutrons in the nucleus
- Electrons now have set orbital pathways they orbit on called electron shells

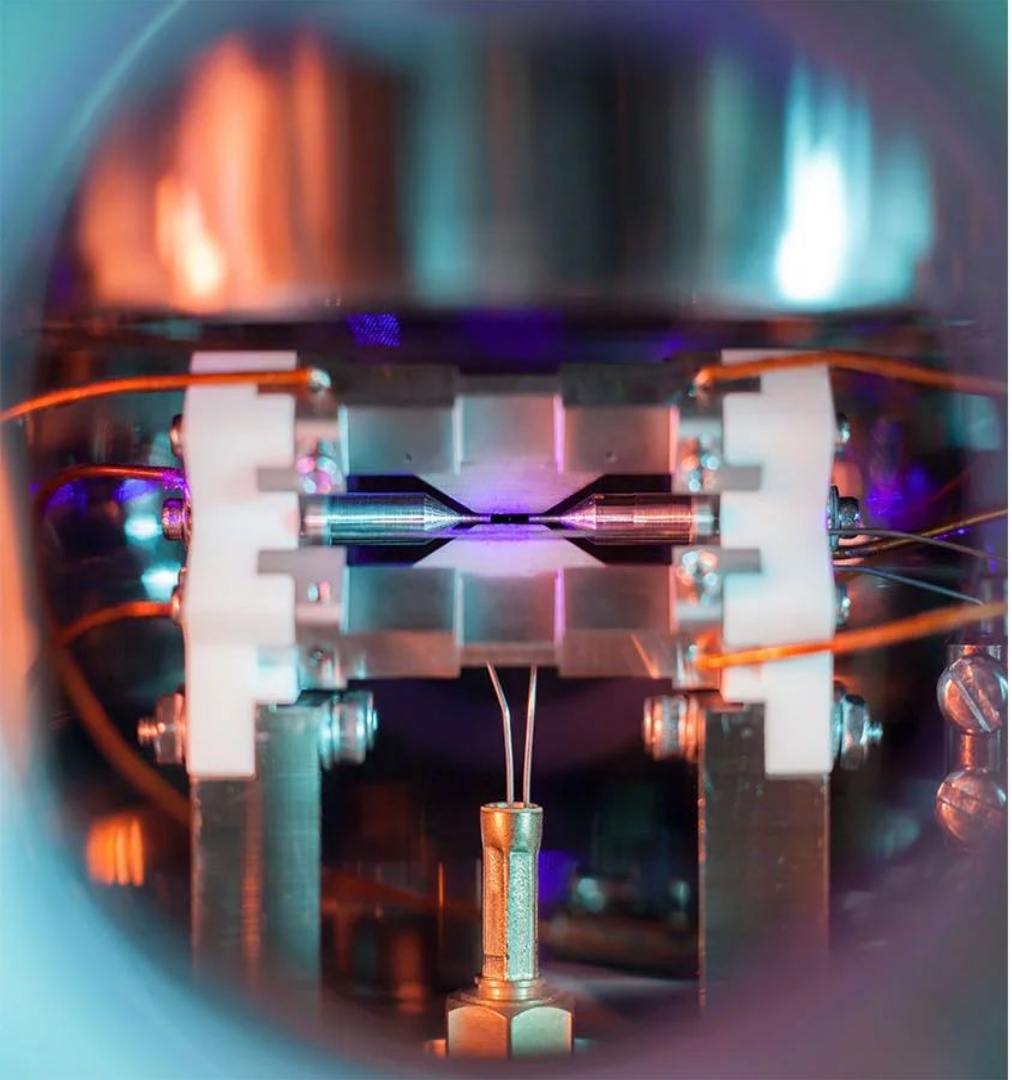
Electron Cloud Model

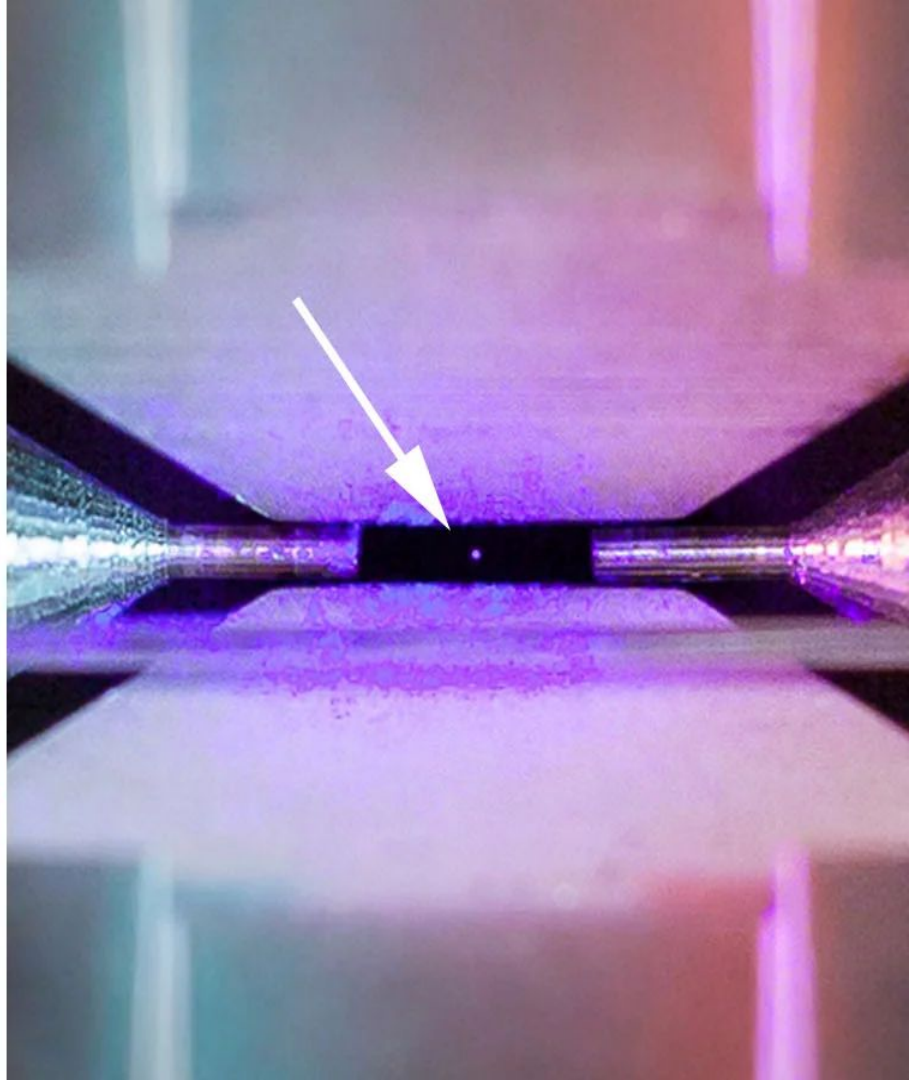


Electron Cloud Model

- Electrons can not have their exact position identified so they exist in areas of probability rather than specific spots







Practice Questions

Pg 114

2,5