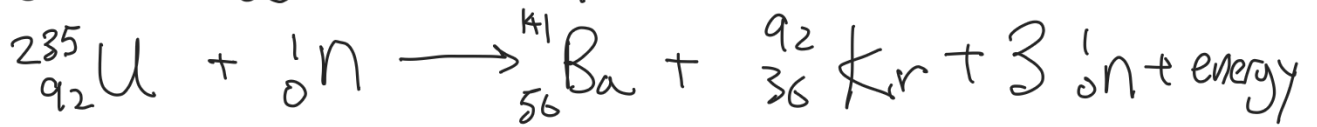


NUCLEAR ENERGY

nuclear fission: a heavy nucleus splits into lighter nuclei



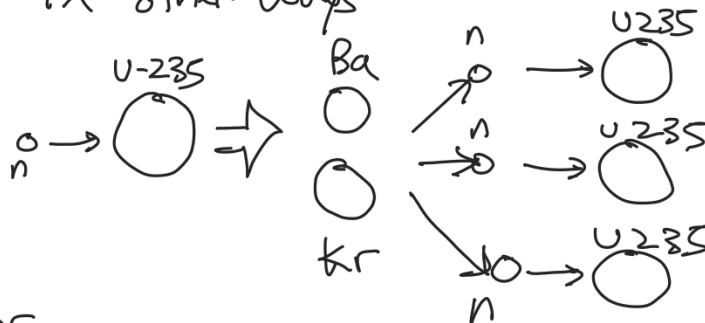
↑
one
slow neutron

↓
3 neutrons

trigger off another U-235
bombardment

U-235 may split in other ways

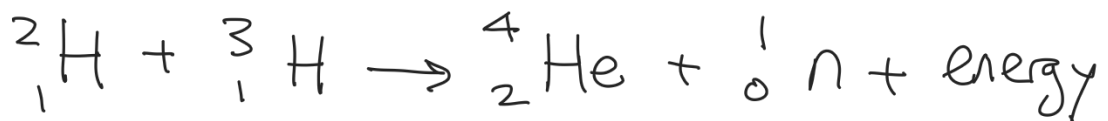
chain reaction



applications: atomic bomb
fission reactor

Concentration of U-235 must be high

nuclear fusion: light nuclei fuse to form a heavier nucleus



must occur at high temp 10^7K to sustain

application: hydrogen bomb

fission reactor ← not yet successful

nature: sun ← fission reaction

Mass Energy Relation

$$E = \underbrace{\Delta m}_{\text{mass defect}} c^2 \quad \text{speed of light}$$

eg. 1g of mass $\Rightarrow E = mc^2$
 $= 0.001 \times (3 \times 10^8)^2$
 $= \underline{\underline{9 \times 10^{13} \text{ J}}}$

Atomic Scale units

Electron Volt (eV): $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$
energy released by one electron across 1V potential

Atomic Mass Unit (or unit)

1u of mass is equivalent to 931 MeV of energy

$$1 \text{ u} = 1.66 \times 10^{-27} \text{ kg}$$

