As the center of the atom is a nucleus formed from nucleons—protons and neutrons. Each nucleus is made from three quarks held together by their strong interactions, which are mediated by gluons. In turn, the nucleus is held together by the strong interactions between the gluons and quark constituents of nucleons. Nuclear physicists often use the exchange of mesons—particles which consist of a quark and an antiquark, such as the pion—to describe interactions among the nucleons.

In an atom, electrons range around the nucleus at distances typically up to 10,000 times the nuclear diameter. If the electron cloud were shown to scale, this chart would cover a small town.

Chart of the Nuclides

The Chart of the Nuclides presents in graphic form all known nuclei with atomic number, Z, and neutron number, N. Each nuclide is represented by a box colored according to its predominant decay mode. Magic numbers (N or Z = 2, 8, 20, 28, 50, 82 and 126) are indicated by a rectangle on the chart. They correspond to major closed shells and show regions of greater nuclear binding energy.