

## MULTIPLICATION FACTOR or Reproduction factor (K):

It is defined as the ratio of number of neutrons in  $(n+1)^{\text{th}}$  generation to the number of neutrons in  $n^{\text{th}}$  generation.

It is given by,

$$K = \frac{\text{number of neutron in any generation}}{\text{number of neutron in previous generation}}$$

If  $K < 1$ , the chain reaction is dying down or subcritical. This reaction is not sustained chain reaction.

If  $K > 1$ , the chain reaction is building up or supercritical. In this type of chain reaction, the reaction takes place at faster rate.

If  $K = 1$ , the chain reaction is steady or critical.

## **CHAIN REACTION:**

The fission reaction which continues until all the fissionable material is disintegrated is called chain reaction. It is self-propagating reaction.

Example: when  ${}_{92}\text{U}^{235}$  is bombarded with slow neutron ( ${}_0n^1$ ), three additional neutrons are released with emission of about 200MeV energy. These three neutrons strike three other Uranium nuclei, producing 9 neutrons & excess of energy. This process is continued until the whole fissionable material is disintegrated & huge amount of energy is released.

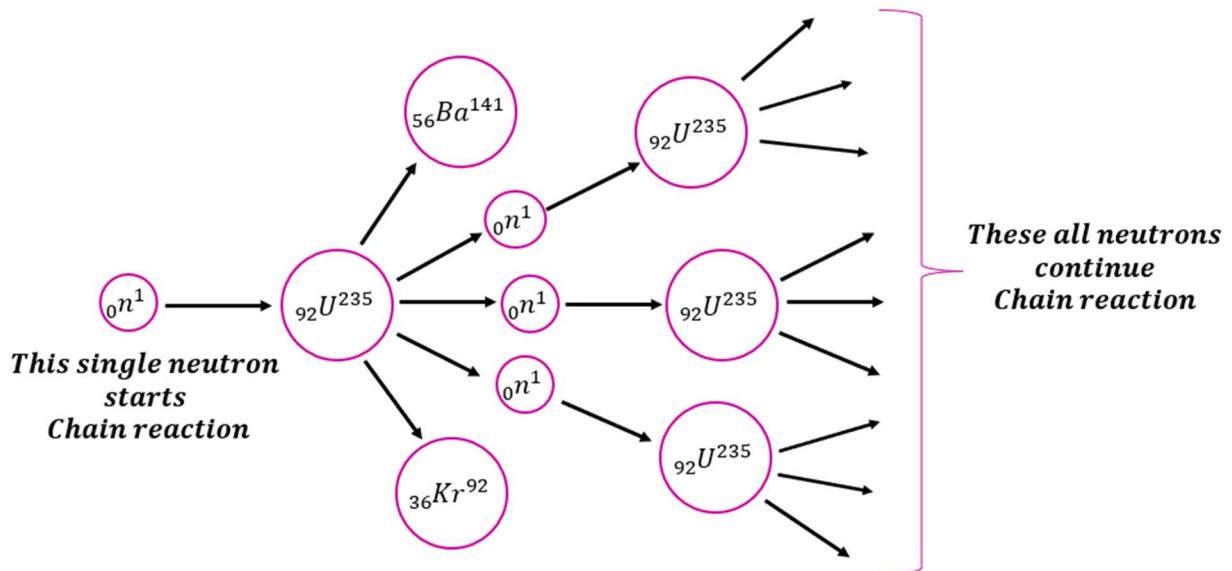
## **TYPES OF CHAIN REACTION:**

### **1. UNCONTROLLED CHAIN REACTION:**

It is a chain reaction in which the energy produced cannot be controlled.

In this reaction, the number of neutrons goes on increasing geometrically & such a reaction proceeds very quickly with the release of huge amount of energy in very short interval of time. So, this reaction is also called explosive chain reaction.

This principle is used in Atom Bomb.



**Figure: Uncontrolled Chain reaction**