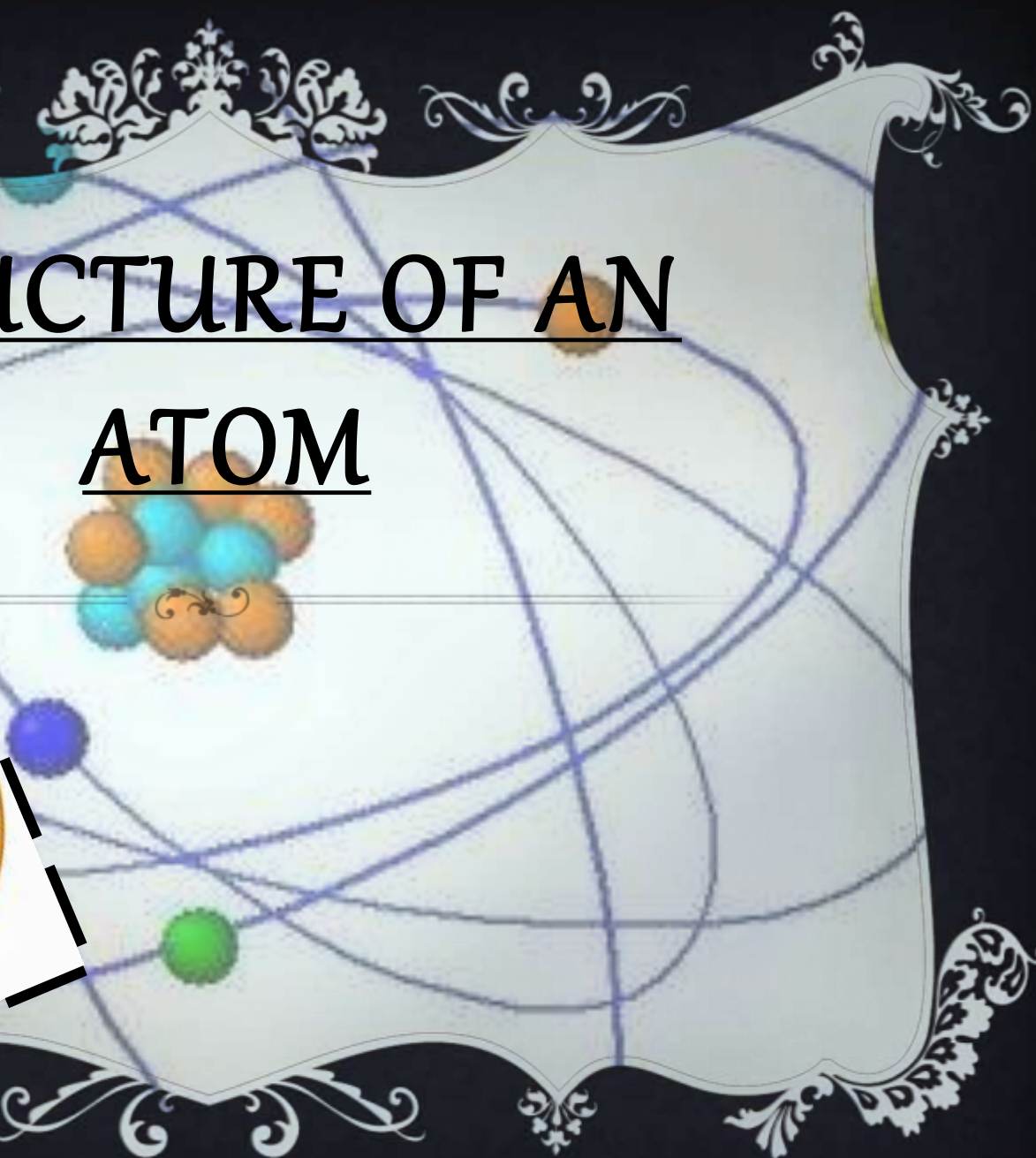


STRUCTURE OF AN ATOM



[ACKNOWLEDGEMENT]

First of all I thank our very respected Smt. Suchitra Kumar Madam, teacher of Science for giving us this opportunity to prepare a PowerPoint Presentation. I also thank our Principal Madam for giving our ma'am enough freedom to assign us with this task as Summer Holiday Homework. Then I thank our computer teacher and librarian sir for giving us ample time to surf the internet and providing us with knowledge by issuing well stocked books from his library respectively. And above all heartiest thanks to my parents who gave me their moral support to complete this assignment.

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HISTORY OF ATOM...

