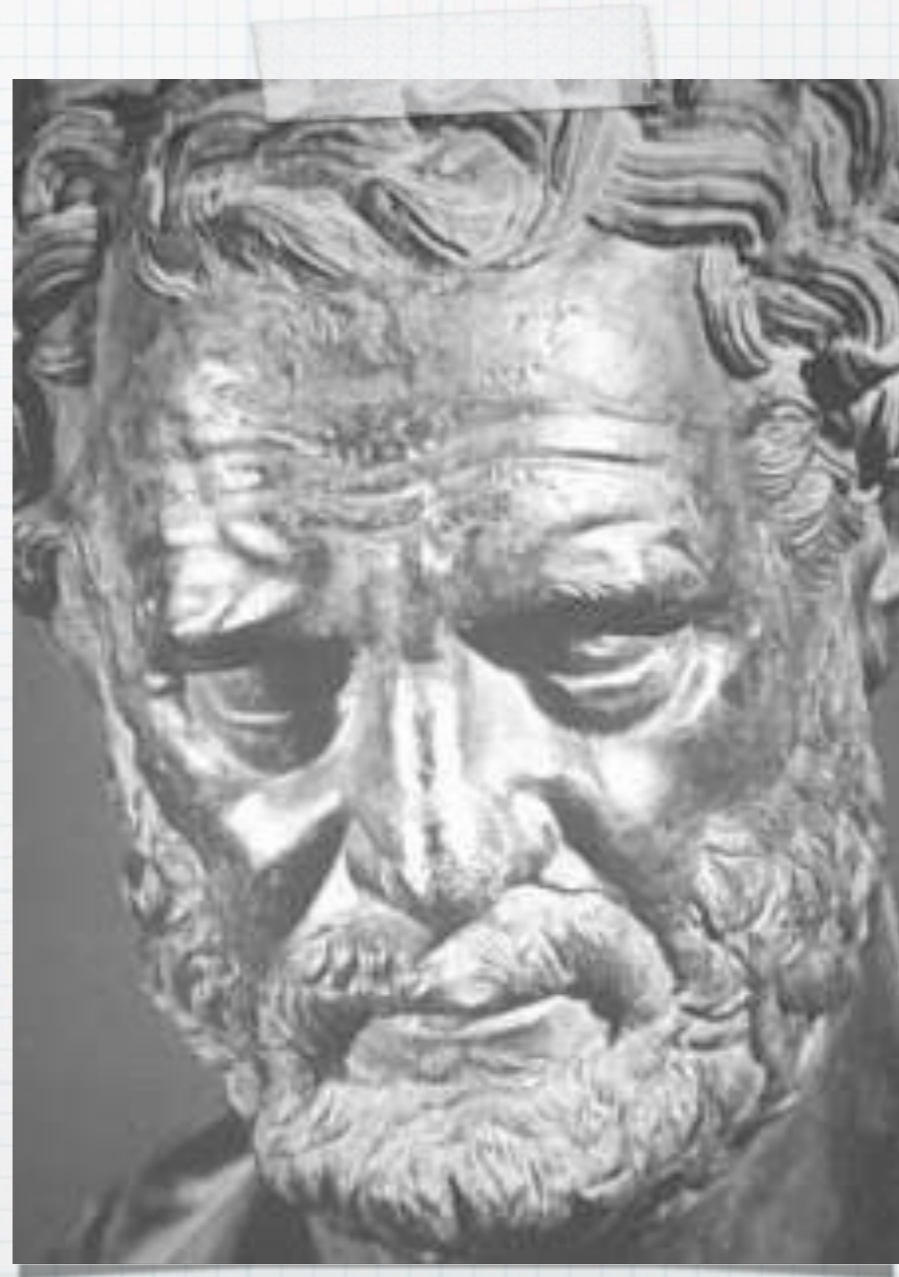


Early Models of the Atom

History of the Atom
Standard Atomic Notation

HISTORY OF THE ATOM

- * 460 BC: Democritus develops the idea of atoms
- * ancient Greek philosopher
- * suggested that matter was made up of tiny particles called: ATOMOS



