FISICA - Allegato C
Fisica Nucleare
**Figure 3.13** Schematic diagram of mass spectrograph. An ion source produces a beam with a thermal distribution of velocities. A velocity selector passes only those ions with a particular velocity (others being deflected as shown), and momentum selection by a uniform magnetic field permits identification of individual masses.

**Figure 3.4** The radial charge distribution of several nuclei determined from electron scattering. The skin thickness $t$ is shown for O, Ni, and Pb; its value is roughly constant at 2.3 fm. The central density changes very little from the lightest nuclei to the heaviest. These distributions were adapted from R. C. Barrett and D. F. Jackson, *Nuclear Sizes and Structure* (Oxford: Clarendon, 1977), which gives more detail on methods of determining $\rho(r)$. 
Figure 13.6  Mass distribution of fission fragments from thermal fission of $^{235}$U. Note the symmetry of the heavy and light distributions, even in the small variations near the maxima. From G. J. Dilorio, *Direct Physical Measurement of Mass Yields in Thermal Fission of Uranium 235* (New York: Garland, 1979).
Figure 13.23  Neutron-capture resonance region of $^{238}$U.
Figure 13.24  Schematic representation of processes occurring during a single generation of neutrons. The cycle has been drawn for a reproduction factor $k$ of exactly 1.000.
Figure 13.25 Schematic diagram of boiling-water (top) and pressurized-water (bottom) reactors. The core consists of a number of rods containing pellets of uranium oxide in a metal (zirconium alloy or stainless steel) housing. Control rods of cadmium can be inserted into the core to absorb neutrons and keep the power level stable. The boiling-water reactor is shown driving electrical generating equipment. Many details, including the important emergency core cooling system, are omitted.
**Figure 13.26** Schematic diagram of Canadian deuterium-uranium (CANDU) reactor. A closed system of $\text{D}_2\text{O}$ circulates through the core and then exchanges heat with ordinary water, the steam from which can drive a turbine. The $\text{D}_2\text{O}$ is under pressure to keep it in the liquid state.

**Figure 13.27** Schematic diagram of gas-cooled reactor. Helium gas flows through the core to extract the heat; the helium is then used to produce steam. A detail of the core is shown at right. The fuel elements are in the form of hexagonal rods containing the fissionable material, graphite moderator, and a channel for gas flow. The core is surrounded with a graphite reflector.
Figure 13.28  Schematic diagram of a liquid-sodium-cooled fast breeder reactor. The core may consist of $^{235}\text{U}$ and $^{239}\text{Pu}$, while the blanket contains the fertile $^{238}\text{U}$ that will breed into fissionable material. An intermediate heat exchanger is necessary to keep sodium and water (which react explosively) from simultaneously being present in the reactor core, and also to keep water away from the highly radioactive sodium in the primary loop.