have identified other subatomic particles, but particles other than electrons, protons, and neutrons have little effect on the chemical properties of matter.

Forces in the Nucleus

Generally, particles that have same electric charge repel one another. Therefore, we would expect a nucleus with more than one proton to be unstable. However, when two protons are extremely close to each other, there is a strong attraction between them. A similar attraction exists when neutrons are very close together. *These short-range proton-neutron, proton-proton, and neutron-neutron forces hold the nuclear particles together and are referred to as* **nuclear forces**.

The Sizes of Atoms

It is convenient to think of the region occupied by the electrons as an electron cloud—a cloud of negative charge The radius of an atom is the distance from the center of the nucleus ot the outer portion of this electron cloud. Because atomic radii are so small, they are expressed using a unit that is more convenient for the sizes of atoms. This unit is the picometer. The abbreviation of the picometer ir pm (1 pm = 10^{-12} m= 10^{-10} cm).