- * 1808: John Dalton
- * working with gases, reconsidered Democritus' theory that particles are indivisible
- * suggested that all matter was made up of tiny spheres that were able to bounce around with perfect elasticity and called them: **ATOMS**



- * Dalton's Atomic Model:**
- * All matter is made up of atoms, which are particles too small to see**
- * Each element has its own kind of atom, with its own particular mass**
- * Compounds are created when atoms of different elements link to form molecules**

- * Problem with Dalton's Theory:
- * unable to explain the Electrical nature of matter:
- * Like charges repel
- * Unlike charges attract

* 1879: William Crookes

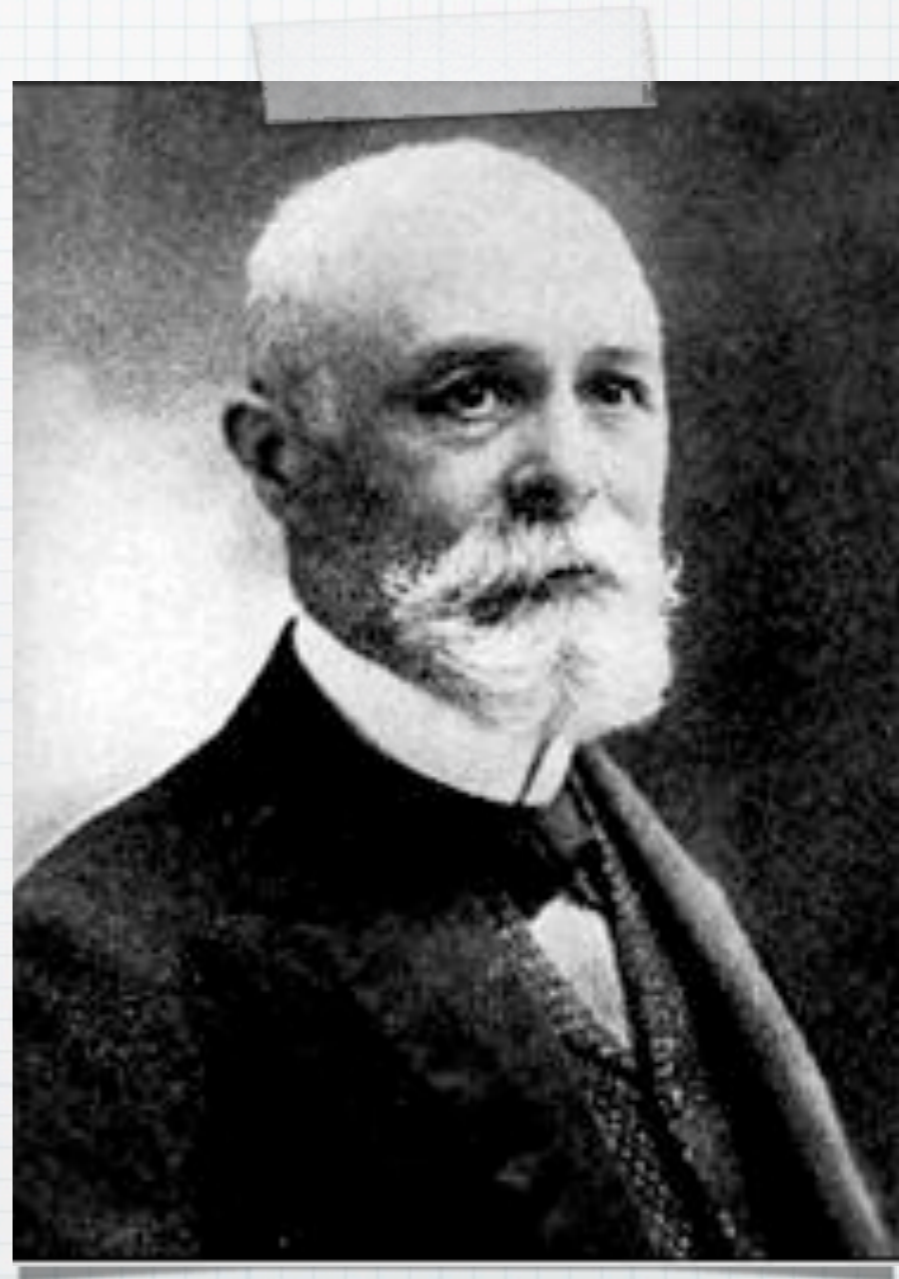
* worked with cathode ray tubes

* beam of particles was attracted to a positive plate

* these particles were called:
ELECTRONS

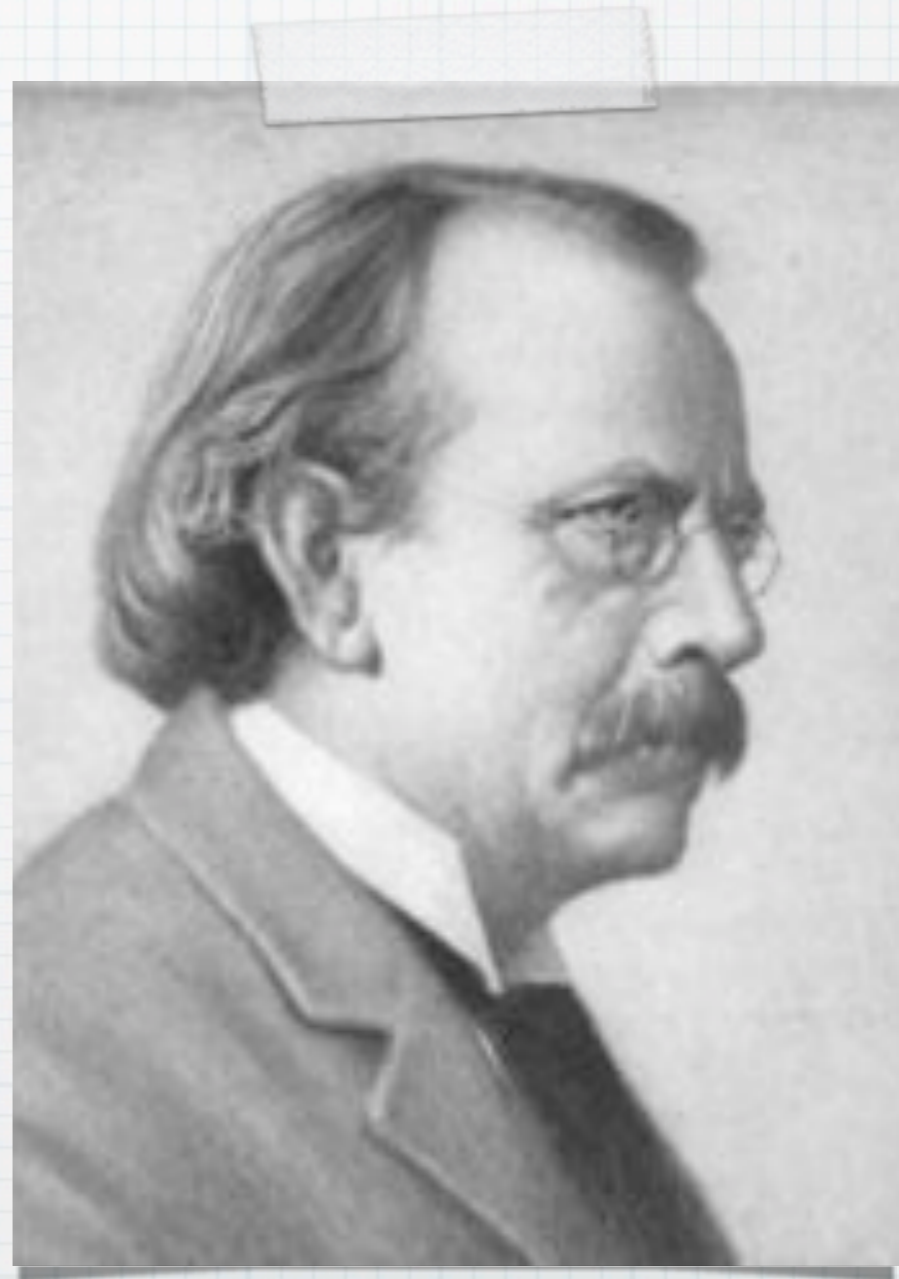


- * 1886: Eugen Goldstein
- * most samples of matter are NOT charged
- * the atom must contain positively charged particles
- * used cathode ray tubes to prove this and they were called: PROTONS



