



# Fundamental Forces and Structure of Matter

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# Fundamental Forces

- Gravitational Force
  - interaction between matter
- Electromagnetic Force
  - interaction between charges
- Weak Nuclear Force
  - “regulation” of nuclear decay
- Strong Nuclear Force
  - “binding” force of matter

# Range of Fundamental Forces

- Gravitational Force
  - infinite
- Electromagnetic Force
  - infinite
- Weak Nuclear Force
  - within nucleus ( $10^{-14}\text{m}$ )
- Strong Nuclear Force
  - within nucleus ( $10^{-14}\text{m}$ )

# Carriers of Fundamental Forces

- Gravitation Force
  - gravitons
- Electromagnetic Force
  - photons (light)
- Weak Nuclear Force
  - $W$ ,  $Z^+$ ,  $Z^-$  bosons
- Strong Nuclear Force
  - mesons & gluons

# Structure of Matter

- Atom consists a nucleus surrounded by an electron cloud.
- The nucleus is made up of protons and neutrons.
- An atom has the same number of electrons and protons.
- Protons and neutrons are made up of smaller particles called quarks.