Democritus(460 BC) developed the idea of “ATOM” -----

He pounded up materials in his pestle and mortar and reduced them to smaller and smaller parts which he called --- “ATOMA”



AllPosters

WHAT IS AN ATOM?

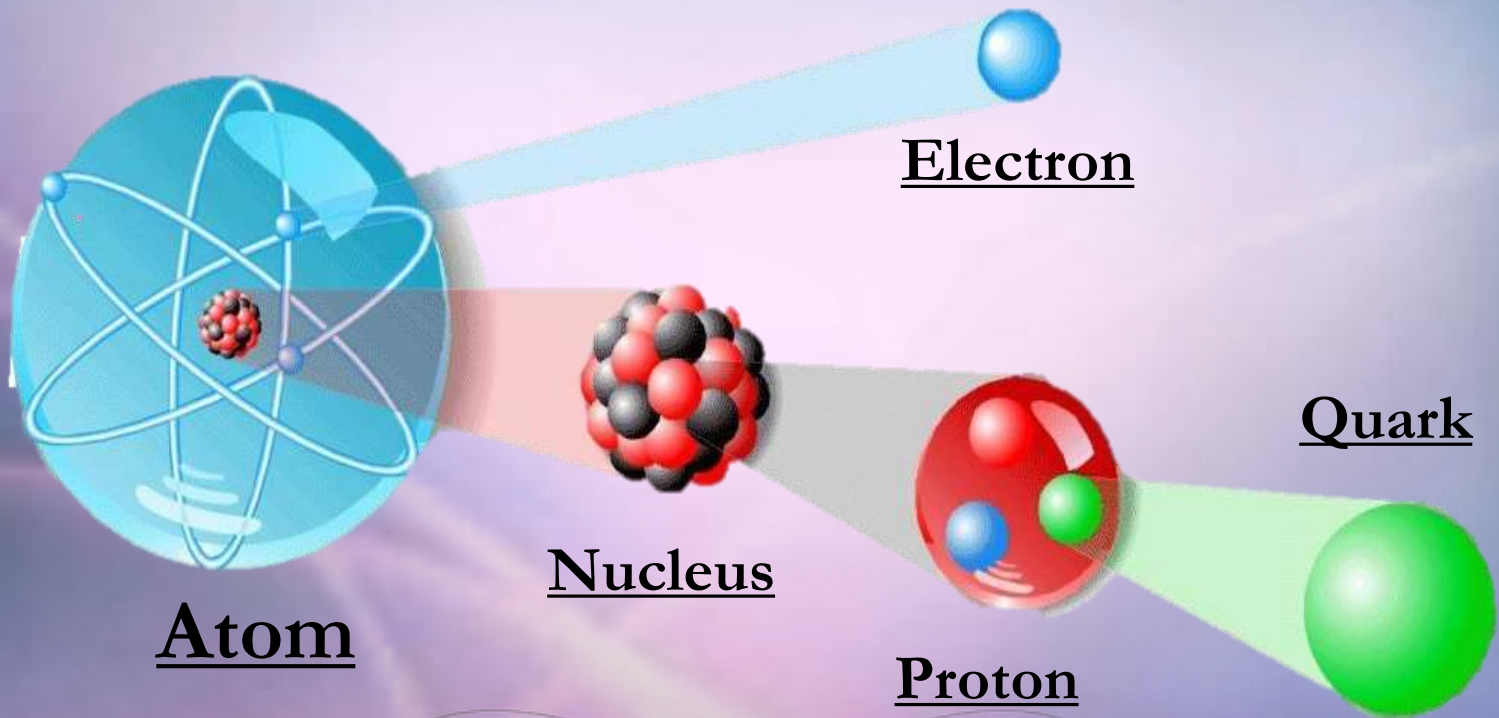
Atom., is a tiny basic building block of matter. All the materials on Earth are composed of various combination of atoms. An atom consist of a cloud of electrons surrounding a small dense nucleus of protons and neutrons.

Atoms are the smallest particle of a chemical element that still exhibit all the chemical properties to that element.