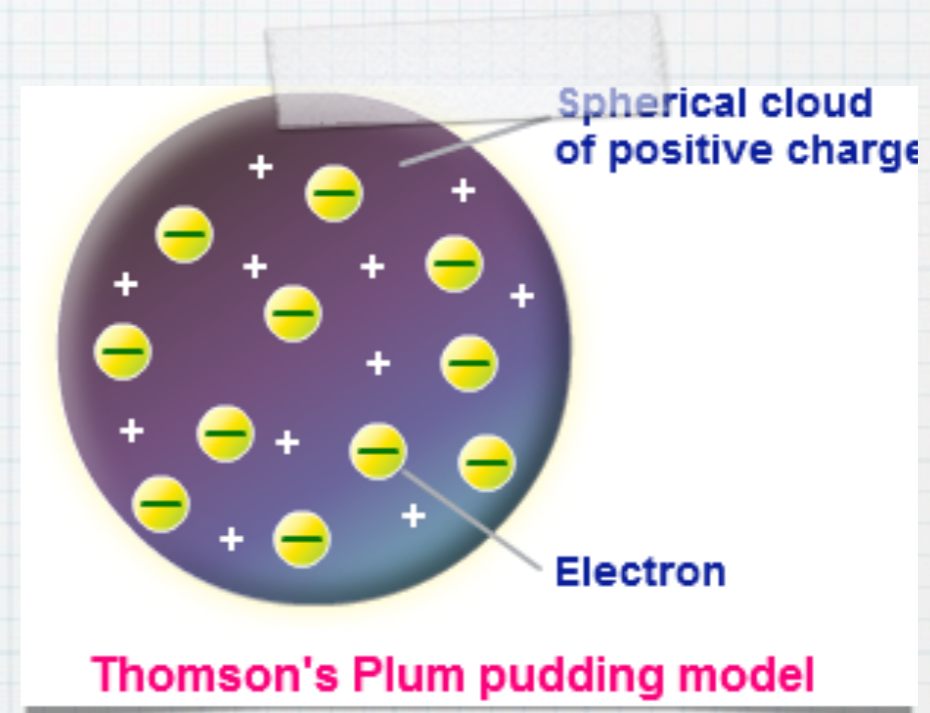
* 1898: Joseph John
Thompson

* atom had a positive
core and electrons
were embedded in this

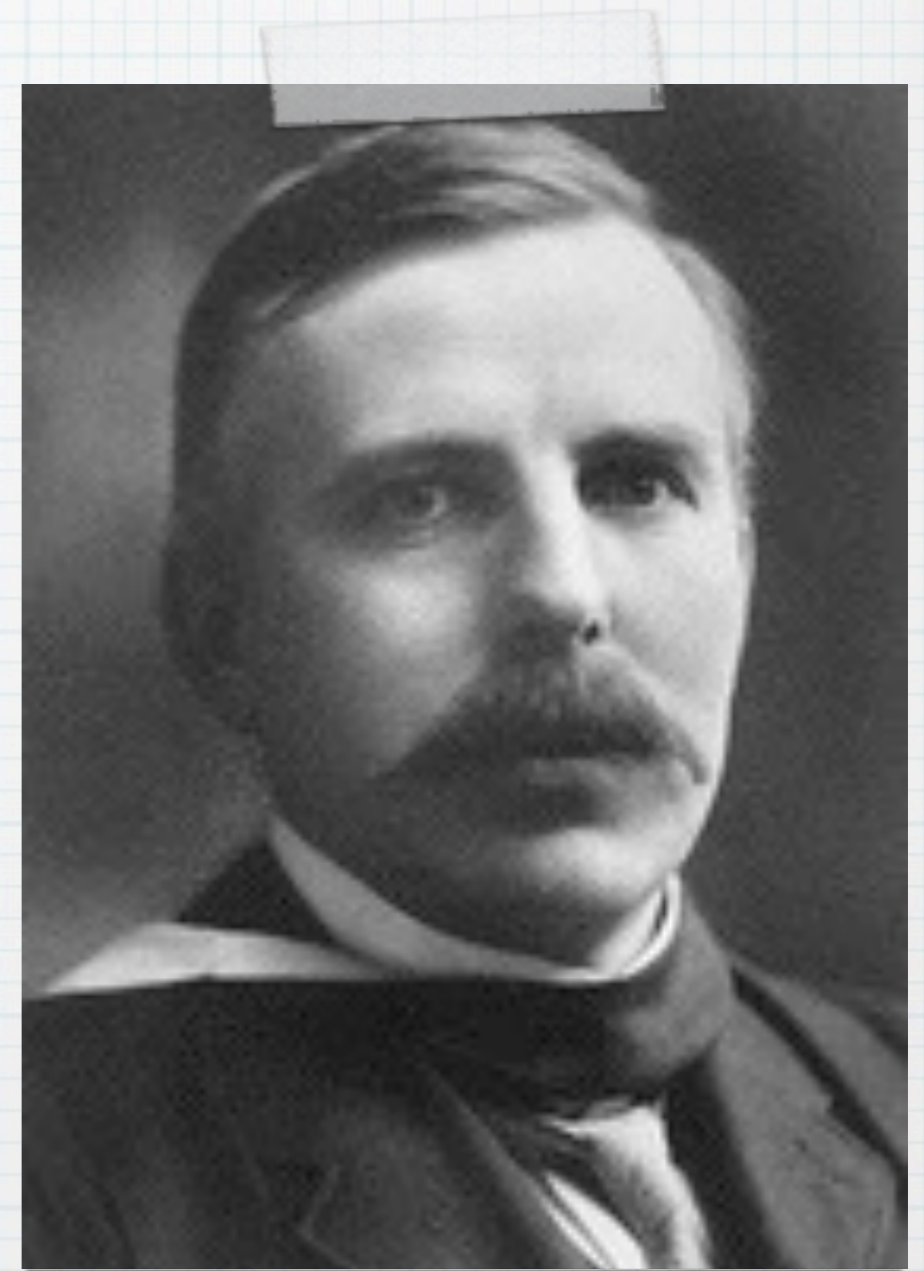


* 1904: Thompson develops the idea that an atom was made up of electrons scattered unevenly within an elastic sphere surrounded by a soup of positive charge to balance the electron's charge like plums surrounded by pudding.

