In nuclear physics and nuclear chemistry, a nuclear reaction is a process in which two nuclei, or a nucleus and an external subatomic particle, collide to produce one or more new nuclides. Thus, a nuclear reaction must cause a transformation of at least one nuclide to another.

Boron neutron capture therapy is based on a nuclear reaction between the nonradioactive isotope boron-10 and either low-energy thermal neutrons or high-energy epithermal neutrons, which generate high linear energy transfer α particles and a recoiled lithium nucleus (7 Li) that selectively destroys the DNA helix in tumor cells.