STRUCTURE OF AN ATOM

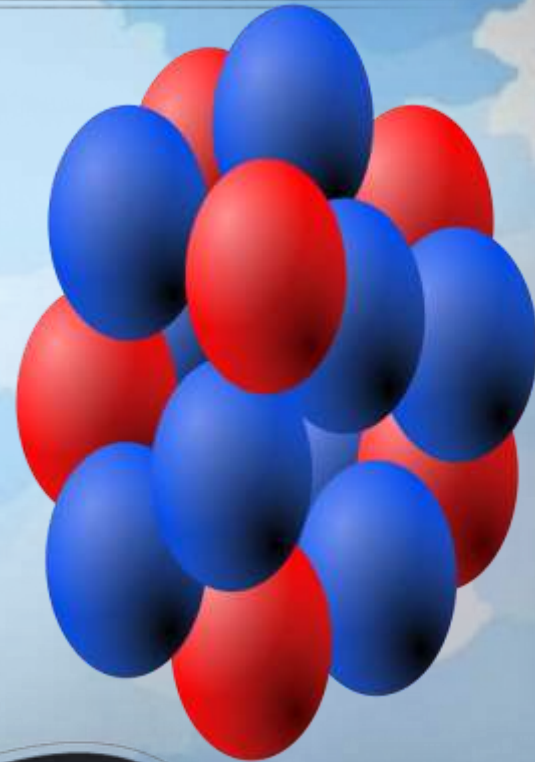
Atoms are made up of smaller particles called electrons, protons and neutrons. Electrons and protons have a property called electric charge which affects the way they interact with each other and with other electrically charged particles.

STRUCTURE OF AN ATOM



THE NUCLEUS...

The nucleus consists of protons and neutrons. The nucleus contains all of the mass of the atom, but, it occupies only a tiny fraction of the space inside the atom. The diameter of a typical nucleus is only about 1×10^{-14} m or about 1/100,000 of the entire atom.

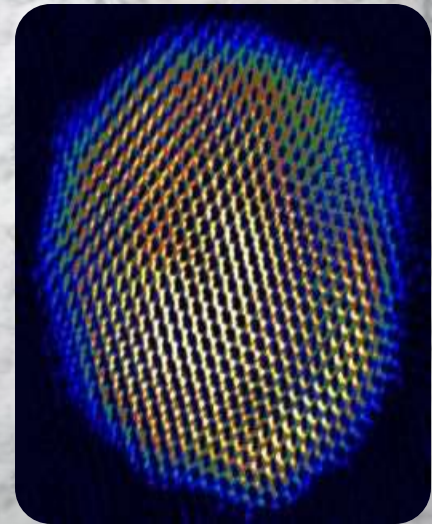


ELECTRONS...

Electrons were discovered by Sir J. J. Thompson.

Electrons are the negatively charged particles of atom. Together, all of the electrons of an atom create a negative charge that balances the positive charge of the protons in the atomic nucleus.

Electrons are extremely small compared to all of the other parts of the atom. The mass of an electron is almost 1,000 times smaller than the mass of a proton. They are found near the nucleus. It has a mass of 9.109×10^{-31} kg.



PROTONS...

Proton was discovered by E. Goldstein.
Protons have a positive electric charge.
A proton's mass is about 1,840 times
that of an electron. The number of
protons in the nucleus determines the
total quantity of protons in the
element.



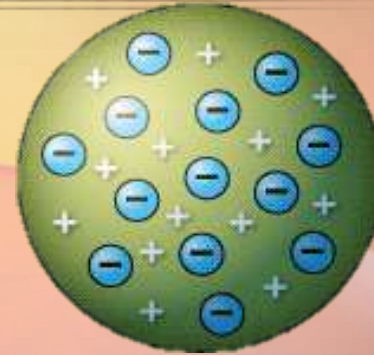
NEUTRONS...

Neutron was discovered by Sir James Chadwick. The neutron is slightly heavier than the proton. They are electrically neutral particles that is part of the nucleus of the atom. The neutron is about 10^{-13} cm and weighs about 1.6749×10^{-27} kg.



[THOMSON'S MODEL OF ATOM]

Thomson proposed the model of atom to be similar to a Christmas pudding. The electrons, in a sphere of positive charge, were like currants(dry fruits) in a spherical Christmas pudding.