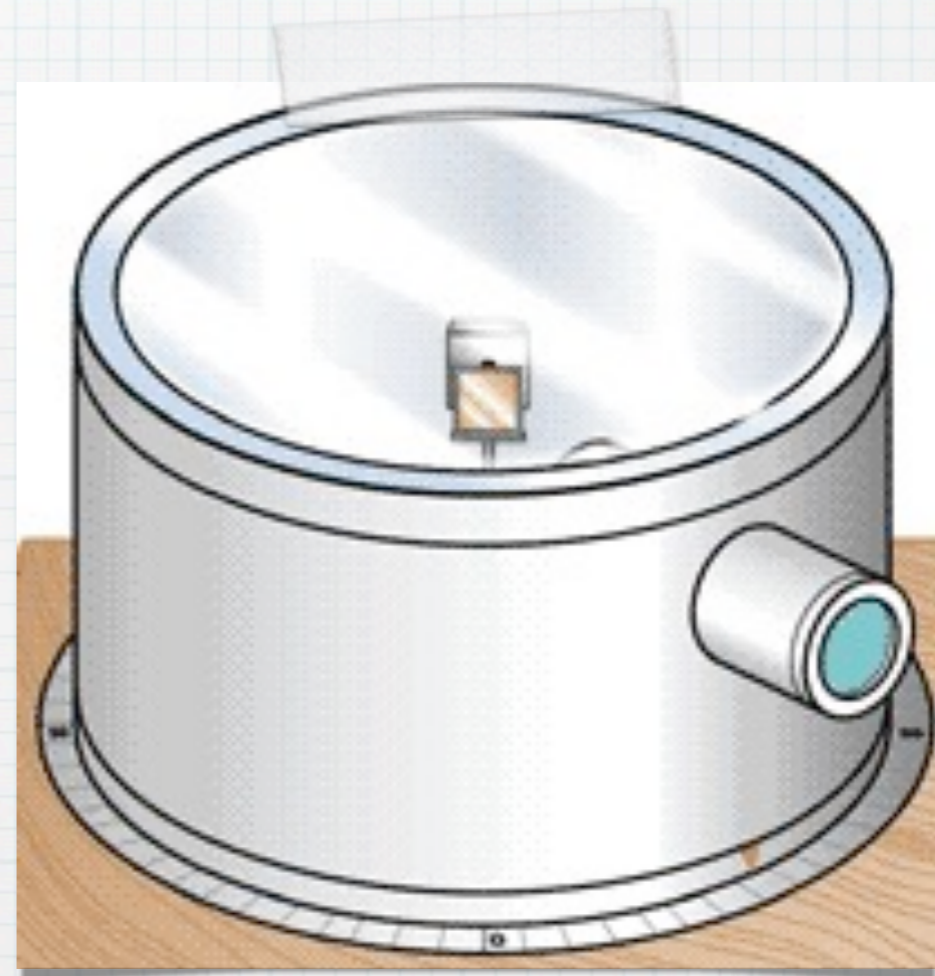
* PLUM PUDDING MODEL OR RAISIN BUN



- * 1910: Ernest Rutherford
- * designed an experiment using RADIUM (this element spits out positive ALPHA particles)
- * he placed a piece of gold foil in front of the beam, surrounded by a screen to detect the path of the particles
- * they found that although most of them passed through, about 1 in 10,000 hit



- * They found that while most of the particles passed through the foil, a small number were deflected and, to their surprise, some particles bounced straight back.



- * Rutherford's new evidence allowed him to propose a more detailed model with a central nucleus.
- * He suggested that the positive charge was all in the central nucleus. This held the electrons in place by electrical

