

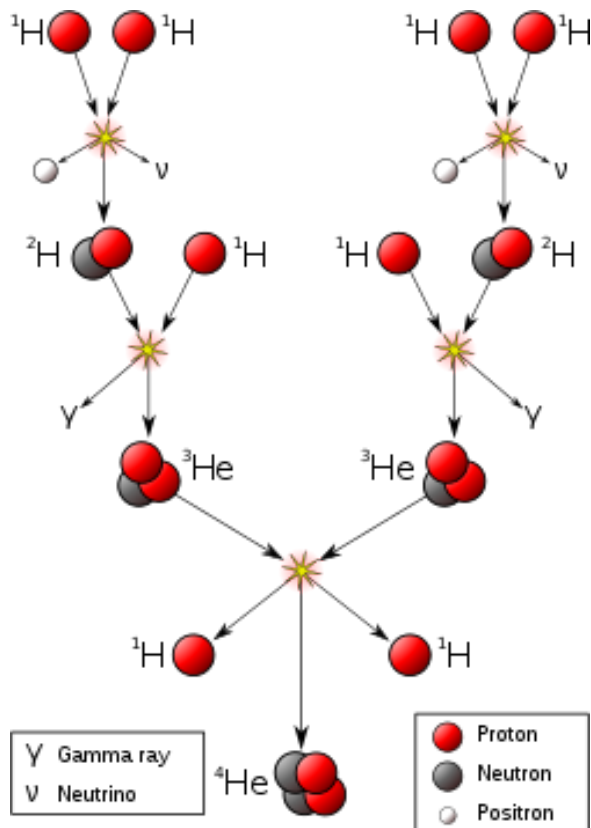
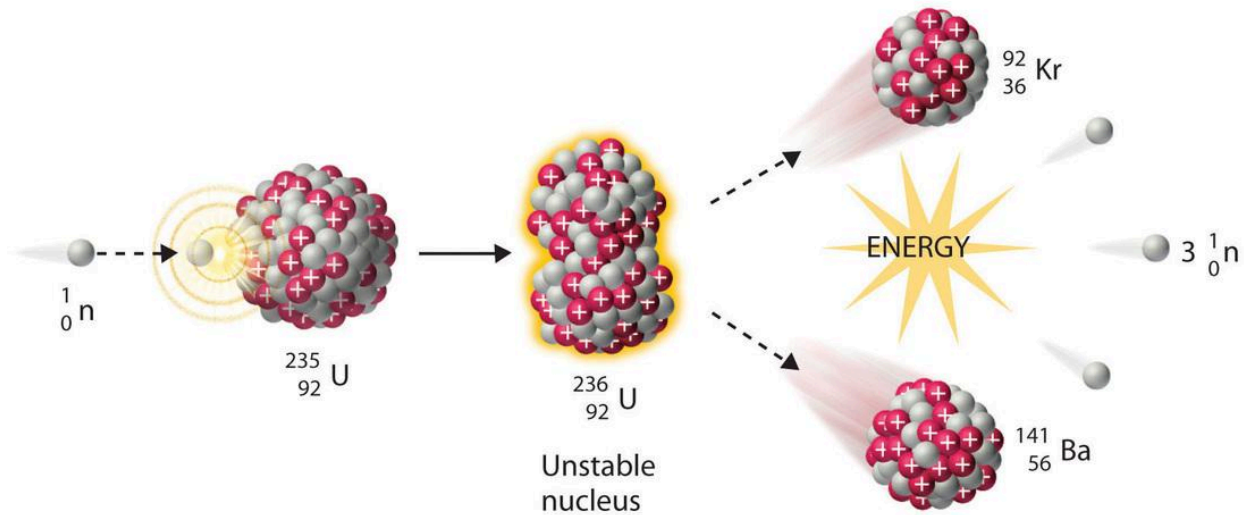
Atomic & Nuclear Physics

Structure

Nuclear Fission

The splitting of a larger nucleus into smaller nuclei (daughter nuclei)

e.g. Nuclear Fission of Uranium-235



Nuclear Fusion

The joining of smaller nuclei into a larger nucleus

e.g. Nuclear Fusion occurring in the Sun

Atomic & Nuclear Physics

Structure

Balancing Nuclear Reactions

- i. Conservation of Atomic Number
- ii. Conservation of Nucleon Number

Nucleon Number is conserved

$$235 + 1 = 142 + 91 + 3 \times 1$$



$$92 + 0 = 56 + 36$$

Atomic Number is conserved

- iii. Conservation of Mass-Energy

$$E = \Delta mc^2$$

- **E** - energy (J)
- **Δm** - change of mass, “*Mass Deficit*” if negative
- **c** - speed of light in a vacuum,
 $c = 3.00 \times 10^8 \text{ ms}^{-1}$
- The mass lost in a nuclear reaction converts into the energy radiated off in the reaction