Nuclear Model of the Atom – Subatomic Particles and Atomic Symbols

Atoms are made from a dense positively charged nucleus surrounded by a cloud of "orbiting" electrons (negative charge). The nucleus is made from protons (positive charge) and neutrons (neutral charge).

NAME	SYMBOL	CHARGE	MASS	LOCATION
proton	p^+	1+	1 u	nucleus
neutron	n	0	1 u	nucleus
electron	e^-	1–	0.00055 u	orbits nucleus

1 u = atomic mass unit = 1.6605×10^{-24} g

Since protons and neutrons have a mass that is about 1836 times greater than an electron, the majority of the mass of an atom is found in the nucleus. Atoms are very small such that a over a billion atoms side by side would fit on a meter stick. The nucleus is VERY small compared to the whole atom. If a nucleus were 1 cm in diameter, the diameter of the atom would be 1 km. Atoms are mostly empty space. (neutron star density is about 2 trillion g/mL)

ATOMIC SYMBOLS

An atomic symbol is a short hand method for identifying the type of atom and how many protons, neutrons (and electrons) are found in that atom.

39 ← **Mass Number** – protons + neutrons

K

19 ← **Atomic Number** – protons (electrons)*

The **Atomic Number** tells you the number of protons in the nucleus decides what type of atom it is. All carbon atoms have six protons in the nucleus. *The number of electrons will be the same as the number of protons only if the atom is neutral.

The **Mass Number** tells you the sum total of protons plus neutrons (nucleons) and therefore also tells you the approximate mass of the atom.

mass number = protons + neutrons