

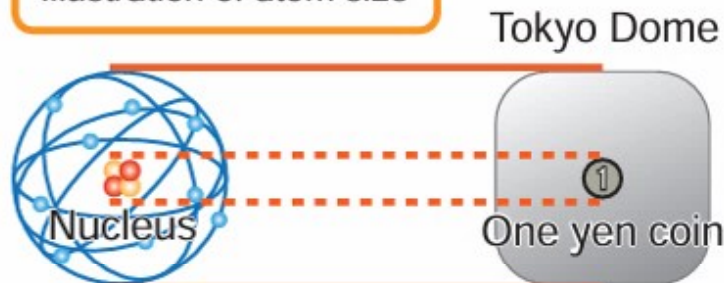
Atoms and nuclear fission

Atoms

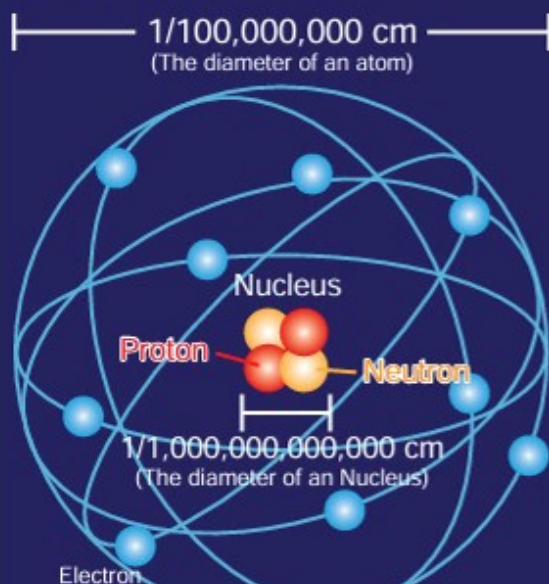
Everything in this universe is made up of combinations of many different kinds of "atoms".

The diameter of an atom is very small, approximately $1/100,000,000$ cm. Atoms are composed of a "nucleus" at the center, which has "electrons" orbiting around it; the nucleus itself is made up of "protons" and "neutrons".

Illustration of atom size



The structure of atoms



In every atom, electrons orbit the nucleus at a distance approximately 10,000 to 100,000 times greater than the size of the nucleus. If the size of the nucleus is scaled to the size of a one yen coin placed at the center of Tokyo Dome, its electrons would be in orbit at approximately the boundary of Tokyo Dome.

Nuclear fission

■ Relation between nuclear fission and nuclear power

Atoms can change into different atoms through a process called "transmutation", and this can happen by, for example, nuclear fission, nuclear fusion, or radioactive decay. The energy released by nuclear transmutation is called "nuclear power".

In particular, "nuclear fission" releases a very large amount of energy. Heavy nuclei, such as uranium, split into two or more lighter nuclei when hit by a neutron (nuclear fission). When this happens, heat and radiation, such as neutrons and gamma rays, are released.

There are two types of uranium: uranium 235, which undergoes nuclear fission easily, and uranium 238, in which nuclear fission is more difficult. Uranium 238 transmutes into plutonium 239 when it absorbs a neutron; plutonium 239 easily undergoes nuclear fission.