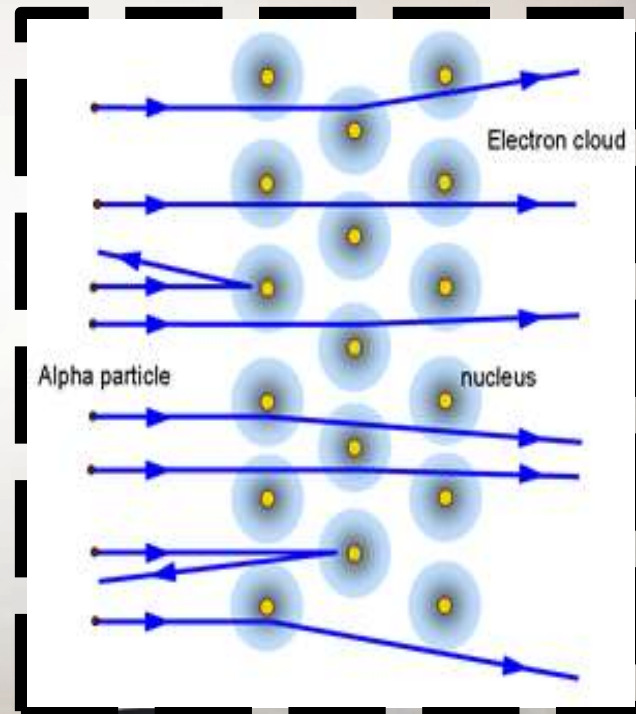


[RUTHERFORD'S MODEL OF ATOM]

An atom consists of a positively charged center in the atom called nucleus. The mass of the atom is contributed mainly by the nucleus.

The size of the nucleus is very small as compared to the atom.

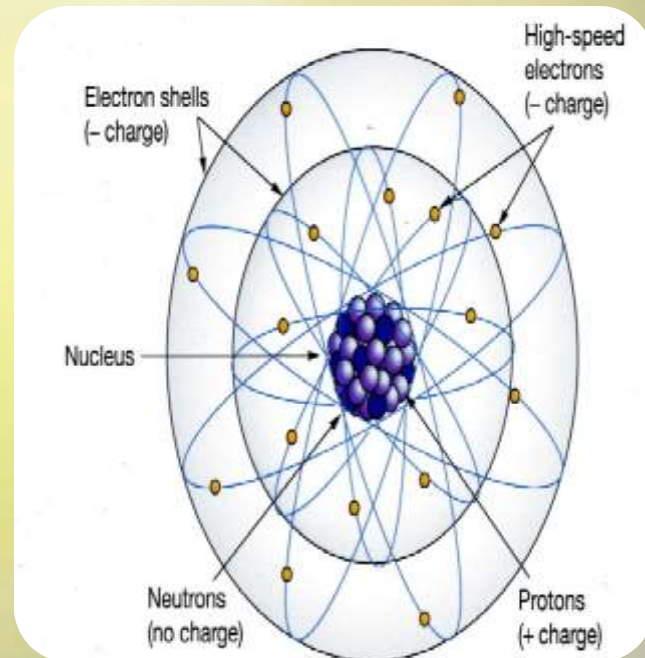
The electrons revolve around the nucleus in well defined orbits.



Scattering of α particles by a gold foil

[BOHR'S MODEL OF ATOM]

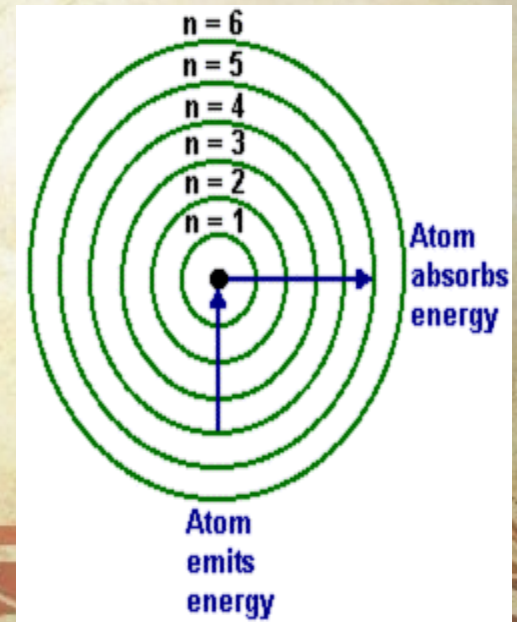
Bohr agreed with most of the points regarding atom as proposed by Rutherford's model of atom, except the revolution of electrons for which he added that there are only certain orbits where electrons revolve inside the atom. While revolving in their discrete orbits they do not radiate energy.



HOW ARE ELECTRONS DISTRIBUTED IN DIFFERENT ORBITS ?

- ✚ The first shell = $2n^2 = 2(1)^2 = 2$
- ✚ The second shell = $2n^2 = 2(2)^2 = 8$
- ✚ The third shell = $2n^2 = 2(3)^2 = 18$
- ✚ The fourth shell = $2n^2 = 2(4)^2 = 32$

And, the distribution of electron in such a manner is called “Electronic Configuration”.