* 1932: Chadwick

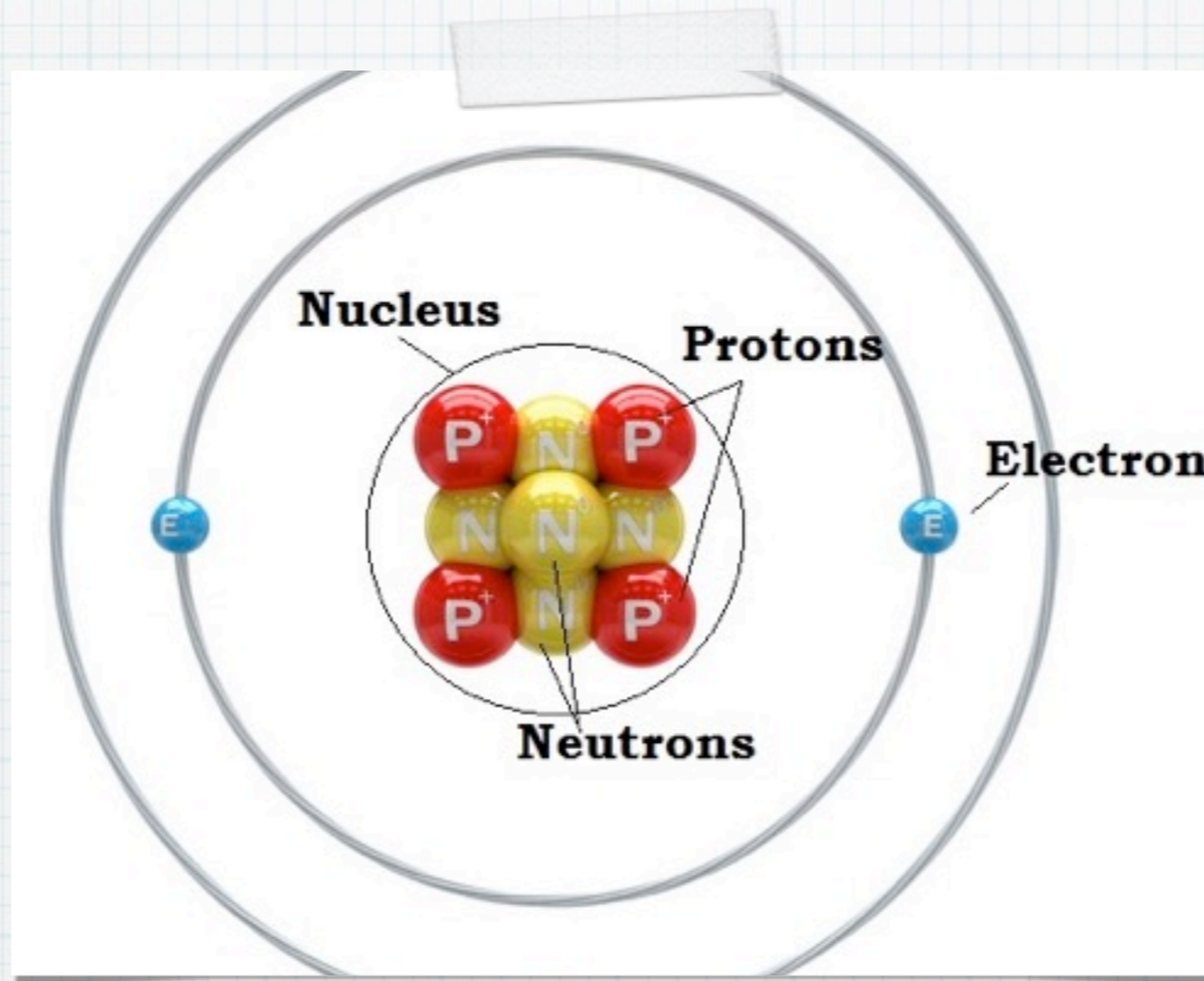
* Nucleus contains another particle which has NO charge (neutral) called a:
NEUTRON

* This particle and the proton have approximately the same mass, but the electron is very small. It takes 1837 electrons to have the same mass as **ONE** proton or neutron.

*** 1913: Neal Bohr**

*** Studied under Rutherford at the Victoria University in Manchester.**

*** Bohr refined Rutherford's idea by adding that the electrons were in orbits. Rather like planets orbiting the sun. With each orbit only able to contain a set number of electrons.**



