Atomic Structure of Matter

Periodic table: $\sim$100 elements.
Building blocks of atoms: fundamental particles.

particle	charge	mass
electron	$q_e = -e$	$m_e = 9.109 \times 10^{-31}$kg
proton	$q_p = +e$	$m_p = 1.673 \times 10^{-27}$kg
neutron	$q_n = 0$	$m_n = 1.675 \times 10^{-27}$kg

- SI unit of charge: 1C (Coulomb).
- Elementary charge: $e = 1.602 \times 10^{-19}$C.
- Atomic nuclei (protons, neutron) have a radius of ~ 1fm $= 10^{-15}$m.
- Atomic electron shells have a radius of ~ 1Å $= 10^{-10}$m.
- Atoms are electrically neutral (equal numbers of electrons and protons).
- Ions: atoms with one or several electrons added or removed.
- Isotopes: atoms differing in the number of neutrons.
- Positively (negatively) charged objects have a deficiency (surplus) of electrons.