[VALENCY]

Now we know that electrons in an atom are arranged in different shells. The combining capacity of an element is called its valency. In other words, valency is the number of electrons gained, lost or shared to attain chemical stability, i.e. the nearest noble gas configuration. For e.g., sodium has configuration (2,8,1) and tends to gain the configuration of neon, Ne(2,8) by losing an electron. Hence, its valency is 1.

Note: Charges are not associated with valency, i.e. valency is not + or -.

ATOMIC NUMBER & MASS NUMBER

Atomic Number - *The number of protons in an atom is called its atomic number.*

Mass Number - *The total number of protons and neutrons in an atom is called its mass number.*

WRITING A SYMBOL OF AN ELEMENT...

Mass
Number

14

Symbol of
an element

NITROGEN

N

Atomic
Number

7

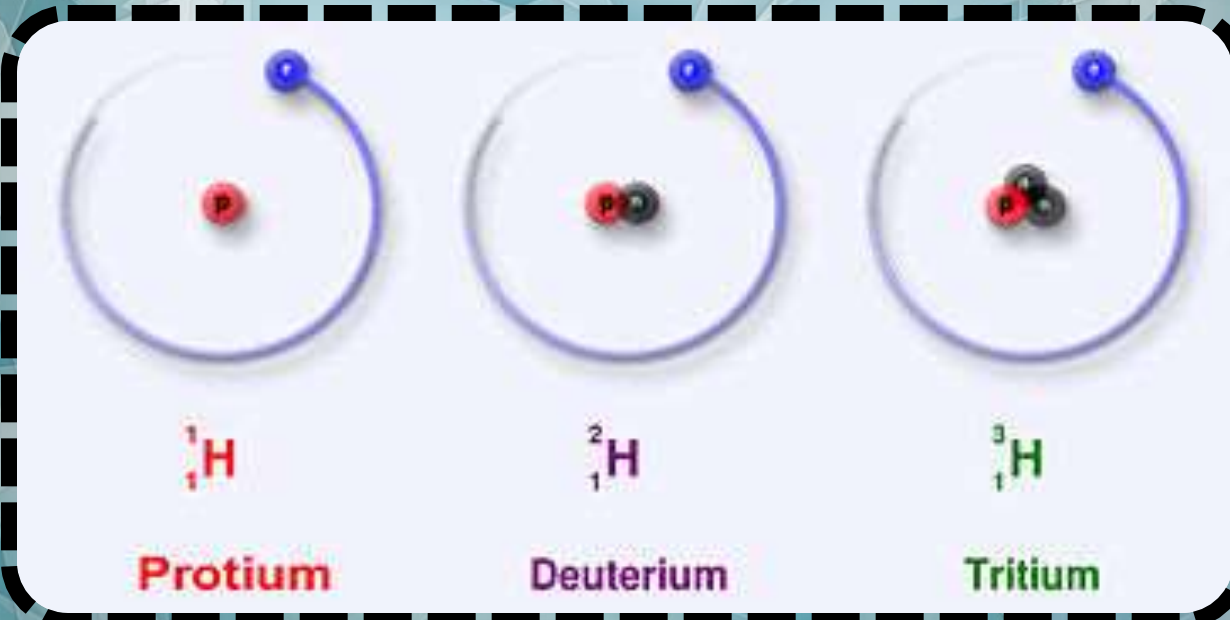


ISOTOPES...

Isotopes, one of two or more species of atoms having the same atomic number, hence constituting the same element, but differing in mass number.

Isotopes of the same element differ from one another only in the numbers of neutrons in their nuclei.

[HYDROGEN ISOTOPES]



Protium

Deuterium

Tritium

ISOBARS...

Atoms of different elements with different atomic numbers, which have the same mass numbers are called isobars. Let us consider two elements – Calcium, atomic number – 20 and argon, atomic number – 18. The number of electrons in these atoms are different but the mass number of both these elements is 40. These are isobars.

[PHOTOSHOP..]



Democritus



John Dalton

[PHOTOSHOP..]



J. J. Thomson



E. Goldstein

[PHOTOSHOP..]



James Chadwick



Ernest Rutherford

[PHOTOSHOP..]



Niels Bohr

The background is a light-colored, slightly textured surface covered with colorful streamers and confetti. The streamers are in shades of purple, yellow, and blue, and the confetti consists of small, multi-colored dots. The entire scene is framed by an ornate, white, scalloped border with intricate floral and scrollwork designs.

Thank You

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Class --- IX C