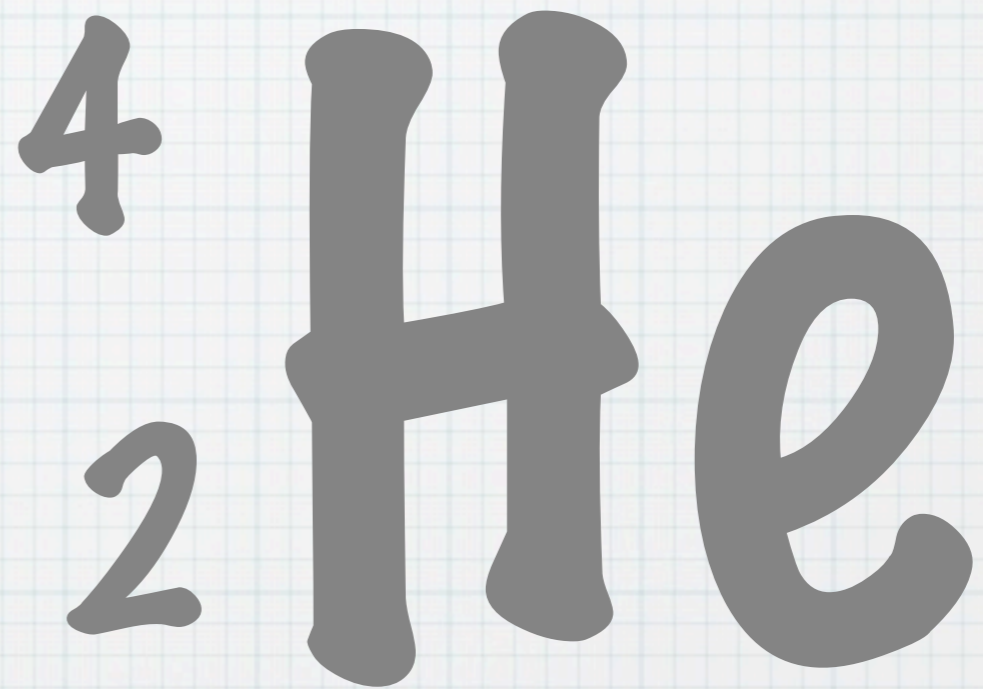
Bohr-Rutherford Diagrams

Subatomic Particles

Particle	Charge	Mass	Location
Proton	+1	1	Nucleus
Electron	-1	nil	Orbits
Neutron	neutral	1	Nucleus

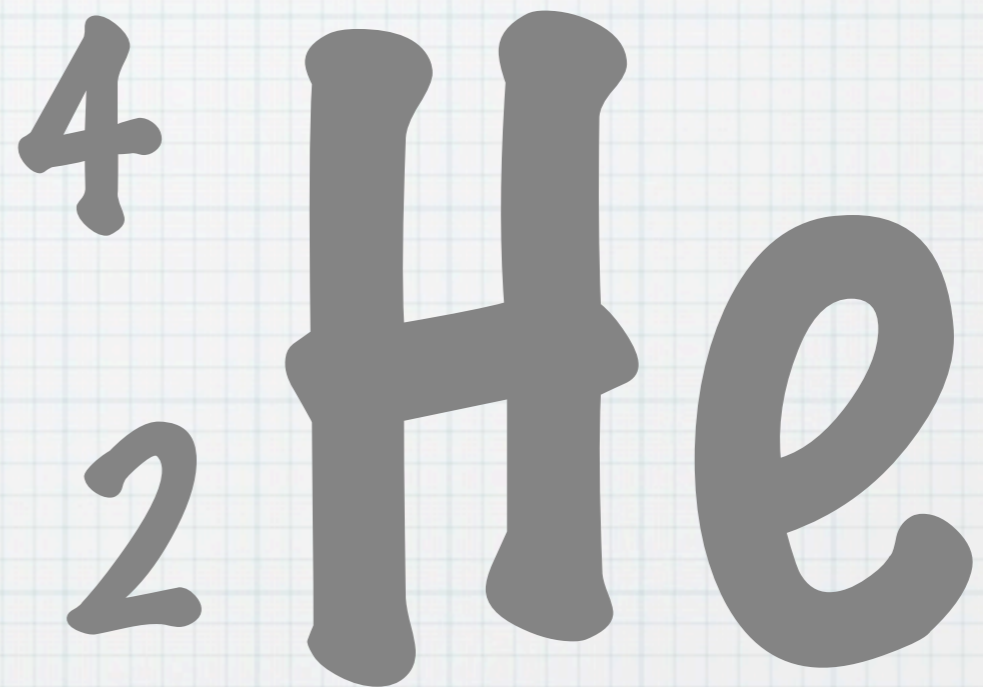
Standard Atomic Notation

- * Mass number: The number of protons and neutrons.
- * Atomic Number: The number of protons in an atom



Standard Atomic Notation

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Atomic number = number of electrons = number of protons
mass number - atomic number = number of neutrons

Electron Configuration

- * Electrons are arranged in Energy Levels or Shells around the nucleus of an atom.
- * first shell: a maximum of 2 electrons
- * second shell: a maximum of 8 electrons
- * third shell: a maximum of 8 electrons

- * There are two ways to represent the atomic structure of an element or compound;
- * 1) Bohr-Rutherford
- * 2) Lewis Dot