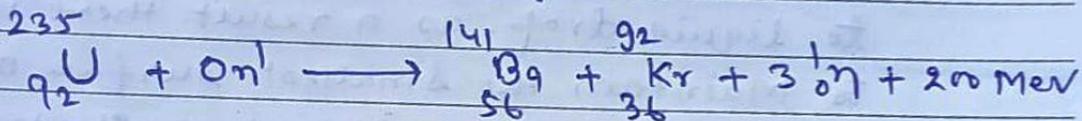
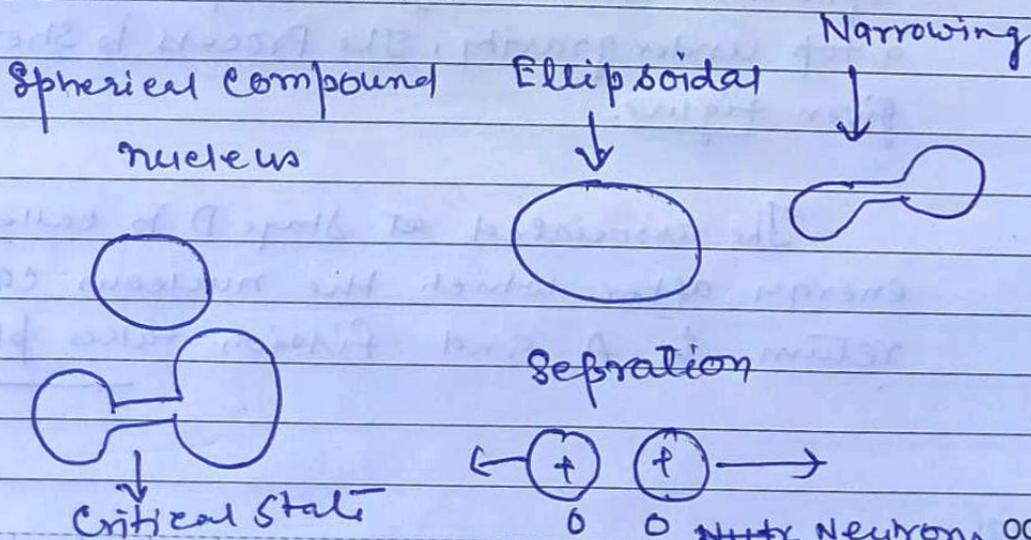


Nuclear Fission

Frisch and Meitner (1939) used the term fission to explain the process which takes place when a heavy nucleus is caused to break down or disintegrate into two (or sometime more) roughly equal parts. Therefore nuclear fission may be defined as the splitting of a nucleus into nearly two equal parts with release of large amount of energy e.g



In this nuclear reaction (discovered by Hahn and Strassmann in 1939) Uranium nucleus is bombarded by slow neutron which causes fission of the ${}_{92}^{235}\text{U}$ and release of about 200 Mev energy. Now it is believed that not only Uranium but other heavy nuclei such as Thorium, Protactinium, Plutonium etc. can also be used for nuclear fission

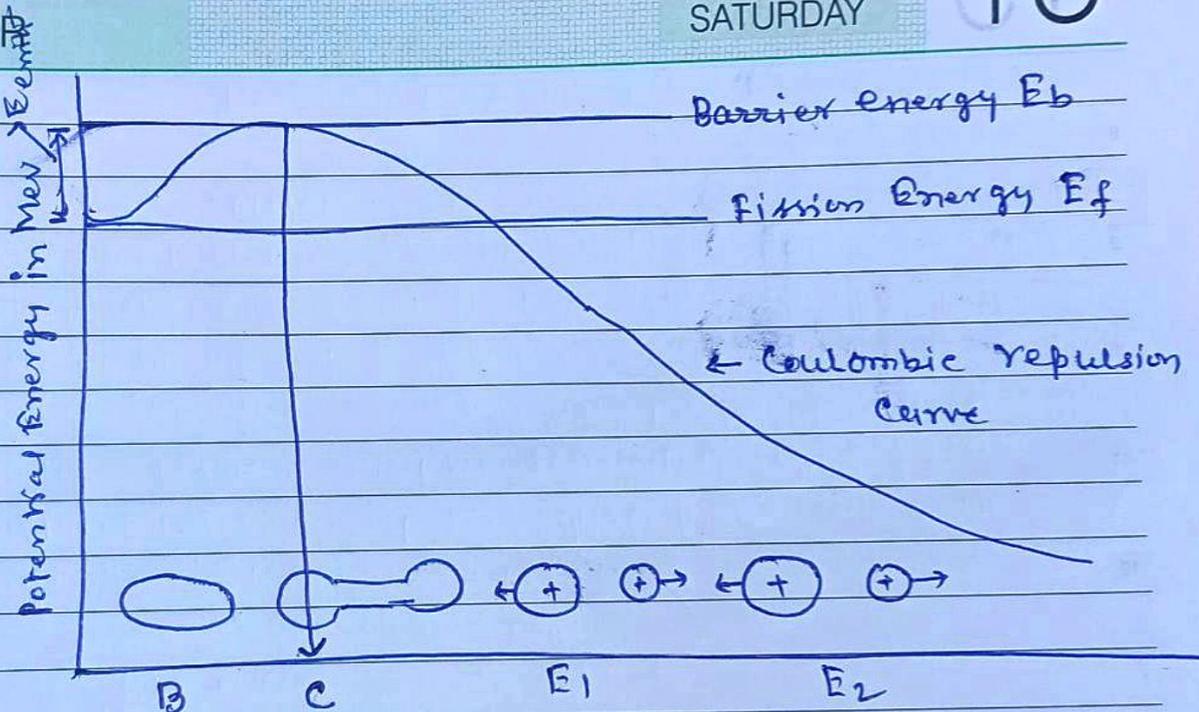


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Theory of Nuclear Fission

Bohr and Wheeler Proposed liquid drop Model to explain nuclear fission. According to them, nucleus of an atom has many similarities to a liquid drop. In an equilibrium state the nuclei of atoms remain spherically symmetric under the action of strong attractive forces (Nuclear forces) which act on all sides on the nuclear volume. The nucleons on surface develop surface tension effects similar to liquid drop. as a result there is a tendency to maintain the smallest surface area which is shortest in case of spherical shape. The Coulomb's repulsive force due to protons generally disturbs the spherical symmetry and distort the nuclear shape specially of large Z number nuclei into an ellipsoid. If forces are large enough the ellipsoid narrows into a 'dumb-bell' shape and finally break at the neck into two major portions with additional small drops as in Plateau's Spherule when liquid drops break away from a top under gravity. The process is shown in the given figure.

The associated at stage D is called critical energy after which the nucleus cannot return to A and fission takes place.



separation of fission fragments

Potential energy curve for fission

← Next Part Rest Pdf →